



Association pour le Contrôle de la Radioactivité dans l'Ouest
Independent laboratory of radioactivity analysis


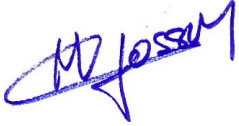
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Analysis Report

RAP111207-OCC(01)-v1

Page 1 / 3

DEMAND	
	SOUTH KOREA NGO « SAVE CHILD »
REPORT ID	
IDENTIFICATION	RAP111207-OCC(01)-v1
DATE	December 7th, 2011
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SAMPLES	
	Wall paper sample
ANALYSES REALISEES	
TYPE	MEASUREMENT OF GAMMA EMMITERS RADIONUCLIDES BY GAMMA SPECTROMETRY SEARCH FOR NATURAL AND ARTIFICIAL NUCLIDES

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1. RESULTS

1.1 Mass activity of wall paper

Sample Identification				
Identification number		111205-OCC-01		
Type / Species		Wall paper		
COUNTING				
Counting number		6991		
Counting time (s)		10455		
Sample mass analysed (g)		18.6		
date		11/12/07		
Analysed state		raw		
Analysed density		0.3		
RESULTS				
Reference date		11/12/07		
Unit		Bq/kg		
ARTIFICIAL RADIONUCLIDES				
<i>No artificial nuclides detected</i>				
NATURAL RADIONUCLIDES				
234Th	Thorium-234	ch. 238U	1,010	± 400
226Ra	Radium-226	ch. 238U	1,360	± 200
214Pb	Lead-214	ch. 238U	970	± 110
214Bi	Bismuth-214	ch. 238U	1,000	± 140
210Pb	Lead-210	ch. 238U	850	± 180
228Ac	Actinium-228	ch. 232Th	8,000	± 800
212Pb	Lead-212	ch. 232Th	7,800	± 700
212Bi	Bismuth-212	ch. 232Th	8,000	± 900
208Tl	Thallium-208	ch. 232Th	2,670	± 260
235U	Uranium-235	ch. 235U	62	± 9

APPENDIX 1

ANALYSIS	
TITLE	Measurement of gamma emitters nuclides by gamma spectrometry
TREATMENT	A representative sample 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-ORTEC). The energy range is taken as 27-2000 keV. The containers are normalized geometries with volumes of 500ml (SG500), 300ml (round boxes) and 50 ml (SG50), adapted to the available quantity.
UNITS	The measured quantity is the mass activity in Becquerel (Bq) per kilogram (kg).
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 detection limit –LD- (detection limit) 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>

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 and quality procedures standards (ISO/CEI 17025).
QUALIFICATION	
The laboratory is qualified for radioactivity measurements in the environment by the French nuclear safety authority (ASN)	
Agreements :	
DEP-DEU-0704-2009	<ul style="list-style-type: none"> - Measurement of gamma-emitters radionuclides in biological matrices - Tritium measurement in waters
CODEP-DEU-2010-031543	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Measurement of gamma-emitters radionuclides in soils