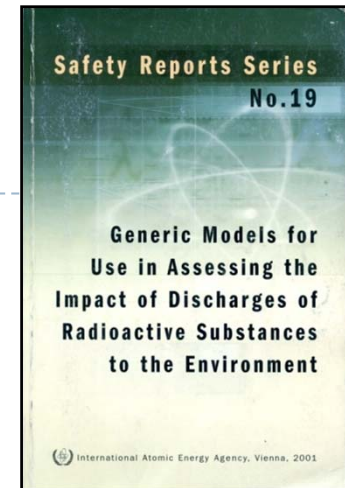


EMRAS II- WG1

Dejanira da Costa Lauria
(BRAZIL)

Scenario A version 2

- CROM code based on SRS 19 (screening code)



- The code is a beta version-attempt to run it and to inform CIEMAT the problems we have met.
 - Some improvements were done. but there is still place to improve.
 - A group of study was created consisting of people from the Reactors. Regulatory Authority and Technical Service Office.
 - GEN II code was bought
-



Reported Results

- ▶ Total concentration in water & Dissolved concentration in water;
- ▶ Concentration in suspended sediment
- ▶ Concentration in bottom sediment (C_{sb})
- ▶ Concentration in shoreline sediment (C_{ss})
 - ▶ $C_{ss}=60*C_{sb}$



Nuclear Power Plants at Angra dos Reis



CNAAA unit 1 (Angra 1) - Westinghouse 600 Mwe: it started operation in 1982

CNAAA unit 2 (Angra 2)- KWU 1300 Mwe; Operation started in
▶ 2000

Discharge Channel



Liquid effluent discharge is not continuous
Meteorological data are integrated and are directly put in the dose codes (online monitoring)



Which scenario should we choose?

- **Angra nuclear power plant scenario.**
 - No homogeneous human group was identified.
 - **Four age groups** are considered:
 - Child (0-7years). Child (7-12 years). Adolescent (12-17 years) and Adult (>17 years)
 - For each age group: the habits and consumption rates are from the most exposure individuals (95% percentile of the distribution of consumption rate of local products and the spent time on the beach)
 - Location of the groups: 1000 meters from the reactor site
 - Individual age group doses are reported



Exposure pathways

- **Atmosphere**
- Radionuclides: Co-58. Co-60. Cs-134. Cs-137. Ce-144. Sr-90. Pu-239. Pu-240. I-131. I-133.
- Exposure pathways:
 - External Irradiation-Gamma and **beta** direct exposure in the plume
 - External irradiation- Gamma from the ground
 - Inhalation
 - Ingestion (vegetables. milk. meat)
- ▶ **Liquid Effluent**
- ▶ Radionuclides: Co-58. Co-60. Sr-90. I-131. Cs-134. Cs-137. H-3
 - ▶ Ingestion of marine products
 - ▶ Fish and seafood
 - ▶ External irradiation –gamma from the beach



Consumption rate

Exposure pathway	Age Group		
	Child	Adolescent	Adult
Vegetable (kg/a)	1.93E+01	2.18E+01	3.03E+01
Grain (kg/ano)	8.20E-01	8.30E-01	1.30E+00
Meat (kg/ano)	2.67E+00	2.94E+00	3.58E+00
Milk (litros/ano)	6.66E+00	6.66E+00	4.99E+00
Fish (kg/ano)	1.14E+01	8.91E+00	2.05E+01
Seafood (kg/ano)	1.02E+00	1.82E+00	3.24E+00
Time on the beach (hours/year)	2.41E+02	1.99E+02	2.41E+02
Inhalation (m ³ /a)	1.88E+03	5.58E+03	8.10E+03



What is the objective?

- ▶ Collective dose & Individual dose
- ▶ Age groups
- ▶ Beta dose

