

DEVELOPMENT OF THE SAFETY CASE OF GEOLOGIC REPOSITORY IN KOREA

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A national energy security in Korea is dependent on the peaceful and safe utilization of nuclear energy. The nuclear option is the only practical solution to accomplish this mission in Korea. The Korean Government's policy on nuclear energy can be summarized into two principles: promotion of the peaceful uses of nuclear energy and securing its safety. Since April 1978, Korea has strongly relied on nuclear energy for its electricity generation. As of today, nineteen nuclear power plants, 15 PWRs and 4 CANDUs, are in operation and nine are to be inaugurated by 2015. The installed nuclear capacity is 16.7 GWe, representing 29% of the nation's total installed capacity. The nuclear share in electricity remains at around 40.2 reaching a level of 130 billion kWh's. New power reactors, Korea Standard Nuclear Power Plants are fully designed by domestic technologies. More advanced reactor named AP1400 will be commissioned in 2010.

The Korea Atomic Energy Research Institute (KAERI) launched a three-step 10-year R&D program in 1997 to develop a reference geologic repository system for HLW by 2006. A preliminary reference repository concept for spent PWR and CANDU fuel was proposed. A site for the underground repository has not been specified, but a generic site with granite rock was suggested for this study. The waste packages will be vertically placed in boreholes drilled in the floor of the deposition tunnels or horizontally placed in the deposition tunnels located about 500m below the surface in a crystalline rock mass. In parallel, the overall system performance assessment code for a probabilistic safety assessment has been developed. To accomplish a TSPA, a systematic development of the FEP list was pursued. Based on the KAERI FEP Encyclopedia, reference and alternative scenarios were developed. By applying the TSPA code, a preliminary safety assessment was performed by using the generic data set. Results showed that the current disposal concept proposed by KAERI satisfies the safety criteria for the given radionuclide release scenario. In

the future, detailed TSPA will be performed by using the Korean geologic data and a more detailed disposal concept.

