



Association pour le Contrôle de la Radioactivité dans l'Ouest

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# Analysis Report

RAP110606-OCJ(01)-v1

## ANALYSIS

**Object : Evaluation of the environmental consequences in Japan caused by the Fukushima nuclear power plant accident**

## REPORT ID

**RAP110426-OCJ-EN** FROM : June, the 6<sup>th</sup> 2011 version : 01

Number of pages : 3 (including appendix)

comment(s) :

## SAMPLES TYPES

ENVIRONMENT MATRICES (SOILS)

## QUANTITY

2 Samples

received : 05/31/2011

## ANALYSES PERFORMED

MEASUREMENT OF GAMMA EMITTERS RADIONUCLIDES BY GAMMA SPECTROMETRY

SEARCH FOR ARTIFICIAL NUCLIDES

## VISA

Mylène JOSSET, Analysis supervisor

## 1. SAMPLES IDENTIFICATION

Reception date: May 31, 2011

The samples were collected by Japanese citizens according to the regular instructions and methodology provided by ACRO. The samples characteristics are given in the table below.

N°	Nature	Collection Date (local)	Location	Origin	Mass/Volume collected	References
24	Soil	25 May 2011 9:25	3-7 Sinsuna Koutou-Ku Tokyo 東京都江東区新砂3丁目7	Ground beside Tobu Sludge Plant 東部スラッジプラント 横、運動場	320 g	110530-OCJ-24
25	Soil	25 May 2011 15:00	9-2 Ohshima Koutou-Ku Tokyo 東京都江東区大島9丁目2	Ohshima Komatugawa Park 大島小松川公園わんさ か広場	404 g	110530-OCJ-25

## 2. ANALYSIS METHOD

The analyses are performed by Gamma spectrometry (see annex 1). The results are displayed in the following tables.

## 3. RESULTS – ACTIVITY FOR SOILS SAMPLE (Bq/kg)

Sample identification		110530-OCJ-24	110530-OCJ-25
Samples number registration		110530-OCJ-24	110530-OCJ-25
Kind - species		Soil	Soil
<b>Sample</b>			
Date		05.25.2011 9:25 AM	05.25.2011 3:00 PM
Place		3-7 Sinsuna Koutou-Ku Tokyo 東京都江東区新砂3丁目7	9-2 Ohshima Koutou-Ku Tokyo 東京都江東区大島9丁目2
Localisation		Ground beside Tobu Sludge Plant 東部スラッジプラント横、運動場	Ohshima Komatugawa Park 大島小松川公園わんさか広場
<b>Counting</b>			
Geometry or volume (cm <sup>3</sup> )		61	61
analysed sample mass (g)		75.0	61.2
state analysed		raw	raw
<b>Result</b>			
Reference date		05.25.2011 9:25 AM	05.25.2011 3:00 PM
Unit		Bq/kg	Bq/kg
<b>ARTIFICIALS RADIONUCLIDES</b>			
<b>Te-129m</b>	33,6 days	< 33	<b>580 ± 190</b>
<b>I-131</b>	8 days	<b>45 ± 16</b>	<b>171 ± 29</b>
<b>Cs-134</b>	2,1 years	<b>1,780 ± 210</b>	<b>2,850 ± 330</b>
<b>Cs-136</b>	13,2 days	< 14	<b>27 ± 8</b>
<b>Cs-137</b>	30 year	<b>1,920 ± 230</b>	<b>3,050 ± 360</b>

## APPENDIX 1

ANALYSIS	GAMMA
TITLE	<b>Measurement of gamma emitters nuclides by gamma spectrometry</b>
TREATMENT	The raw sample is homogenised. A representative 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 plastic round boxes with a fiducial volume of 61ml (ref. 7215) and standard geometries of 500ml.
UNITS	The measured quantity is the activity in becquerel (Bq) per kilogram of raw material (raw kg), in becquerel (Bq) per liter (L) and becquerel (Bq) per squared meter (m2)

## RESULTS

IN GENERAL	<p>Measurements are performed with identical geometries as thoses 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 detection limit –LD- (detection limit) is indicated, with the inferior “&lt;” 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)	
Décision n°DEP-DEU-0704-2009 du 8/12/09 De l’Autorité de Sûreté Nucléaire	<ul style="list-style-type: none"> <li>- Measurement of gamma-emitters radionuclides in biological matrices</li> <li>- Tritium measurement in waters</li> </ul>
Décision n°DEP-DIS-346-2008 de l’Autorité de Sûreté Nucléaire	<ul style="list-style-type: none"> <li>- Radon concentration (volume activity) in public places</li> </ul>
Décision n°CODEP-DEU-2010-031543 du 15/06/10 de l’Autorité de Sûreté Nucléaire	<ul style="list-style-type: none"> <li>- Measurement of gamma-emitters radionuclides in waters</li> <li>- Uranium isotopes in soils</li> <li>- Thorium isotopes in soils</li> <li>- Radium-226/228 and decaying partners in soils.</li> </ul>