P-ISSN: 1411-240X E-ISSN: 2527-9963
Accreditation No.: 200/M/KPT/2020
Accredited to Vol. 27 No. 1 (February 2025)

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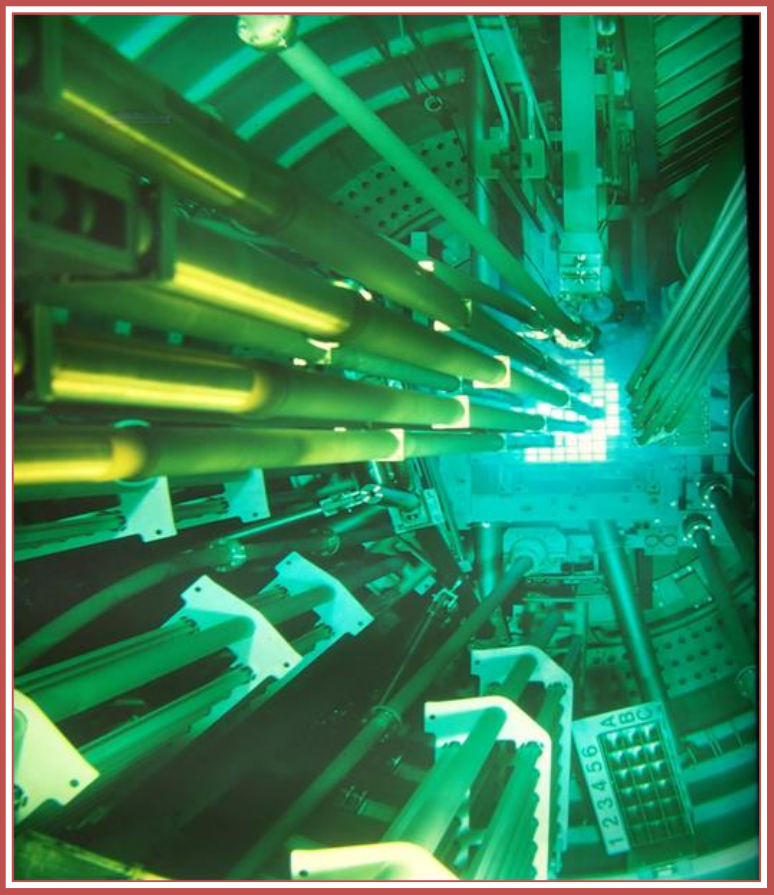

JOURNAL OF NUCLEAR REACTOR TECHNOLOGY
TRI DASA MEGA

Tri Dasa Mega	Vol. 25	No. 2	Hal. 45 – 96	Serpong June 2023	P-ISSN: 1411-240X E-ISSN: 2527-9963

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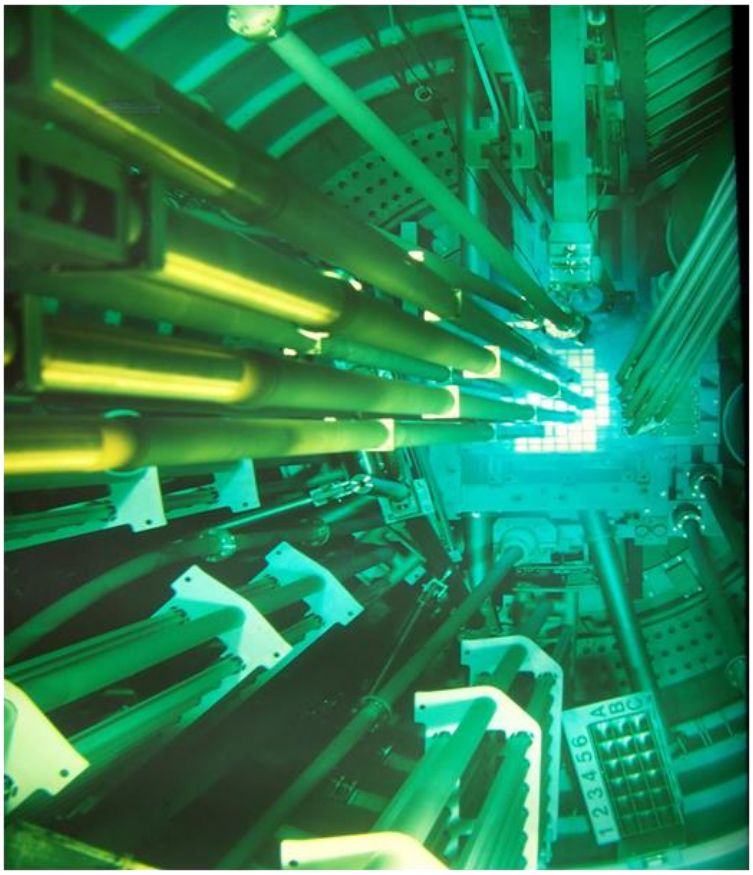

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JURNAL
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Vol. 25 No. 2 June 2023

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PUBLISHER
Research Center for Nuclear Reactor Technology
National Research Innovation Agency (BRIN)

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Situs Web: http://jurnal.batan.go.id/index.php/tridam

*Published three times a year in **February**, **June,** and **October***

P-ISSN: 1411-240X E-ISSN: 2527-9963
Accreditation No.: 200/M/KPT/2020
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JURNAL
TEKNOLOGI REAKTOR NUKLIR
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P-ISSN: 1411-240X E-ISSN: 2527-9963
Accreditation No.: 200/M/KPT/2020
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JURNAL
TEKNOLOGI REAKTOR NUKLIR
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Accreditation No.: 200/M/KPT/2020
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PREFACE

Dear readers,

With great pleasure, we provide you with the first issue of the Jurnal Teknologi Reaktor Nuklir (Journal of Nuclear Reactor Technology), Tri Dasa Mega, in 2023 – Vol. 25 No. 2 (June 2023). This issue contains five articles discussing various applications of nuclear technologies and sciences.

The first article "A Simulation of Irradiation Calculations on Lutetium-177 Production in RSG-GAS Using U3Si2-Al and U7MO-Al Fuels" was written by Lena Rosmayani, Anis Rohanda, Raden Farzand Abdullatif from the Department of Physics, Faculty of Mathematics and Natural Sciences – Jenderal Soedirman University, Purwokerto, Banyumas, Central Java, Indonesia. They study radioisotope Lutetium-177 production in RSG-GAS Using U3Si2-Al and U7MO-Al Fuels. This study aims to analyze the comparative calculation of 177Lu activity and its purity. One of the production methods of 177Lu in RSG-GAS is carried out by irradiating Lu2O3 targets. This Lu2O3 target irradiation produced the radioisotope 177Lu along with 177mLu as an impurity. For Medical treatment using radioisotopes, the minimum activity for 177Lu is 20 GBq/mg, and the impurity should not exceed 0.1%. Calculations were carried out with thermal neutron flux input at 15 MWt operational power for the RSG-GAS core with U3Si2-Al fuel and U9Mo-Al fuel. Calculations were carried out by simulating 8 days of irradiation using ORIGEN2.1. The results showed that the 177Lu activity resulting from irradiation of Lu2O3 targets at various CIP positions in the U9Mo-Al reactor core was larger than that of the U3Si2-Al core. Until the 30th day, the 177Lu product resulting from irradiation on the U3Si2-Al and U9Mo-Al cores still meet the minimum value.

The second article "Neutronic Analysis of the RSG-GAS Fuel Using Burnable Poison" was investigated by Muhammad Ridho, Haryono Budi Santosa, Tukiran Surbakti, Purwadi Purwadi from the Department of Nuclear Engineering and Engineering Physics, Faculty of Engineering, UGM, Yogyakarta, Indonesia. This research is focused on the neutronic parameter of the RSG-Gas fuel using burnable poison. The objective of the study is to examine how the RSG-GAS fuel safety parameters behave in a typical reactor operation state. A lattice cell fuel model of the fuel lattice of the RSG-GAS reactor core was modeled using WIMSD-5B with cross-section library data based on ENDF/B-VIII.0. The value of the infinite multiplication factor with various burnable poison concentrations, as well as the moderator and fuel temperatures, were the variables that were examined. The reactivity coefficient parameters were similarly analyzed. By comparing the WIMSD-5B code results with information from the SAR document, the WIMS model for RSG-GAS fuel was verified, and it was inferred that the parameters are in good agreement. Safe behavior uses the predicted reactivity coefficient values as an example.

The third article "Preliminary Study on Implementing a Simplified Source Terms Estimation Program for Early Radiological Consequences Analysis" was studied by Theo Alvin Ryanto, Jupiter Sitorus Pane, Muhammad Budi Setiawan, Ihda Husnayani, Anik Purwaningsih, Hendro Tjahjono, from Research Center for Nuclear Reactor Technology, South Tangerang, Banten, Indonesia. They study the radionuclide release into the atmosphere, including source terms estimation. One simplified method for such estimation is the use of the Relative Volatility approach by Kess and Booth, published in IAEA TECDOC 1127. The objective of this study was to evaluate the use of a simple and comprehensive tool for estimating the source terms of planned nuclear power plants to facilitate the

analysis of radiological consequences during site evaluation. Input parameters for the estimation include fuel burn-up, blow-down time, specific heat transfer of fuel to cladding, and coolant debit, using 100 MWe PWR as a case study.

The fourth article “Systematic Literature Review (SLR): Nuclear Power Plants” was explored by Muhammad Reza Maulana Aliva, Nofi Yendri Sudiar, Hamd*,* from the Department of Physics, Faculty of Math and Science, Padang State University, Indonesia. They study Nuclear Power Plant (NPP) as a thermal power plant using one or several nuclear reactors as its heat source. NPP uses radioactive materials such as uranium as the heat source by utilizing fission reactions. The fission reaction produces enormous heat energy. Currently, there are many studies on NPPs, ranging from technological developments to the environmental impact of the NPP itself. This study aims to identify research developments on nuclear power plants from around the world obtained from relevant international journals in 2017-2023. The method used in this study is the Systematic Literature Review (SLR) method. The SLR method is used to identify, review, evaluate, and conclude all available research with interesting topic areas, with specific relevant research questions. Data were obtained by searching journals with Harzing's Publish or Perish application from the Scopus journal database. There are 191 journals with the keyword " Nuclear Power Plant " obtained from the Scopus database. Then these journals are filtered by type of article and if the number of citations is more than 32, then 49 articles are obtained which will be reviewed. This SLR method shows the development of research on NPP in several developed countries that have been using this technology for a long time. In addition, research topics such as the Fukushima accident, fault diagnostics, and safety assessment are the most discussed topics in the research so that they can be used as a reference for countries that are developing NPP.

The fifth article “Analysis of Core Configuration for Conceptual Gas Cooled Fast Reactor (GFR) using OpenMCynthesis” was investigated by Iklimatul Karomah, Ahmad Muzaki Mabruri, Ratna Dewi Syarifah, Nuri Trianti, from the Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Jember, Indonesia. The paper is presented on a conceptual core configuration of Gas Cooled Fast Reactor (GFR), as part of a generation IV reactor. Uranium-plutonium carbide (UC-PuC) was used as reactor fuel and a Monte Carlo simulation method using OpenMC has been carried out. This study aims to find the composition of uranium-plutonium carbide fuel to use inside a fuel pin, making up a hexagonal prism fuel assembly arranged to form a full core. A homogeneous and heterogeneous core configuration was considered in this study, while the plutonium percentage varied.

On behalf of the Jurnal Teknologi Reaktor Nuklir (Journal of Nuclear Reactor Technology) Tri Dasa Mega, I would like to thank all Editors, Reviewers, Managements, Authors, and Readers for your endless support.

Editor in Chief