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# 4th Meeting of the EMRAS II WG 1 Controlling Discharges

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**Adriana Curti**

*Scientific and Technical Support Department*

*Radiological Safety Assessments Division*

*Argentina*

## 1- Scenario A version 2 exercise (I)

Argentina only participated in the exercise for atmospheric releases due to the fact that there are not nuclear power plants (NPP) on the sea coast

## 1- Scenario A version 2 exercise (II)

Two codes were used :

- Dosamed
- PC CREAM 98

## 1- Scenario A version 2 exercise (III)

Dosamed code characteristics:

It's a self-developed code by the Nuclear Regulatory Authority (ARN) based on IAEA SS57 model

Since libraries with dose factors, transfer parameters, dilution factors, consumption and breathing rates can be modified, they have been updated

## 1- Scenario A version 2 exercise (IV)

Input parameters:

- released activity (Bq/y) for each radionuclide
- facility site
- age group

## 1- Scenario A version 2 exercise (V)

Output:

Total effective dose for each radionuclide,  
facility site and age group, without discriminating  
among critical exposure pathways contributions

## 1- Scenario A version 2 exercise (VI)

PC CREAM 98 run comments:

It was performed with PLUME module and ASSESSOR module with default values in transfer model for terrestrial food (FARMLAND module)

## 1- Scenario A version 2 exercise (VII)

Two runs were performed with PC CREAM 98 code:

- the first one for an “Effective duration of the deposition” of 1 year (“Integration time” in PC CREAM)
- the second one for an “Effective duration of the deposition” of 50 years



## 1- Scenario A version 2 exercise (VIII)

The following Tables show the results:

The first one presents Total dose for every radionuclide (including all exposure pathways) for different runs and codes

## 1- Scenario A version 2 exercise (IX)

It should be mentioned that due to the large difference between Dosamed and PC CREAM 98 results for Co-60, a hand-made calculation was performed to normalize two of the parameters (deposition velocity and external exposure time at exposure location) with those of PC CREAM 98 code

## 1- Scenario A version 2 exercise (X)

The second Table shows the comparison of Dosamed results (for both calculations) with PC CREAM 98 run for 50 year “Effective duration of the deposition”



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Total dose (Sv/a)	Dosamed	Dosamed normalized	CREAM 98 (50a)	CREAM 98 (1a)
Co-60	2.9E-3	5.5E-4	1.8E-4	3.3E-5
Cs-137	6.2E-4		1.3E-4	3.9E-5
I-131	1.7E-4		1.2E-4	1.2E-4
Kr-85	1.9E-10		2.1E-10	2.1E-10



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	<b>Dosamed/ PC CREAM 98 (50a)</b>	<b>Dosamed norm/ CREAM 98 (50a)</b>
Co-60	16.1	3.1
Cs-137	4.8	
I-131	1.4	
Kr-85	0.9	

## 1- Scenario A version 2 exercise (XI)

Some comments about the results

a- Identified parameters with differences between

Dosamed and PC CREAM 98 (50a) runs

a-1) Deposition velocity (0.003 m/s vs 0.001 m/s)

a-2) Time of exposure at exposure location (6132 h/a  
vs 2628 h/a)

## 1- Scenario A version 2 exercise (XII)

b- Comparing PC CREAM 98 runs for (50a) and (1a) through different exposure pathways, it was identified that “External dose rate from groundshine” was the most affected. Within this pathway, it appeared that the radionuclides with the longest radioactive half-life changed the most because they did not reach equilibrium in 50 years

## 2- Critical group selection criteria for Scenario B (I)

The characterization of the critical group in Argentina, for assessing retrospective doses resulting from routine discharges, is performed using a deterministic approach



## 2- Critical group selection criteria for Scenario B (II)

The critical group characterization could be divided into three aspects:

- Geographical location
- Composition
- Habit data and exposure pathways

## 2- Critical group selection criteria for Scenario B (III)

### Geographical location - gaseous discharges (Argentina)

Site specific information is used to identify the inhabited place with maximum radioactivity concentration. This information includes the population distribution around the NPP and the dispersion conditions in the site (discharge point characteristics and meteorological data)

## 2- Critical group selection criteria for Scenario B (IV)

### Composition (Argentina)

In a simplified deterministic approach it is considered a single age group: Adults

## 2- Critical group selection criteria for Scenario B (V)

### Habits data and exposure pathways (Argentina)

The following Tables show habits data and consumption rates for critical exposure pathways, selected with a deterministic approach, based on site specific information and international publications

## 2- Critical group selection criteria for Scenario B (VI)

### Habits data and exposure pathways (Argentina) (cont)

For locally produced foodstuff, the actual production site with maximum radioactivity concentration is considered



<b><i>Ingestion exposure pathways</i></b>	
Green and root vegetables, and fruit (kg/a)	270
Cow meat (kg/a)	75
Cow milk (kg/a)	140



<b><i>Inhalation exposure pathway</i></b>	
Breathing rate (m <sup>3</sup> /a)	8400
<b><i>External exposure pathways</i></b>	
Surface contamination due to air deposition (h/a)	2628
Submersion in air (h/a)	8760

## 2- Critical group selection criteria for Scenario B (VII)

The criteria used in Argentina along with the available data of Sizewell area will be applied to identify the Scenario B critical group





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Gracias

[acurti@arn.gob.ar](mailto:acurti@arn.gob.ar)