Nuclear Technology

VOLUME 202 · NUMBERS 2-3 · MAY-JUNE 2018

Selected papers from the Tenth International Topical Meeting on Nuclear Plant Instrumentation, Control, and Human-Machine Interface Technologies

Contents

iii Foreword

Jacques V. Hugo, Jamie Coble

TECHNICAL PAPERS

- 101 Development and Assessment of a Diversity and Defense-in-Depth Strategy for the TerraPower TWR-P Advanced Nuclear Power Plant

 Baofu Lu. Eric Williams, Jerry Mauck, Michael Howard, Richard Wood, Edward L. Quinn
- 106 Fault Propagation and Effects Analysis for Designing an Online Monitoring System for the Secondary Loop of the Nuclear Power Plant Portion of a Hybrid Energy System

 Xiaoxu Diao, Yunfei Zhao, Mike Pietrykowski, Zhuoer Wang, Shannon Bragg-Sitton,
 Carol Smidts
- 124 Mechanical and Chemical Properties of Harvested Hypalon Cable Jacket Subjected to Accelerated Thermal Aging

Robert C. Duckworth, Michelle K. Kidder, Tolga Aytug, Leonard S. Fifield, William Glass III, Sarah Davis

- **132** Safety Demonstration of a Class 1 Smart Device *Sofia Guerra, Eoin Butler*
- 141 A Bio-Inspired, Self-Healing, Resilient Architecture for Digital Instrumentation and Control Systems and Embedded Devices

 Shawkat S. Khairullah, Carl R. Elks
- 153 Data-Driven Analysis of Ultrasonic Inspection Data of Pressure Tubes

 Panagiotis Zacharis, Graeme West, Gordon Dobie, Timothy Lardner, Anthony Gachagan
- 161 Model-Assisted Approach for Probability of Detection (POD) in High-Temperature Ultrasonic NDE Using Low-Temperature Signals

 Prathamesh N. Bilgunde, Leonard J. Bond
- 173 A Novel Technique Applying Spectral Estimation to Johnson Noise Thermometry
 N. Dianne Bull Ezell, Chuck Britton, Nance Ericson, David Holcomb, M. J. Roberts,
 Seddik Djouadi, Richard Wood
- **180** Design and Analysis of Embedded I&C for a Fully Submerged Magnetically Suspended Impeller Pump

Alexander M. Melin, Roger A. Kisner

—continued—

Contents continued

VOLUME 202 · NUMBERS 2-3 · MAY-JUNE 2018

- 191 Design Considerations for Secure Wireless Sensor Communication Systems in Harsh Electromagnetic Environments of Nuclear Reactor Facilities Faranak Nekoogar, Farid Dowla
- **201** Automated Work Packages: Capabilities of the Future *Ahmad Al Rashdan, Johanna Oxstrand, Vivek Agarwal*
- **210** New Procedural Path for F&B Operation and Its Risk Impact on a Nuclear Power Plant *Wondea Jung*
- **220** Application of Eye Tracking for Measurement and Evaluation in Human Factors Studies in Control Room Modernization

Casey Kovesdi, Zachary Spielman, Katya LeBlanc, Brandon Rice

230 Development of the Delphi Display Concept for Alternative Explanations Decision-Making Support

Charles Weaver, John Gwynne, Mark F. St. John

237 Eye-Tracking Studies Based on Attentional-Resource Effectiveness and Insights into Future Research

Jun Su Ha, Young-Ji Byon, Chung-Suk Cho, Poong Hyun Seong

- **247** Computer-Based Human-Machine Interfaces for Emergency Operation *Maren H. Rø Eitrheim, Håkan Svengren, Alexandra Fernandes*
- **259** Design and Implementation of HuREX Analysis Supporting Interface for HRA Data Extraction Seunghwan Kim, Yochan Kim, Sun Yeong Choi, Wondea Jung, Jinkyun Park
- **278** Use of Immersive 3-D Virtual Reality Environments in Control Room Validations *Joakim D. Bergroth. Hanna M. K. Koskinen. Jari O. Laarni*
- 290 Human Factors Engineering in the Design of the Socio-Technical System of the Control Room of a New Generation Reactor: Issues Faced During Multistage Validation

 Stanislas Couix

INDEXES/CONTENTS

299 Author Index

300 Subject Index

v Contents of Volume 202

