METHODOLOGY OF ENVIRONMENTAL IMPACT STUDY AND OPTIMIZATION OF RELEASES

Application to the Study Centre of CADARACHE

FRENCH ATOMIC ENERGY COMMISSION
by
JC CARIES (Health Physics Department)

OBJECTIVES :

- Impact study.
- Optimization of releases.

PRINCIPLES :

- Activities in the air and the water computed independently.
- The dose error contains more information than the dose itself ; it is representative of the knowledge evolution of the site.
- Computations of sensitivity and global error are essential in the modelling - experimentation interaction.
- Assessment of doses in the organs.
- Information feedback of the data-processing tools of a CEA subsidiary company (CISI) : modularity and flexible operation.

PROCEDURE :

- Source term : Spectrum of the radioelements.
- Impact study (per station).
  - * computations of transfers to both food and man ; sensitivities and error computations,
  - * main parameters with regard to the value : dose + error (d+Δd)
- Surveillance plan of the site.
  - * computations of the number of stations to be studied for a fixed percentage of (d + Δd),
  - * reduced equation of transfers , mapping and meshing of the site,
  - * exposures and food activities computations in every mesh, and filing.
- Optimization of releases (critical station)
  - * determination of the boundary level of exposures,
  - * successive iterations with the source term of the impact study and tests with different spectra of the source term.

RESULTS : Liquid transfers : Δd = (7 to 10)×d - Atmospheric transfers : Δd = (3 to 7)×d

	AIR				WATER					
	^{85}Kr	^{3}H	^{131}I	^{125}Sb	^{3}H	^{60}Co	^{137}Cs	$^{90}Sr+Y$	^{241}Am	^{239}Pu
Authorized releases (1978) Bq/year (1)	555.E12		18,5.E9		1,85. E12	3,7.E9			0,37 .E9	
If d+Δd=10 µSv/year multiplying factor of (1)	(if 100% ^{3}H) 0,3		22		65	24			0,3	

Maximum exposure due to present releases from the Centre :d < 1µSv/year - *Present tritium releases from the Centre: some per cent of the authorized releases*

OPTIMIZATION: *α emitters* Objective: release << 0,3 × authorization by:

- improving analyses to avoid adding up detection limits
- retaining the solid particles of the effluents in the installations.