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Abstract Collection

Muhammad Budi Setiawan, Ihda Husnayani, Heni Susiati., *Assessment of Radiological Impacts from Postulated Accident Conditions of HTGR: A Case Study in Serpong Nuclear Area.*, Tri Dasa Mega, 24 (2), 51.

High-temperature gas-cooled reactor (HTGR) design has improved safety which relies on its TRISO-coated fuel particles that are considered as no failure even in accident conditions. However, the radiological impacts of accident conditions in HTGR are still important to be assessed. This research is aimed to perform a radiological impacts assessment of two postulated accidents of HTGR, which are depressurization and water ingress accidents. As a case study, a 10-MWt pebble-bed HTGR design named Reaktor Daya Eksperimental with the planned site located in Serpong Nuclear Area was chosen. The source terms from the accident conditions were estimated using the mechanistic source term model and the dose consequences were calculated using PC-COSYMA. The input data for PC-COSYMA, consisting of meteorological, population distribution, agricultural, and local farm data, were compiled based on the site data of the Serpong Nuclear Area. The radiological impacts were assessed based on individual and collective doses. The results showed that the highest dose will be received by the community within a radius of 250 m to the south from the reactor, amounting to about 7.22E-02 mSv and 3.04E-03 mSv from depressurization and water ingress accidents, respectively. It was also found that these accidents only result in minor radiological impacts since the highest dose obtained is still below the limit set by the national nuclear regulatory agency (BAPETEN) and do not require any countermeasures (iodine thyroid blocking, sheltering, evacuation, food ban, decontamination, and relocation).
Keywords: HTGR, Depressurization, Water Ingress, Radiological impacts, Radiation doses.

Lily Suparlina, Purwadi Purwadi, Nabeshima Kunihiko., *Analysis of the RSG-GAS PPF Value Dependence on the Fuel Burnup.*, Tri Dasa Mega, 24 (2), 59.

The RSG-GAS reactor has been operated in a safe and reliable manner for about 35 years since it commenced its operation in 1987 to serve radioisotopes production, NAA, neutron beam experiments, material irradiation, and reactor physics experimental activities as well as training purposes. Power peaking factor (PPF) has a strong relation to operation safety as well as service availability. Its value is necessary to determine by calculation since it is impossible to determine it experimentally in the core. This paper is intended to analyze the PPF values of the RSG-GAS reactor core as a function of burnup. The analysis was done using WIMSD-5B/BATAN-3DIFF computer codes. The result shows that the PPF values are significantly different for each burnup or energy in MWD. The values of axial and radial PPF are still under the safety limit and the BATAN-3DIFF code satisfyingly determines the PPF values of the RSG-GAS reactor core and supports the safety of reactor operation.

Keywords: RSG-GAS reactor, Reactor operation, Equilibrium core, BATAN-3DIFF, PPF value.

Jonny Haratua Panggabean, Santo Paulus Rajagukguk, Syaiful Bakhri., *Analysis of Thorium Pin Cell Burnup of the PWR using WIMS Code.*, Tri Dasa Mega, 24 (2), 67.

A thorium-fueled benchmark comparison was made in this study between state-of-the-art codes, WIMSD-5B code to MOCUP (MCNP4B + ORIGEN2), and CASMO-4 for burnup calculations as an effort to examine the possible benefits of using thorium in PWR fuel. WIMSD-5B calculations employ the same model as a reference, while for MOCUP and CASMO, there are some differences in methodology and cross-section libraries. On a PWR pin cell model, eigenvalue and isotope concentrations were examined up to high burn-up. The eigenvalue comparison as a function of burn-up is in good agreement, with a maximum difference of less than 5% and an average absolute difference of less than 1%. The isotope concentration comparisons outperform a set of ThO2-UO2 fuel benchmarks and are comparable to a set of uranium fuel benchmarks previously published in the literature. As a burn-up function, the eigenvalue comparison is discussed in this paper. The actinide and fission product data sources for a typical thorium fuel are reported in the WIMSD-5B burnup calculations. The reasons for discrepancies in coding are examined and explored.

Keywords: Thorium, PWR Fuel, Burn up, Pin Cell, WIMSD-5B

Ratih Luhuring Tyas, Deswandri, Dinnia Intaningrum, Julwan Hendry Purba., *Safety Assessment on the Decommissioning Stage of Indonesian TRIGA 2000 Research Reactor.*, Tri Dasa Mega, 24 (2), 75.

Decommissioning is the final stage of a nuclear reactor. In preparing the decommissioning plan, one of the important elements that need to be considered is safety assessment. During decommissioning, there are many complex tasks to be done where the radiological and non-radiological hazards arise and can significantly affect not only the workers but also the general public and the environment. Indonesia has no experience with nuclear reactor decommissioning, so it is necessary to study various experiences of decommissioning activities in the world. This study proposes a framework to implement the safety assessment on the decommissioning of the TRIGA 2000 research reactor. The framework was developed on desk-based research and analysis. The proposed framework involves the facility and decommissioning activities, hazard identification, hazard analysis, hazard evaluation, hazard or risk control, and independent review.

Keywords: Safety assessment, Decommissioning, Hazard, Research Reactor, TRIGA 2000.

Iman Kuntoro, Lily Suparlina, Purwadi Purwadi., *The Assessment of the Safety Operation of RSG-GAS Reactor for Radioisotope Target Irradiation.*, Tri Dasa Mega, 24 (2), 85.

The RSG-GAS multipurpose reactor is operated to serve the utilization in the field of radioisotope production, neutron activation analysis (NAA), and material research. The reactor actually has the power of 30 MW thermal, but upon considerations of efficiency and of most user's requirements, the reactor is mostly operated at the power of 15 MW thermal, 5 days a week to produce a primary radioisotope from the target of 2 grams U-235. To ensure safe operation and optimum utilization, a safety procedure was established. The paper is intended to assess the operation safety in serving radioisotope target irradiation at its cycle operation. The assessment was carried out for core numbers 102 – 105. The result shows that excess reactivity and shutdown margin reactivity are safe to provide the target irradiation in the core for each cycle operation.

Keywords: RSG-GAS reactor, Operation safety, Target irradiation. Radioisotope production.

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