Contribution ID: **181** Type: **POSTER**

Impact of nuclear data uncertainties on the reactivity coefficients of ALFRED

Wednesday 28 June 2017 17:50 (1h 10m)

The advancement of the design of ALFRED –the Advanced Lead-cooled Fast Reactor European Demonstrator –beyond the conceptual phase, passes through the analysis of the impact of uncertainties, notably to what concerns safety-related conditions.
Focusing on the design of the core, nuclear data are the main source of uncertainties, so that their evaluation is of utmost importance in order to assess the favourable behaviour of the system under beyond-Design Basis transients, as resulting from previous best estimate analyses standing on nominal values of the system parameters.
This work presents the results of the sensitivity/uncertainty (S/U) analysis of the ALFRED core on the reactivity (k-eff) and safety coefficients. The sensitivity analysis allowed pointing out firstly the most relevant cross sections for every response function and the key regions where safety parameters needed to be evaluated. Uncertainty analysis allowed then establishing a possible range of confidence for the reactivity coefficients. The adjoint-based technique involved in TSUNAMI-3D module from SCALE6 system was used.
The confidence intervals identified for each reactivity coefficient will permit transient calculations to propagate uncertainties into transient behaviour, after pointing out the most unfavourable –yet physical –set of reactivity coefficients for the selected transient scenarios. This will in turn provide an exhaustive picture of the influence of nuclear data uncertainties on core performance, identifying key parameters and possibly indicating specific actions required to achieve the aimed safety performances.

Country/Int. Organization

Italy

Author: Prof. GARCIA-HERRANZ, Nuria (Universidad Politécnica de Madrid (UPM))

Co-authors: Mr LOPEZ, Daniel (Centro de Investigaciones Científicas, Medioambientales y Tecnológicas (CIEMAT)); Mr LODI, Francesco (Univerity of Bologna); Dr ALVAREZ-VELARDE, Francisco (Centro de Investigaciones Científicas, Medioambientales y Tecnológicas (CIEMAT)); Dr GRASSO, Giacomo (Italian National Agency for New Technology, Energy and Sustainable Economic Development (ENEA)); Mr ROMOJARO, Pablo (Universidad Politécnica de Madrid (UPM))

Presenter: Dr GRASSO, Giacomo (Italian National Agency for New Technology, Energy and Sustainable Economic Development (ENEA))

Session Classification: Poster Session 2

Track Classification: Track 6. Test Reactors, Experiments and Modeling and Simulations