

# International Conference Underground Disposal Unit Design & Emplacement Processes for a Deep Geological Repository 16-18 June 2008, Prague

## ABSTRACT

- Especially during the last ten years, a part of Romanian research program “Management of Radioactive Waste and Spent Fuel” was focused mainly on applicative research for the design of near-surface disposal facility, which intends to accommodate the low and intermediate radioactive waste generated from Cernavoda NPP. In this frame, our contribution was at the acquisition of technical data for the characterization of the future disposal facility.
- In the present, the project of the disposal facility, located on the Saligny site, near Cernavoda NPP, must be licensed.
- As regards to the safe disposal, the location of final disposal, the Saligny site, has been characterized through the five geological formations which contain potential routes for transport of radionuclide released from disposal facility, in the receiving zones (potential receiving zones), into liquid and gaseous phases.
- The technical characteristics of the disposal facility were adapted at the Romanian disposal concept using the reference data from IAEA technical report [1]. Input parameters which characterized from physical and chemical point of view the disposal system, were partially taken from literature.
- The performance assessment studies, which follows the preliminary design development phases and the selection, describes how the source term is affected by the infiltration of water through the disposal facility, degradation process of engineering barriers (reflected in the distribution coefficient values) and solubility limit.

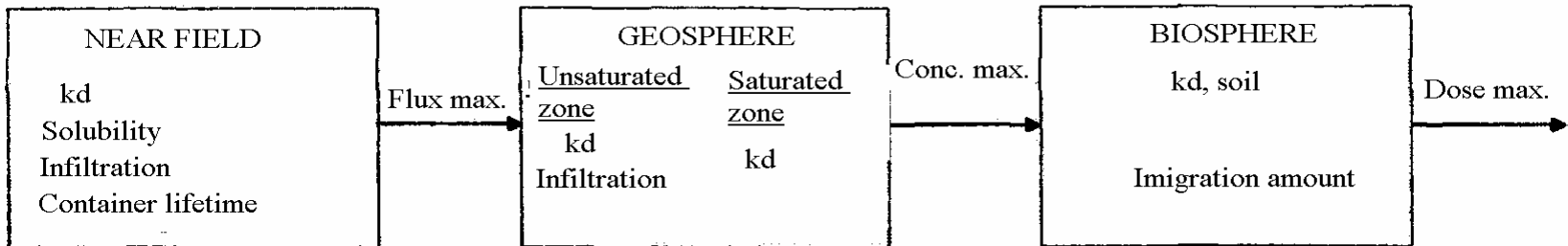
- **INTRODUCTION**

- The studies regard the evaluation of the source term, sensitivity and uncertainty analysis provide the information on “how” and “why” were evaluated, following:
- Radiological safety assessment of near-surface disposal facility on Saligny site;
- Complexity standard assessment of the Engineering Barriers Systems (EBS);
- Identification of the elements which must be elaborated for the increase of the disposal safety and the necessity for new technical data for the characterization of the disposal facility.
- In the frame of the performance assessment, sensitivity and uncertainty analyses for the Saligny disposal facility have been conducted, consulting associate activity for the three phases corresponding to the disposal:
  - Operational period;
  - Institutionalized control;
  - Post-operative control.

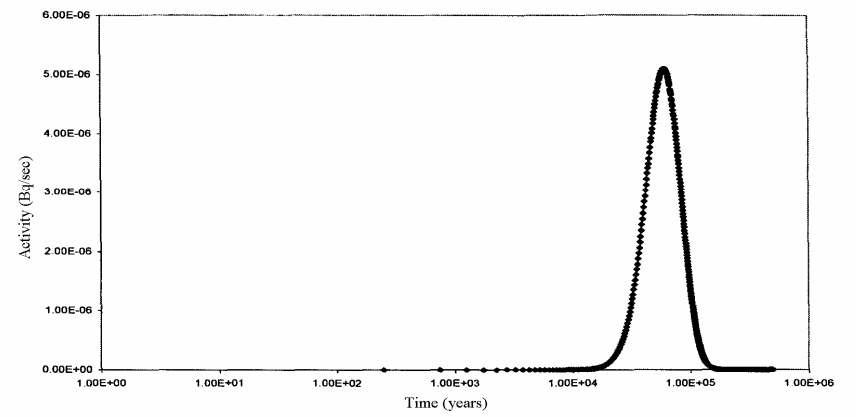
In source term evaluating study and of the sensitivity and uncertainty analyses, we took into consideration radionuclide of Cs-137, H-3 and C-14, these representing the most relevant radionuclide generated by the operation of the nuclear power plant.

Generally uncertainties in assessment are classified as:

- Scenario uncertainty;
- Model uncertainty;
- Parameter uncertainty



	Material Radionuclide	kd [ml/g]		Diffusion [cm <sup>2</sup> /sec]	
		1 - Top and radier zones	2 – Near field cell	1	2
Intact concrete	C-14	2000	2000	1.00E-07	1.00E-06'
	H-3	0	0	1.00E-07	1.00E-06
	Cs-137	2	2	1.00E-07	1.00E-06
	Co-60	100	100	1.00E-07	1.00E-06
	Sr-90	1	1	1.00E-07	1.00E-06
Degradation concrete	C-14	500	500	1.00E-07	1.00E-06
	H-3	0	0	1.00E-07	1.00E-06
	Cs-137	0.2	0.2	1.00E-07	1.00E-06
	Co-60	10	10	1.00E-07	1.00E-06
	Sr-90	1	1	1.00E-07	1.00E-06



- For tritium, because it retains practically zero in geological and in concrete medium, it moves with water infiltration in near field. In this manner, the rate of H-3 is the rate water to the near field. From representative parameters, because H-3 is not retained on the engineering barriers, can be observed a rapid release, the factors who delay the migrate are a small permeability of concrete and a small rate of infiltration

