

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 2024. 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 12.14 mSv, and regarding the internal exposure dose, no significant value was measured.

## 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 2023			January 2024			February 2024		
	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	2	2	0	0	0	0	3	3
5-10	0	61	61	0	18	18	0	40	40
1-5	17	522	539	9	380	389	8	489	497
1 or less	1037	6378	7415	984	6457	7441	1036	6434	7470
Total	1054	6963	8017	993	6855	7848	1044	6966	8010
Maximum (mSv)	3.70	10.20	10.20	1.90	8.00	8.00	1.89	12.14	12.14
Average (mSv)	0.08	0.33	0.29	0.06	0.24	0.22	0.07	0.30	0.27

• 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 2023. Two different periods of time are shown in the Table 2: from April 1, 2021 to January 31, 2024 and from April 1, 2021 to February 29, 2024, and Table 3: from April 1, 2023 to January 31, 2024 and from April 1, 2023 to February 29, 2024 for comparison.

**Table 2. Cumulative Exposure Dose for Five Years**

Dose Ranges (mSv)	April 2021 - January 2024			April 2021 - February 2024			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	1	1	0	1	1	0	0	0
20-50	21	922	943	21	955	976	0	33	33
10-20	49	1593	1642	55	1652	1707	6	59	65
5-10	102	1544	1646	98	1573	1671	-4	29	25
1-5	347	2630	2977	355	2647	3002	8	17	25
1 or less	1228	7628	8856	1220	7715	8935	-8	87	79
Total	1747	14318	16065	1749	14543	16292	2	225	227
Maximum (mSv)	30.32	50.62	50.62	30.54	50.62	50.62	-	-	-
Average (mSv)	1.71	4.80	4.47	1.74	4.87	4.54	-	-	-

• 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 2023**

Dose Ranges (mSv)	April 2023 - January 2024			April 2023 - February 2024			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	602	604	3	716	719	1	114	115
5-10	24	1026	1050	25	1100	1125	1	74	75
1-5	153	1940	2093	166	2085	2251	13	145	158
1 or less	1213	6448	7661	1208	6384	7592	-5	-64	-69
Total	1392	10016	11408	1402	10285	11687	10	269	279
Maximum (mSv)	10.60	16.70	16.70	11.69	16.82	16.82	-	-	-
Average (mSv)	0.50	2.12	1.92	0.54	2.26	2.05	-	-	-

• 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.\*<sup>1</sup>

**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 2023			January 2024			February 2024		
	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	1	1	0	0	0	0	0	0
10-20	0	16	16	0	0	0	0	3	3
5-10	0	75	75	0	28	28	0	47	47
1-5	19	628	647	11	471	482	8	536	544
1 or less	1035	6243	7278	982	6356	7338	1036	6380	7416
Total	1054	6963	8017	993	6855	7848	1044	6966	8010
Maximum (mSv)	3.70	20.70	20.70	2.50	9.80	9.80	1.89	12.14	12.14
Average (mSv)	0.09	0.41	0.37	0.07	0.28	0.26	0.07	0.32	0.29

• 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 2023			January 2024			February 2024		
	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	2	2	0	0	0	0	3	3
5-10	0	72	72	0	27	27	0	44	44
1-5	17	537	554	9	397	406	8	537	545
1 or less	1037	6352	7389	984	6431	7415	1036	6382	7418
Total	1054	6963	8017	993	6855	7848	1044	6966	8010
Maximum (mSv)	3.70	11.40	11.40	2.20	8.00	8.00	1.89	12.14	12.14
Average (mSv)	0.09	0.35	0.32	0.06	0.26	0.23	0.07	0.32	0.29

• 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, 2023 to January 31, 2024 and from April 1, 2023 to February 29, 2024 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, 2024 and from April 1, 2021 to February 29, 2024 for comparison.

**Table 7. Equivalent Dose to the Skin**

Dose Ranges (mSv)	April 2023 - January 2024			April 2023 - February 2024			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	3	3	0	3	3	0	0	0
50-75	0	3	3	0	4	4	0	1	1
20-50	0	56	56	0	66	66	0	10	10
10-20	4	812	816	4	912	916	0	100	100
5-10	27	950	977	28	1031	1059	1	81	82
1-5	155	1903	2058	170	2017	2187	15	114	129
1 or less	1206	6289	7495	1200	6252	7452	-6	-37	-43
<b>Total</b>	<b>1392</b>	<b>10016</b>	<b>11408</b>	<b>1402</b>	<b>10285</b>	<b>11687</b>	<b>10</b>	<b>269</b>	<b>279</b>
Maximum (mSv)	12.80	91.40	91.40	13.50	92.13	92.13	-	-	-
Average (mSv)	0.52	2.57	2.32	0.57	2.72	2.46	-	-	-

- 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 2023 - January 2024			April 2023 - February 2024			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	3	710	713	3	822	825	0	112	112
5-10	25	972	997	27	1050	1077	2	78	80
1-5	155	1924	2079	167	2084	2251	12	160	172
1 or less	1209	6410	7619	1205	6329	7534	-4	-81	-85
Total	1392	10016	11408	1402	10285	11687	10	269	279
Maximum (mSv)	10.60	17.10	17.10	11.99	17.10	17.10	-	-	-
Average (mSv)	0.50	2.26	2.05	0.55	2.42	2.19	-	-	-

• 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 2024			April 2021 - February 2024			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	22	1006	1028	22	1049	1071	0	43	43
10-20	52	1602	1654	56	1651	1707	4	49	53
5-10	103	1499	1602	102	1527	1629	-1	28	27
1-5	350	2615	2965	357	2635	2992	7	20	27
1 or less	1220	7596	8816	1212	7681	8893	-8	85	77
Total	1747	14318	16065	1749	14543	16292	2	225	227
Maximum (mSv)	30.51	49.54	49.54	30.73	49.79	49.79	-	-	-
Average (mSv)	1.73	5.00	4.65	1.77	5.08	4.72	-	-	-

• 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.