

Fukushima Daiichi Nuclear Power Station: Am and Cm analysis result in the soil

1. Analysis result

(Unit : Bq/kg·dry soil)

Sampling spot (): Distance from the stack of Unit 1, 2	Data sampling/Analys is organization	Pu-238 ^{*1}	Pu-239 ^{*1} Pu-240 ^{*1}	U-234 ^{*2}	U-235 ^{*2}	U-238 ^{*2}	Am-241	Cm-242	Cm-243 Cm-244
Playground (west-northwest approx. 500m)	May 16 Japan Chemical Analysis Center	(1.3 ± 0.13) × 10 ⁻¹	(6.5 ± 0.86) × 10 ⁻²	(1.4 ± 0.08) × 10 ¹	(5.2 ± 1.0) × 10 ⁻¹	(1.5 ± 0.09) × 10 ¹	N.D.	(1.5 ± 0.08) × 10 ⁰	(9.0 ± 1.3) × 10 ⁻²
Near the industrial waste disposal plant (south-southwest approx. 500m)		(3.8 ± 0.60) × 10 ⁻²	(1.8 ± 0.41) × 10 ⁻²	(7.5 ± 0.48) × 10 ⁰	(5.4 ± 1.1) × 10 ⁻¹	(7.0 ± 0.45) × 10 ⁰	N.D.	(7.2 ± 0.38) × 10 ⁻¹	(2.2 ± 0.51) × 10 ⁻²
Playground (west-northwest approx. 500m)	May 23 Japan Chemical Analysis Center	(1.5 ± 0.13) × 10 ⁻¹	(5.9 ± 0.77) × 10 ⁻²	(1.4 ± 0.06) × 10 ¹	(7.5 ± 1.0) × 10 ⁻¹	(1.4 ± 0.06) × 10 ¹	(1.6 ± 0.47) × 10 ⁻²	(1.7 ± 0.07) × 10 ⁰	(1.0 ± 0.12) × 10 ⁻¹
Near the industrial waste disposal plant (south-southwest approx. 500m)		(1.0 ± 0.11) × 10 ⁻¹	(4.1 ± 0.64) × 10 ⁻²	(4.8 ± 0.34) × 10 ⁰	(3.3 ± 0.82) × 10 ⁻¹	(5.3 ± 0.37) × 10 ⁰	(2.1 ± 0.49) × 10 ⁻²	(1.3 ± 0.06) × 10 ⁰	(9.3 ± 1.1) × 10 ⁻²
Average nuclide density ratio of fuel in Units 1 to 3 (ratio in case the ratio of Pu-238 is considered as 1) ^{*3}		1	-	-	-	-	0 . 1	1 0	1

*1 : Released on June 4, 2011 *2 : Released on June 25th, 2011 *3 : Values calculated by ORIGEN Code (round number)

2. Evaluation

Detected Am and Cm are considered to derive from the accident due to following reasons.

- Cm-242, Cm-243 and Cm-244 are nuclides that do not exist in the natural world. In particular, Cm-242 whose half-life is relatively short (approximately 160 days) was detected.
- The density ratio of each nuclides (Am-241/Cm-242/Cm-243, Cm-244) to Pu-238 in the sample , , and is almost the same as the average nuclide density ratio of fuel in Units 1 to 3.

Pu-238 in the sample : (Am-241/Cm-242/Cm-243,Cm-244) 1 : (- /12/0.7)
Pu-238 in the sample : (Am-241/Cm-242/Cm-243,Cm-244) 1 : (- /19/0.6)
Pu-238 in the sample : (Am-241/Cm-242/Cm-243,Cm-244) 1 : (0.1/11/0.7)
Pu-238 in the sample : (Am-241/Cm-242/Cm-243,Cm-244) 1 : (0.2/13/0.9)

END