



French Non Governmental Organization for Radioactivity Control

Independent laboratory of radioactivity analysis

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Analysis Report

RAP110802-OCJ(01)-v1

ANALYSIS

Evaluation of consequences in Japan caused by the Fukushima nuclear power plant accident

Object : Radiotoxicology analysis (2nd campaign)

REPORT ID

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comment(s) :

SAMPLES TYPES

CHILDREN URINES

QUANTITY

from **18** children

received in May, July and August 2011

ANALYSES PERFORMED

MEASUREMENT OF GAMMA EMITTERS RADIONUCLIDES BY GAMMA SPECTROMETRY

SEARCH FOR ARTIFICIAL NUCLIDES

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1. RESULTS 1/3 : FOLLOWING OF RADIOACTIVITY CONTAMINATION IN URINES OF 10 CHILDREN FROM FUKUSHIMA CITY (2 CAMPAIGNS)

Sample No	Type	Sex / Age	First campaign 19-21 May 2011 Bq/L		Second campaign 23-25 July 2011 Bq/L	
			Cs-134	Cs-137	Cs-134	Cs-137
U-1	Urine	Male / 9	1.04 ± 0.26	1.22 ± 0.28	0.44 ± 0.18	0.70 ± 0.20
U-2	Urine	Male/ 16	0.76 ± 0.21	0.78 ± 0.22	0.74 ± 0.25	0.87 ± 0.27
U-3	Urine	Male / 6	0.76 ± 0.27	0.62 ± 0.23	< 0.42	< 0.5
U-4	Urine	Female / 8	0.41 ± 0.20	0.43 ± 0.19	< 0.30	< 0.33
U-5	Urine	Female / 9	0.91 ± 0.23	0.93 ± 0.23	0.43 ± 0.19	0.46 ± 0.17
U-6	Urine	Male / 6	0.80 ± 0.27	0.88 ± 0.27	< 0.27	0.40 ± 0.17
U-7	Urine	Male / 7	1.00 ± 0.27	1.30 ± 0.30	0.39 ± 0.18	0.40 ± 0.19
U-8	Urine	Female / 8	1.13 ± 0.34	1.19 ± 0.35	0.56 ± 0.24	0.46 ± 0.22
U-9	Urine	Female / 8	0.70 ± 0.20	0.90 ± 0.22	0.54 ± 0.19	0.57 ± 0.18
U-10	Urine	Male / 13	1.06 ± 0.29	1.22 ± 0.30	0.60 ± 0.19	0.73 ± 0.20

2. RESULTS 2/3 : RADIOACTIVITY CONTAMINATION IN URINES OF OTHER 5 CHILDREN FROM THE PREFECTURE OF FUKUSHIMA (1 CAMPAIGN)

Sample No	Type	Sex / Age	23-26 July 2011 Bq/L	
			Cs-134	Cs-137
U-11	Urine	Male / 17	1.82 ± 0.31	1.65 ± 0.30
U-12	Urine	Male/ 18	0.34 ± 0.18	0.37 ± 0.18
U-13	Urine	Male / 18	0.37 ± 0.18	0.45 ± 0.19
U-14	Urine	Female / 11	0.30 ± 0.17	< 0.34
U-15	Urine	Female / 11	0.37 ± 0.17	< 0.33

3. RESULTS 3/3 : RADIOACTIVITY CONTAMINATION IN URINES OF 3 CHILDREN FROM OTHER PREFECTURES (1 CAMPAIGN)

Sample No	Type	Sex / Age	place	date	July 2011 Bq/L	
					Cs-134	Cs-137
110719-OCJ-01	Urine	Male / 9	Tokyo	13-15 July 2011	< 0.3	< 0.3
110719-OCJ-01	Urine	Male/ 16	Kawazaki	13-15 July 2011	< 0.6	< 0.6
110719-OCJ-01	Urine	Male / 6	Yokosuka, Kamogawa, Chiba	14-19 July 2011	< 0.2	< 0.2

APPENDIX 1

ANALYSIS	GAMMA
TITLE	Measurement of gamma emitters nuclides by gamma spectrometry
TREATMENT	The urine sample is homogenized. The whole part is taken to be conditioned in a geometry adapted to the gamma measurement.
MATERIAL	High-Purity Germanium (HPGe), type N coaxial , 32% efficiency, mounted in a vertical cryostate. The samples are placed in a 10-cm thick lead shielding. Data are readout by a digital acquisition system (DSPEC-ORTECH). The energy range is taken as 27-2000 keV. The containers are standard geometries of 500ml (SG500).
UNITS	The measured quantity is the activity in becquerel (Bq) per liter (L)

RESULTS

IN GENERAL	<p>Measurements are performed with identical geometries as those of the standard (calibrated) sources. They concern gamma-emitters radionuclides displaying one or several emission peaks within the reference energy range. Among all the radionuclides detected in the samples, only the most abundant are displayed in the tables, without any specific demand from the client. In all cases, the tables display at least all detected artificial radionuclides.</p> <p>Only elements with activity larger than the decision threshold are given. On the contrary, for the specified radionuclides, the value of detection limits is indicated, with the inferior "<" sign. When it is not possible to deduce a satisfying detection limit LD, the data are replaced by the sign "-". When an element has been detected but cannot be quantified properly, the mention "Identified but Not Quantified" (INQ) is reported. The measured activity of each radioelement is given with its absolute uncertainty calculated within a 95% interval of confidence (2 times the standard deviation). Each expressed activity, including the detection limit, is calculated at the reference date indicated in the table (collection date and time).</p>
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APPENDIX 2

INFORMATION ABOUT THE LABORATORY ACRO	
Measurements capacities	The ACRO laboratory can measure radon concentration in the air, tritium (HTO) in liquids and gamma radionuclides in all kind of matrices. Other measurements are under development. The measurement protocols are in accordance to the actual French and International standards (ISO/CEI 17025).
QUALIFICATION	
The laboratory is qualified for radioactivity measurements in the environment by the French nuclear safety authority (ASN)	
DEP-DEU-0704-2009	- Measurement of gamma-emitters radionuclides in biological matrices - Tritium measurement in waters
CODEP-DEU-2010-031543	- Measurement of gamma-emitters radionuclides in waters - Uranium isotopes in soils - Thorium isotopes in soils - Radium-226/228 and decaying partners in soils.
CODEP-DEU-2011-031763	- Measurement of gamma-emitters radionuclides in soils