Enhancing co-operation between AVN, IRSN and GRS: the junior staff pilot project on the comparative testing of IPA codes
(A. de Hoyos, S. Keesmann, O. Smidts)

> Objectives
The project takes place within the framework of the Junior Staff Program of AVN, GRS and IRSN which aims at creating a junior staff network among European TSOs.

The objective of this project is to apply integrated performance assessment (IPA) tools used by AVN, IRSN and GRS to two generic and simplified models (Bure site in France and Mol site in Belgium) for disposal systems in argillaceous formations. The comparison of the results from different codes applied to the disposal systems of the two mentioned sites aims at a better understanding of the confinement capabilities of the considered geological formations and of the IPA methodology in general. The incentive is a common understanding of approaches developed by each partner and the improvement of this expertise. More specifically, this pilot project aims at enhancing exchanges of views and mutual experiences in the field of understanding major safety functions.

> Tools and Methods
A new code for the assessment of barrier systems in argillaceous formations has only recently been developed at GRS, as in the past such formations played a minor role as a possible hosting environment for a repository in Germany. The project also serves as a test case for this code. The considered disposal systems are defined on the basis of the concepts and data available for Mol and Bure.

The program packages used for the performance assessment calculations are:

- HYDRUS-1D with source term module (AVN),
- GoldSim (IRSN) and
- EMOS-modules CLAYPOS and CHET (GRS).

While the coupling of HYDRUS-1D with a source term module and the EMOS-modules are FORTRAN77-coded programs specifically developed for the simulation of parts of a barrier system of a final repository, GoldSim is a general purpose simulation environment with an integrated graphical user interface for modelling and data output. Models realized in GoldSim are flexible and can be easily adapted to new requirements. The software also offers an intrinsic infrastructure for the sensitivity analysis of a model.

The radionuclide flows out of the argillaceous layer hosting the repository serve as an indicator for the comparison of the different program packages. Additionally, the build up of nuclide inventories within a pumping well and a river at the interface to the biosphere will be compared.

> Perspectives
The current project focuses on the far-field of a repository hosted in a deep geological formation. A follow-up project is being considered on comparing approaches for modelling the biosphere used at the three involved organizations.