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An Investigation of Multiple RV-SGV Design Concepts for SMART Plus

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This is a preliminary conceptual design configurations study for SMART Plus reactor vessel (RV) and steam generators (SGVs) for the purpose of enhancing its economic efficiency and safety by introducing innovative element technologies. To enhance the competitiveness of SMART, several element technologies have been suggested such as printed circuit steam generator (PCSG), in-vessel control element drive mechanism (IV-CEDM), an improved RV module, and so on. The most important and promising one of those is to utilize a printed circuit heat exchanger (PCHE) as a steam generator, and to develop an improved RV module adopting the PCSG, which can enhance the economic efficiency of SMART Plus. Several types of conceptual design candidates of SMART Plus were investigated thoroughly in the present study to find out the most effective reactor configuration for economic enhancement without drastic degradation of safety. There are five conceptual designs for arrangement of an RV and SGVs, i.e., integral, 1-SGV modular, 2-SGV modular, 3-SGV modular, and 4-SGV modular arrangement.

Speaker Bio

Primary author: Dr MOON, Joo Hyung (Korea Atomic Energy Research Institute - KAERI)

Co-authors: Mr ALTAYEB, Abdulrahman (King Abdullah City for Atomic and Renewable Energy); Dr CHO, Hyunjun (Korea Atomic Energy Research Institute - KAERI); Dr LEE, Kang Heon (Korea Atomic Energy Research Institute - KAERI); Dr AHN, Kwanghyun (Korea Atomic Energy Research Institute - KAERI); BUSHNAG, Mazen (King Abdullah City for Atomic and Renewable Energy)

Presenter: BUSHNAG, Mazen (King Abdullah City for Atomic and Renewable Energy)

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