

SUMMARY OF MEMBER STATE REPORTS

UNSCEAR 2013 Report, Annex A, Levels and effects of radiation exposure due to the nuclear accident after the 2011 great east-Japan earthquake and tsunami, Appendix C (Assessment of doses to the public)

Contents

Twenty-five Member States provided, on request, relevant data directly to the Committee. This included information on radionuclides detected in air samples and in imported and locally produced foods, internal dosimetry measurements on their citizens who were in Japan at the time of the accident, and analyses of environmental samples. This attachment provides an overview of the information reported by these Member States.

Notes

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

© United Nations, December 2014. All rights reserved, worldwide.

This publication has not been formally edited.

Table 1. Summary of data submitted by Member States

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Argentina			Whole-body counting for gamma emitters and fixed position thyroid monitoring for ^{131}I for 20 returning Argentine citizens who had lived in Japan mid to late March 2011 at distances of 150 to 500 km from FDNPS ^a . All measurement results were negative.			
Australia		Over 700 imported foodstuffs tested for ^{131}I , ^{134}Cs and ^{137}Cs . No positive detections for ^{131}I . 92 samples tested positive for ^{137}Cs and 65 for ^{134}Cs . Highest activity concentration was measured in Sep-2011 in green tea (335 Bq/kg and 238 Bq/kg for ^{137}Cs and ^{134}Cs , respectively).	Whole-body measurements for gamma emitters on a family of four living 60 km NW of FDNPS during and after the accident returned negative test results. ^{134}Cs and ^{137}Cs detected in urine sample of all family members at maximum activity concentration of 0.381 and 0.475 Bq/L, respectively.			
Belarus	119 air samples collected from mid-March to mid-April 2011. All results reported ^{131}I (particulate) specific activity. All 7 sites showed elevated levels from late March 2011 to early April 2011.			Gamma dose rate readings by GM tube in all sampling sites showed no trend towards elevated levels over the same sampling periods.		

^a FDNPS: Fukushima-Daiichi Nuclear Power Station

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Belgium	108 air samples from 20 March 2011 to 26 April 2011 (8 locations). Although ^{137}Cs and ^{134}Cs were sometimes detected, most of the detections were for ^{131}I . ^{131}I levels were mostly elevated around the end of March 2011 to the beginning of April 2011.				30 ground deposition samples from various locations (28 February 2011 to 26 April 2011). Samples were of total deposit, rain water and deposit on grass. Positive detection of ^{131}I occurred from late March 2011. Some ^{137}Cs was also detected on grass.	
Brazil		Radionuclides: ^{131}I , ^{134}Cs and ^{137}Cs . Types of samples: candies, chewing gum, biscuits, teas, spices, noodles, dried fish. Number of analyses: 900; screening level: 15 Bq/kg; results: all below the screening level. Measured from March to December 2011.	Two people were analysed for ^{131}I , ^{134}Cs , and ^{137}Cs . Results were below detection limit.			
Canada	Over 650 air filter samples from approximately 30 sampling sites from early March to early June 2011. To different degrees, all radionuclides (^{129}Te , $^{129\text{m}}\text{Te}$, ^{132}Te , ^{131}I , ^{132}I , ^{133}I , ^{137}Cs , ^{134}Cs , ^{136}Cs) were elevated from late March to late April. Results from the CTBTO noble gas stations for ^{133}Xe (gaseous) and $^{131\text{m}}\text{Xe}$ (gaseous) showed radioxenon activity highest between early March and late April 2011.	18 milk samples measured for ^{131}I , ^{134}Cs and ^{137}Cs . 10 of these samples included results for ^{90}Sr . Collection dates from start of April to early May 2011. ^{90}Sr detected in six April 2011 samples. No radiocaesium or radioiodine reported.		38 samples containing total precipitation over a one-month period from approximately 15-20 sampling sites collected between early February and late May 2011. Measurements for ^{131}I , ^{134}Cs and ^{137}Cs . ^{131}I detected in 4 samples in the March 2011 collection period.		12 fish samples measured for caesium and iodine. No detections above trace noted.

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
China	Approximately 60 air samples from about 35 sites. Measurements included results for ^{132}Te , ^{131}I , $^{131\text{m}}\text{Xe}$, ^{133}Xe , $^{133\text{m}}\text{Xe}$, ^{134}Cs , ^{137}Cs ; and in aerosol and gaseous form for ^{131}I . Majority of sample periods were early March to end of April 2011.	Approximately 120 domestic foodstuffs from numerous locations tested for ^{131}I , ^{134}Cs and ^{137}Cs . 60 drinking water samples mostly from Beijing and Shenyang for gross alpha and gross beta activities. Food sampling periods covered late March to mid-May 2011. Most of the positive detections in foodstuffs were for ^{131}I .	Three human body measurements conducted. One hair counting, one trunk counting and one whole-body monitor. Monitoring subjects were in Fukushima and Tokyo.	200 gamma dose rate measurements at over 45 sites including nuclear power plants. All measurements conducted within a period in March–April 2011.	Approximately 50 ground deposition measurements across about 20 locations. Most positive detections were for ^{131}I with the highest readings recorded in late March to early April 2011. Positive detections for ^{137}Cs followed a similar trend. Soil samples from 62 cities were tested for ^{131}I , ^{134}Cs and ^{137}Cs . ^{134}Cs was not detected. ^{137}Cs was detected in a number of cities and ^{131}I was only detected in one city	Approximately 20 domestic fish samples measured for ^{131}I , ^{134}Cs and ^{137}Cs from various locations resulted in only 2 positive detections for ^{137}Cs .
Finland	268 air samples measured for particulates ($^{129\text{m}}\text{Te}$, ^{132}Te , ^{131}I , ^{134}Cs , ^{136}Cs , and ^{137}Cs), and 98 air samples (measured for gaseous ^{131}I) from 9 different sampling sites. Data presented for samples taken from late March to end of June 2011. Activity concentrations of all radionuclides peaked from late March to early April 2011.					

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
France	<p>The various measurement results relating to air, rainwater and land-based products revealed that no traces of radionuclides due to the FDNPS accident were detected prior to 24 March 2011.</p> <p>Monitoring detected trace levels of the main radionuclides released into the atmosphere during the accident, ^{131}I, ^{134}Cs, ^{137}Cs, and small quantities of ^{132}Te, and enabled changes to be tracked until May 2011.</p> <p>At no time did these concentrations pose any environmental or health risk.</p> <p>Various observations revealed that all French regions were affected to the same extent, albeit with some geographic and chronological fluctuations due to the movements of the air masses.</p>		<p>Whole body and thyroid measurements taken for 250 people returning from within 80 km of FDNPS site.</p> <p>Radionuclides detected were ^{132}Te, ^{125}I, ^{129}I, ^{131}I, ^{132}I, ^{134}Cs and ^{137}Cs. 90 urine samples were also taken, the activity of all of which were below the detection limits.</p>			
Germany	<p>126 air samples from 4 locations. Radionuclides sampled were combinations of ^{95}Nb, $^{123\text{m}}\text{Te}$, $^{129\text{m}}\text{Te}$, ^{132}Te, ^{131}I, ^{132}I, ^{133}Xe, ^{134}Cs, ^{136}Cs, ^{137}Cs, ^{140}Ba and ^{140}La. Highest levels of all radionuclides between late March and early April 2011.</p>		<p>145 human body measurements showing detectable levels of ^{132}Te, ^{131}I, ^{132}I, ^{134}Cs and ^{137}Cs. 79 accompanying effective dose assessments from whole body counting and thyroid measurements.</p>			
India	<p>462 air samples (12 locations) measured for ^{137}Cs (particulate) and 236 measured for ^{131}I (gaseous). Samples over period from mid-March to late July 2011. There were no detections over the detection limit of 0.002 Bq/m^3.</p>			<p>GM tube gamma dose measurements from early March to end of July 2011 from 5 measurement sites. Readings varied from site to site but no elevations over time evident.</p>		

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Indonesia	14 air samples measured for ¹³⁷ Cs from 10 locations between early April and late November 2011. No detections above the detection limit of 0.01 Bq/m ³ .	416 foodstuff samples measured for combinations of some or all of ¹³¹ I, ¹³⁴ Cs, and ¹³⁷ Cs. Only 1 positive detection for ¹³⁷ Cs in Worcestershire Sauce in October 2011 was recorded. Sampling period for foodstuffs covers late March to early November 2011.	3 whole-body counting results of subjects from Fukushima conducted on 28 March 2011. Out of 3, 2 had positive detections of ¹³¹ I.	23 gamma dose measurements made with NaI from approximately 20 locations. All levels appeared to be within background range. 34 soil samples measured for ¹³⁷ Cs with HPGe. Samples collected between early May 2011 and early May 2012. No sampling locations specified by name (coordinates provided). All results below detection limit of 0.01 Bq/kg.		5 sea water and sediment samples were tested for ¹³⁷ Cs in Nov 2011. All water samples had results below the detection limit of 1 Bq/m ³ . All sediment samples measured were below detection level of 0.01 Bq/kg. 20 marine biota samples tested for ¹³⁷ Cs in Nov 2011. All results below detection limit of 0.008 Bq/kg dry weight.
Malaysia		Maximum activity concentrations of both ¹³⁴ Cs and ¹³⁷ Cs found in food were 2–14 Bq/kg wet weight.	No detectable levels found in human body monitoring.			No detectable levels in coastal waters
Mexico	10 air samples (4 locations) for ¹³¹ I, ¹³⁴ Cs and ¹³⁷ Cs (all particulate) from late March to early May 2011. Too few measurements to extrapolate any trends in the data.			2 GM tube gamma dose measurements (2 locations) in mid-March 2011. Results seemed to be within background levels.		
Pakistan	115 air samples from 7 locations between mid-March and late April 2011 (¹³¹ I and ¹³⁷ Cs). No detections above detection limits of 0.09 and 0.3 Bq/m ³ , respectively. 13 additional air sample measurements (3 locations) between March and early April 2011 for ¹³¹ I (gaseous) which resulted in a few low detections.					

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Philippines	74 air samples (between early March and late May 2011) measuring for ^{131}I (particulate), ^{134}Cs and ^{137}Cs . Some samples included results for ^{95}Nb , ^{132}Te and ^{136}Cs . All radionuclides were detected between late March and late April 2011.	About 250 imported food samples tested for ^{131}I , ^{134}Cs , and ^{137}Cs . Low detections (mBq/kg) for ^{131}I in fish, food additives and sauces. Some positive detections for ^{134}Cs and ^{137}Cs (mBq/kg to Bq/kg) in seafood, food additives, feedstuffs, flavours, fruit and beverages. Highest levels recorded in October/November 2011.	34 human body measurements of Philippine citizens living in Japan. Measurements were all thyroid counting for ^{131}I conducted from late March to early April 2011. Resulted in no detections.	Approximately 600 gamma dose measurements from Quezon City and 25 other locations measured by NaI between early March and mid-November 2011. No obviously elevated levels recorded. 77 soil samples (approximately 15 locations) measured for ^{137}Cs between early April and mid-December 2011 using HPGe. Low levels (mBq/kg to Bq/kg) detected with highest activities being recorded April to May 2011.		15 marine surface water samples measured for ^{137}Cs from April-October 2011. All detections for ^{137}Cs were low (Bq/m^3). 15 sediment samples collected June-October 2011 were also measured for ^{137}Cs . All detections were low (mBq/kg). 78 marine biota samples collected April-October 2011, and measured for ^{137}Cs . All positive detections were below 2 Bq/kg dry weight and mostly in fish samples.
Poland	Approximately 180 air samples from about 25 locations measured for ^{131}I , ^{134}Cs , and ^{137}Cs . Some samples were measured for ^{95}Nb , ^{102}Ru , ^{105}Ru , ^{106}Ru , $^{129\text{m}}\text{Tc}$, ^{132}Te , ^{132}I , ^{136}Cs and ^{140}La . Sampling period was from mid-March to mid-June 2011. Activities for most radionuclides were elevated between late March and early April 2011.		Human body measurements on 6 people (4 Polish, 2 Japanese) living in various places near Fukushima. Measurements conducted include whole-body counting, thyroid and urine measurements. Some positive detections for ^{137}Cs and ^{134}Cs .	Over 30,000 GM probe gamma dose measurements from 13 locations taken on every hour of every day from 11 March to 15 June 2011. No elevated levels apparent during this time period.		Water and sediment samples from the Baltic Sea collected in June 2011. Sampling of type has been conducted for the last 30 years. The June 2011 samples showed no difference in the anthropogenic radionuclide concentrations.

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Republic of Korea		23 tap water samples from different locations measured for ^{131}I and ^{137}Cs from early April to late July 2011. All results were less than the detection limits.			12 soil samples collected on 4 April 2011 measured for ^{131}I , ^{134}Cs , ^{137}Cs , and $^{239}\text{Pu}+^{240}\text{Pu}$. No detections for ^{131}I or ^{134}Cs . ^{137}Cs detections in Bq/kg range for some samples. Plutonium detected in some samples.	~250 seawater samples around Republic of Korea collected March to December 2011. Measurements were for ^{131}I , ^{134}Cs , ^{137}Cs and $^{239/240}\text{Pu}$. Activities of ^3H and ^{90}Sr were also reported for one of the data sets. ^{131}I and ^{134}Cs always below level of detection. ^{137}Cs and plutonium always consistent with no obvious elevations (mBq/m^3 and $\mu\text{Bq/m}^3$ range, respectively). ~120 marine organisms measured for ^{131}I , ^{134}Cs and ^{137}Cs from April to September 2011 (and ^{90}Sr and Pu for April/May). ^{131}I found in 3 seaweed samples (<1 Bq/kg fresh weight) in May and July 2011. Positive detections of ^{137}Cs and ^{90}Sr were <1 Bq/kg. 1 result for Pu was >1 Bq/kg. 15 sediment samples were collected between April and May 2011 and measured for ^{137}Cs , ^{90}Sr and $^{239}\text{Pu}+^{240}\text{Pu}$. No results were higher than 5 Bq/kg for ^{137}Cs , 0.32 Bq/kg for ^{90}Sr , and 1.12 Bq/kg plutonium.

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Russia			Human body measurements of 268 Russian citizens living within the territory of the Russian Embassy in Tokyo. All conducted from 9-17 April 2011. 3 adults with ¹³¹ I activity between 100 and 130 Bq in the thyroid. The maximum absorbed dose to the thyroid was determined as 2 mGy from these measurements.			
Singapore	395 air samples (1 location) between mid-April 2011 and late January 2012 measured for ¹³¹ I (particulate), ¹³⁴ Cs and ¹³⁷ Cs. No detections above detection limit of 0.1 Bq/m ³ for all radionuclides.	Approximately 25 imported foodstuff samples tested positive for ¹³¹ I, ¹³⁴ Cs and/or ¹³⁷ Cs. Food samples measured between late March 2011 and early May 2012. Radiocaesium levels were higher in tea, vegetables and fish. Radioiodine levels were higher in vegetables and fish.		410 gamma dose measurements conducted at Changi Naval Base using NaI detectors within same time period. All results appear to be consistent with no obvious elevated levels.		About 200 seawater samples from Sentosa Beach, Changi Beach and East Coast Beach, as well as 6 rainwater samples were collected between early April 2011 and mid-January 2012. There were no detections above the detection limits of 1 Bq/L for ¹³¹ I, ¹³⁴ Cs or ¹³⁷ Cs.
Slovakia	26 air samples (Bratislava) measured for ¹³¹ I (total) and ¹³⁷ Cs from mid-December 2010 to mid-January 2012. Duration of sampling varied from 1 day to 1 month. Elevated levels of both radionuclides from late March to late April 2011.	5 sheep milk samples tested for ¹³¹ I, ¹³⁴ Cs and ¹³⁷ Cs in April 2011. 4 samples had slightly elevated ¹³¹ I levels. No radiocaesium was detected.				

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Spain	941 air samples, mostly for ^{131}I (gaseous) from approximately 50 locations. Some of the samples were also measured for $^{110\text{m}}\text{Ag}$, $^{129\text{m}}\text{Te}$, ^{132}Te , ^{131}I (particulate), ^{132}I (particulate), ^{134}Cs , ^{136}Cs and ^{137}Cs . Time period for sampling was mid-March to mid-June 2011. Iodine was detected through most of the sampling period.		150 human body measurements conducted on people at Torrejon Airport, Madrid, Spain. Measurements included checks of surface activities with gamma-emitters and thyroid checks for ^{131}I with portable detectors. 7 other people in Tokyo and south Japan had whole-body counting and thyroid checks conducted. No positive measurements.			

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
Sweden	205 air samples measured for ^{129m}Te , ^{132}Te , ^{131}I (particulate), ^{134}Cs , ^{136}Cs , and ^{137}Cs from 6 monitoring locations between early March and mid-June 2011. All radionuclide activities elevated between late March and early April 2011.	42 imported foodstuffs measured for ^{131}I , ^{134}Cs and ^{137}Cs between late July 2011 and early March 2012. No detections of ^{131}I reported. Only one tea sample tested positive for both ^{134}Cs and ^{137}Cs (greater than 100 Bq/kg). One sample tested positive for ^{137}Cs only at less than 1 Bq/kg.	9 human body measurements for ^{131}I and ^{137}Cs (6 urine, 2 whole-body counting, 1 thyroid) conducted on people who had been living in the Tokyo area and were returning to Sweden. There were 3 ^{131}I and 5 ^{137}Cs detections in urine and 1 ^{137}Cs detection in a whole-body counting measurement.		38 ground deposition measurements for ^{131}I , ^{134}Cs and ^{137}Cs from 4 locations conducted between late March and late June 2011. Most had detectable levels of all radionuclides with the highest results being for ^{131}I in the Bq/m ² range. 16 in-situ deposition density measurements for ^{131}I , ^{134}Cs and ^{137}Cs conducted at different locations in early April 2011. All resulted in ^{131}I detected in the Bq/m ² range. Some had detectable levels of ^{134}Cs and ^{137}Cs in the Bq/m ² range.	
United Kingdom	125 air samples from 14 locations for ^{132}Te , ^{131}I (particulate), ^{134}Cs and ^{137}Cs from mid-March to early May 2011. All radionuclides detected in all samples in specified time period, except ^{132}Te in only a few samples.				2 ground deposition samples from Oxfordshire on 30 and 31 March 2011 where ^{131}I , ^{134}Cs and ^{137}Cs were all detected.	20 samples of seaweed collected from Whitehaven and Seascale between late March and late April 2011. ^{131}I and ^{137}Cs activities in the mBq/kg to Bq/kg range. 6 fish samples (cod and bass) collected from 29 March to 26 April 2011 and tested for ^{131}I . No sample above detection limit.

<i>Country</i>	<i>Air samples</i>	<i>Foodstuff</i>	<i>Human body</i>	<i>Gamma dose rate</i>	<i>Deposition density on the ground</i>	<i>Marine environment or biota</i>
United States of America	229 air filter and cartridge samples taken from mid-March to mid-April 2011 in 12 States. Samples tested for 11 radionuclides. Trace amounts of ^{128m} Te, ¹³² Te, ¹³¹ I, ¹³² I, ¹³³ I, ¹³⁴ Cs, ¹³⁶ Cs and ¹³⁷ Cs detected in some samples.	67 milk samples collected from 36 cities tested for a range of radionuclides from late March to May 2011. 153 drinking water samples from 42 States taken from late March to late April 2011.			157 precipitation samples from 26 States taken between mid-March and late April. Tested for 11 radionuclides. Detections of ¹³¹ I peaked from late March to mid-April 2011.	