S1-155

Calculation of Radiological Consequences of Design Basis Accidents for Licensing Purposes

Petra Strmečki,
Davor Grgić,
Siniša Šadek,
Paulina Družijanić
University of Zagreb Faculty of Electrical Engineering and Computing
Unska 3, Zagreb, Croatia
petra.strmecki@fer.hr,
davor.grgic@fer.hr,
sinisa.sadek@fer.hr,
paulina.druzijanic@fer.hr

The calculation of radiological consequences of Design Basis Accidents (DBA) is used for licensing purposes including siting and SAR Chapter 15 applications. In this paper NPP Krško LOCA was used as a reference DBA accident. The released radiological effluents were calculated using Regulatory Guide RG 1.183 assumptions and RADTRAD computer code. Plant specific fuel source term is obtained using ORIGEN code for real plant's operation history data. The dispersion X/Q factors needed to perform calculation of doses in the environment (Exclusion Area Boundary EAB and Low Population Zone LPZ locations, and 1D/2D spatial dependence around the plant) were determined using two different approaches. The first is a classical one based on RG 1.145 as implemented in the PAVAN code with close range additions from RG 1.249 as implemented in ARCON96 code. The second is a X/Q calculation based on the Lagrange particle methodology developed by MEIS d.o.o. Both approaches use similar sets of meteorological data measured at NPP Krško location. Additional independent radiological consequences calculation was performed using MACCS2 code for the same release source term and meteorological data. The last methodology proposed to calculate TEDE doses around the plant was based on number of JRODOS calculations for selected past sequences of meteorological data, and statistical post processing of obtained spatial dose rate data. Three different approaches of radiological consequences calculation are compared from the point of view of accuracy, type of provided results, calculation time and user requirements. The methodologies were applied to existing Gen II NPP, but are mentioned to be applied to SMR plants with more focus on the radiological impact close to the plant too.

Keywords: *radiological consequences, DBA accident, LOCA, atmospheric dispersion*