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Vol. 23 No. 2 June 2021

TABLE OF CONTENTS

	PAGE
EDITORIAL BOARD	i
PEER REVIEWERS	ii
TABLE OF CONTENTS	iii
PREFACE	iv
PRELIMINARY ASSESSMENT OF ENGINEERED SAFETY FEATURES AGAINST STATION BLACKOUT IN SELECTED PWR MODELS	47-56
<i>(Andi Sofrany Ekariansyah, Surip Widodo, Susyadi, Hendro Tjahjono)</i>	
ENVIRONMENTAL CONSEQUENCES OF ROUTINE RELEASES FROM SMALL MEDIUM REACTOR AT BABEL SITE.....	57-62
<i>(Pande Made Udiyani, M. Budi Setiawan, Anik Purwaningsih, Nursinta Adi Wahanani, Amir Hamzah, Hery Adrial, Jupiter S. Pane, Muksin Aji Setiawan)</i>	
CALCULATION OF RADIOACTIVE SOURCE TERM RELEASE FROM FLEXBLUE SMR	63-68
<i>(M. Budi Setiawan and Pande Made Udiyani)</i>	
ANALYSIS OF NEUTRON ABSORBER MATERIALS ON THE SAFETY PARAMETERS IN THE RSG-GAS REACTOR	69-78
<i>(Lily Suparlina, Tukiran Surbakti, Surian Pinem, Purwadi)</i>	
RADIATION DOSE OPTIMIZATION OF BREAST CANCER WITH PROTON THERAPY METHOD USING PARTICLE AND HEAVY ION TRANSPORT CODE SYSTEM.....	79-85
<i>(Hafiz Fahrurrozi, Andang Widi Harto, Isman Mulyadi Triatmoko, Gede Sutrisna Wijaya, Yohannes Sardjono)</i>	
ABSTRACT COLLECTION	86-87
KEYWORDS INDEX	88-89
ACKNOWLEDGMENT.....	90

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 2021 – Vol. 23 No. 2 (June 2021). This issue contains five articles discussing various applications of nuclear technologies and sciences.

The first article “Preliminary Assessment of Engineered Safety Features Against Station Blackout in Selected PWR Models” was written by Andi Sofrany Ekariansyah, Surip Widodo, Susyadi, Hendro Tjahjono from the Center for Nuclear Reactor Technology and Safety, National Nuclear Energy Agency (BATAN), Tangerang Selatan. They study to assess the technology of engineered safety features (ESFs) of the newly constructed PWRs, especially in facing the station blackout (SBO) event. It is expected from this study that there are a number of PWR models that can be considered to be constructed in Indonesia from the year of 2020. The scope of the study is PWRs with a limited capacity from 900 to 1100 MWe constructed and operated after 2011 and small-modular type of reactors (SMRs) with the status of at least under licensing. Based on the ESFs design assessment, the passive core decay heat removal has been applied in the most PWR models, which is typically using steam condensing inside heat exchanger within a water tank or by air cooling. From the selected PWR models, the CPR-1000, HPR-1000, AP-1000, and VVER-1000, 1200, 1300 series have the capability to remove the core decay heat passively.

The second article “Environmental Consequences of Routine Releases from Small Medium Reactor at Babel Site” was investigated by S Pande Made Udiyani, M. Budi Setiawan, Anik Purwaningsih, Nursinta Adi Wahanani, Amir Hamzah, Hery Adrial, Jupiter S. Pane, Muksin Aji Setiawan from the Center for Nuclear Reactor Technology and Safety, National Nuclear Energy Agency (BATAN), Tangerang Selatan. This research is focused in the assessment and analysis of the results of PWR safety study related to the routine release of radioactivity from the SMR subsystems and components of the 100 MWe-type PWR along with its consequences in the site. The core inventory calculation was done using ORIGEN2 software, applying release parameters from the existing analysis and calculation results. The radiological consequences were calculated by the PC-CREAM program package. Environmental and meteorological data were obtained using Arc-GIS and spatial analysis. The Bangka Belitung (Babel) site was used as the specific footprint. Analyzing PC-CREAM output data the radiological consequences of routine operation of 3 100 MWe PWR modules on Sebagin site (South Bangka) and Muntok site.

The third article “Calculation of Radioactive Source Term Release from Flexblue SMR” was studied by M. Budi Setiawan and Pande Made Udiyani from the Center for Nuclear Reactor Technology and Safety, National Nuclear Energy Agency (BATAN), Tangerang Selatan. They study about safety aspect of the Flexblue reactor module. It is necessary to know the release of fission products (source term), for the study of the radiation safety of a nuclear reactor. This paper aims to examine the source term in normal and abnormal operating conditions, as well as postulated accidents. Based on the Flexblue reactor core parameter data, the calculation of the reactor core inventory using the ORIGEN2 software is evaluated. The source term calculation uses mechanistic and graded approach. The normal source term is calculated assuming the presence of impurities on the fuel plate, due to fabrication limitations.

The fourth article “Analysis of Neutron Absorber Materials on the Safety Parameters in the RSG-GAS Reactor” was explored by Lily Suparlina, Tukiran Surbakti, Surian Pinem, Purwadi from the Center the Center for Nuclear Reactor Technology and Safety, National Nuclear Energy Agency (BATAN), Tangerang Selatan. Their research about possibility using neutron absorber materials in RSG-GAS research reactor as a control rod. In this research, a neutron absorber analysis was carried out on the neutronic safety parameters for the RSG-GAS reactor core. The WIMSD-5B and Batan-3DIFF computer programs were used to perform this calculation.

The fifth article “Radiation Dose Optimization of Breast Cancer with Proton Therapy Method Using Particle and Heavy Ion Transport Code System” was investigated by Milah Fadhilah Kusuma Fasihul, Andang Widi Harto, Isman Mulyadi Triatmoko, Gede Sutrisna Wijaya, and Yohannes Sardjono from Department of Nuclear Engineering and Physics Engineering, Faculty of Engineering, Universitas Gadjah Mada, Yogyakarta. The paper is presented cancer treatments conducted by proton therapy method. In this study, proton therapy in breast cancer will be simulated. This study aims to identify the optimal dose in breast cancer therapy using proton therapy and to identify the dose exposed in the surrounding organs. This study uses simulation based PHITS program to model the geometry and the components of breast cancer and the surrounding organs.

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

Editor in Chief