

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 August 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 August was 11.24 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)	June 2024			July 2024			August 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	0	0	0	0	0	0	1	1
5-10	0	28	28	0	42	42	0	24	24
1-5	18	529	547	16	424	440	14	349	363
1 or less	1024	6201	7225	923	6308	7231	964	6084	7048
Total	1042	6758	7800	939	6774	7713	978	6458	7436
Maximum (mSv)	3.8	7.7	7.7	4.2	9.4	9.4	2.69	11.24	11.24
Average (mSv)	0.08	0.31	0.28	0.08	0.29	0.26	0.07	0.22	0.20

• 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.

### 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 July 31, 2024 and from April 1, 2021 to August 31, 2024, and Table 3: from April 1, 2024 to July 31, 2024 and from April 1, 2024 to August 31, 2024 for comparison.

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

Dose Ranges (mSv)	April 2021 - July 2024			April 2021 - August 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	19	19	0	29	29	0	10	10
20-50	27	1144	1171	27	1154	1181	0	10	10
10-20	60	1770	1830	64	1788	1852	4	18	22
5-10	121	1581	1702	121	1596	1717	0	15	15
1-5	364	2727	3091	367	2760	3127	3	33	36
1 or less	1272	8351	9623	1292	8404	9696	20	53	73
Total	1844	15592	17436	1871	15731	17602	27	139	166
Maximum (mSv)	31.92	57.52	57.52	32.08	58.51	58.51	-	-	-
Average (mSv)	1.86	5.12	4.78	1.87	5.17	4.82	-	-	-

• 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 - July 2024			April 2024 - August 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	0	44	44	0	78	78	0	34	34
5-10	4	349	353	7	441	448	3	92	95
1-5	73	1244	1317	97	1383	1480	24	139	163
1 or less	1174	6487	7661	1199	6477	7676	25	-10	15
Total	1251	8124	9375	1303	8379	9682	52	255	307
Maximum (mSv)	6.3	14.8	14.8	6.60	15.72	15.72	-	-	-
Average (mSv)	0.24	0.87	0.78	0.28	1.01	0.91	-	-	-

• 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)	June 2024			July 2024			August 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	0	0	0	0	0	0	0	0
10-20	0	4	4	0	0	0	0	1	1
5-10	0	66	66	0	51	51	0	25	25
1-5	24	589	613	17	510	527	14	377	391
1 or less	1018	6099	7117	922	6213	7135	964	6055	7019
Total	1042	6758	7800	939	6774	7713	978	6458	7436
Maximum (mSv)	4.5	12.8	12.8	4.2	9.5	9.5	2.69	11.24	11.24
Average (mSv)	0.09	0.38	0.34	0.08	0.33	0.30	0.07	0.23	0.21

• 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 6. Equivalent Dose to the Lens of the Eye**

Dose Ranges (mSv)	June 2024			July 2024			August 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	0	0	0	7	7	0	1	1
5-10	0	48	48	0	41	41	0	25	25
1-5	17	526	543	17	441	458	14	377	391
1 or less	1025	6184	7209	922	6285	7207	964	6055	7019
Total	1042	6758	7800	939	6774	7713	978	6458	7436
Maximum (mSv)	3.8	9.1	9.1	4.2	10.9	10.9	2.69	11.24	11.24
Average (mSv)	0.08	0.33	0.30	0.08	0.30	0.28	0.07	0.23	0.21

• 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 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 July 31, 2024 and from April 1, 2024 to August 31, 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 July 31, 2024 and from April 1, 2021 to August 31, 2024 for comparison.

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

Dose Ranges (mSv)	April 2024 - July 2024			April 2024 - August 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	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	1	1
10-20	0	72	72	0	113	113	0	41	41
5-10	8	447	455	12	537	549	4	90	94
1-5	79	1278	1357	101	1417	1518	22	139	161
1 or less	1164	6327	7491	1190	6311	7501	26	-16	10
<b>Total</b>	<b>1251</b>	<b>8124</b>	<b>9375</b>	<b>1303</b>	<b>8379</b>	<b>9682</b>	<b>52</b>	<b>255</b>	<b>307</b>
Maximum (mSv)	7.1	18.8	18.8	7.30	21.20	21.20	-	-	-
Average (mSv)	0.26	1.02	0.92	0.31	1.17	1.05	-	-	-

- 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 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 - July 2024			April 2024 - August 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	0	85	85	0	128	128	0	43	43
5-10	6	359	365	9	445	454	3	86	89
1-5	76	1229	1305	98	1393	1491	22	164	186
1 or less	1169	6451	7620	1196	6413	7609	27	-38	-11
Total	1251	8124	9375	1303	8379	9682	52	255	307
Maximum (mSv)	6.2	16.7	16.7	6.60	16.7	16.7	-	-	-
Average (mSv)	0.25	0.93	0.84	0.29	1.08	0.98	-	-	-

• 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 - July 2024			April 2021 - August 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	30	30	0	39	39	0	9	9
20-50	28	1236	1264	28	1255	1283	0	19	19
10-20	60	1782	1842	64	1791	1855	4	9	13
5-10	123	1515	1638	123	1531	1654	0	16	16
1-5	368	2713	3081	370	2751	3121	2	38	40
1 or less	1265	8316	9581	1286	8364	9650	21	48	69
Total	1844	15592	17436	1871	15731	17602	27	139	166
Maximum (mSv)	32.78	57.80	57.80	32.81	60.17	60.17	-	-	-
Average (mSv)	1.89	5.36	4.99	1.90	5.40	5.03	-	-	-

• 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.