

Development of Evaluation Code for Source Term at RCS of Nuclear Power Plant in Korea

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Abstract

The amount of radioactive materials released from nuclear power plant must be evaluated before construction stage for the design of bulk shielding and radioactive systems. These methodologies are developed from the mid of 1970s to the mid of 1980s. Since 1985, any new methodologies is not provided. The purpose of this study is to provide a method and evaluation tool for a set of typical radionuclide concentrations at RCS. These concentrations are the predominant factor at evaluation of the expected source term that is the amount of radioactive materials released from nuclear power plant. In this study, an evaluation method for radionuclide concentrations at primary coolant is suggested and a tool for source term is developed. The code named as SYCOS(SYstem for Calculation of Source term) is able to provide the radioactivity at coolant region based on two kinds of methods. One is using ORIGEN 2, another is using a simplified equation for estimation of the radioactivity of fission product at fuel pellet region. For coolant region, a simplified equation assuming the equilibrium state is used. As applying SYCOS to YGN unit 3, 4, the results is compared with the actual measured data from objective plants. The comparison shows that the results from SYCOS are similar to the actual radioactivity distribution except for Xe-133 and Xe-135. Especially, for the change of fuel defect rate from 0.05% to 0.12%, the results from SYCOS are nearly same as the actual data.