

DETERMINATION OF FLOW PROPERTIES OF THE SALIGNY AQUIFER (ROMANIA)

A. Genty^{*}, D. Diaconu[†], C. Bucur[†], A. Constantin[†] and G. Zyvoloski[‡]

^{*} Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA)
DEN/DM2S/SFME/LSET, CEA-Saclay, France
e-mail: alain.genty@cea.fr

[†] Sucursala Cercetari Nucleare (SCN)
Pitesti, Romania
e-mail: daniela.diaconu@nuclear.ro ; crina.bucur@nuclear.ro ; alina.constantin@nuclear.ro

[‡] Los Alamos National Laboratory (LANL)
Los Alamos, USA
e-mail: gaz@lanl.gov

Summary. In the context of radioactive waste disposal calculations, the Romanian Institute for Nuclear Research (SCN) and the French Atomic Energy Commission (CEA) initiated a benchmark exercise dealing with aquifer flow modelling (using FEHM code for SCN and Alliances Platform for CEA) for Romanian applications.

The Alliances platform allows dealing with a large set of phenomenological processes like flow in saturated and unsaturated porous media and reactive transport of radionuclides, by integrating associated numerical codes inside a common computational environment. The Alliances platform is developed by CEA in collaboration with the French agency for radioactive waste management (ANDRA) and the French electricity provider (EDF) and is used to conduct radioactive waste disposal performance calculations in the French context.

The FEHM computer code was developed by Los Alamos National Laboratory for the simulation of water flow and contaminant transport in porous and fractured, saturated and unsaturated environments. The computer code is based on the numerical solution (through the finite elements method) of the general equations governing the water flow in porous media, the transport of the solved species as well as the transport coupled with the thermal transfer.

The calcareous Barremian aquifer from Saligny is located in eastern Romania in the vicinity of Cernavoda nuclear power plant near the Danube / Black Sea Canal. As part of a site of interest for a potential subsurface radioactive waste disposal, the Barremian aquifer flow and transport properties have to be estimated in order to conduct waste disposal performance calculations. In this scope, SCN conducted some pumping test in the area of interest of the aquifer. In this paper, we present the results of the determination of the flow properties of the Barremian aquifer using FEHM code and Alliances platform for flow calculations. The checking of transmissivity and storativity of the aquifer was made by simple matching between the transient flow modelled with the tools (heads map evolution with time) and the pumping test results.