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"Gheorghe Asachi" Technical University of Iasi, Romania

USE OF THE "HOTSPOT" CODE FOR SAFETY AND SECURITY ANALYSIS IN NUCLEAR POWER PLANTS: A CASE STUDY

Mariachiara Carestia[1], Andrea Malizia[1]*, Oscar Barlascini[1], Eugenio Fiorini[1], Paolo Maurizio Soave[1], Gianna Latini[2], Orlando Cenciarelli[1], Fabrizio D'Amico[1], Carlo Bellecci[1], Pasquale Gaudio[1]

[1]Department of Industrial Engineering, University of Rome "Tor Vergata", Via del Politecnico 1, I-00133, Roma, Italy
[2]Aero Sekur S.p.a., Via delle Valli 46, I-04011, Aprilia, Italy

Abstract

Accidents in spent nuclear fuel reprocessing plants are a critical issue for the safety of people, of operators and the environment, as well as for the security of the plants. The purpose of this work is to demonstrate the possibility to use a free license code to simulate radiological diffusion after an accident in these particular plants, in order to obtain a model which allows identifying escape routes for the people potentially involved in the fallout. The authors performed a benchmark analysis of the data collected by the IAEA during the radiological accident of Tomsk. These data were further used to simulate general worst case scenarios. Numerical values of Total Effective Dose Equivalent (TEDE) generated in each "worst case scenario" where compared to the ICRP (International Commission on Radiological Protection) dose limits for acute exposition to radiation, in order to identify information on evacuation, sheltering and iodine prophylaxis in case of radionuclides release in conditions comparable to those analyzed. The authors achieved a good match between the numerical and field-results, giving a solid background to the worst case scenario simulations and allowing proposing a methodology for safety and security analysis with free license codes.

Key words: accident, nuclear, simulation

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* Author to whom all correspondence should be addressed: e-mail: malizia@ing.uniroma2.it; Phone: +39 0672597201