

University of Florida Nuclear Training Reactor (UFTR) Digital Control System Upgrade for Education and Training of Engineers and Operators,

May 2013 Progress Report

Phase II, By Dr. Kelly A. Jordan, Director UFTR

Background

The UFTR proposes to implement the first-ever fully digital control and safety system at a nuclear reactor in the United States. This is the key piece in a full renovation of the facility, which has been in operation since 1959. This upgrade will replace the analog system with a digital control system from Siemens Energy. This facility will provide for the training and education of the necessary workforce in the area of digital control and instrumentation for nuclear reactors. The upgrade ensures that the UFTR is on a footing to continue its research and education missions over the next decades, and will open up new revenue streams to put it on a sustainable financial path. FESC is supporting this project with a grant to help provide for critical infrastructure equipment, in this case, new reactor shutdown blade drives which will interface to the new digital system.

Progress

Blade drives are equipment that control the neutron absorber blades in the core of the reactor. By inserting and withdrawing the blades, the reactor can be shut down or the power level changed. As part of both the digital control project and the general modernization of the UFTR, the reactor blade drives will be replaced with modern components that can interface with the new control system. The first design phase of the digital system is nearly complete. The Engineering design began in April 2013 for the new blade drives, with manufacturing and install to be completed before the end of the year.

New Collaborations

| Partner name | Title or short description of the collaboration | Funding, if applicable |
|--|--|--|
| Swiss Federal Institute of Technology, Lausanne (EPFL) | Validation of Reactor Physics-Thermalhydraulics Coupled Calculations in Water-Cooled Research Reactors with Laminar Flow Regimes | \$200,000 in funding for Ph.D. student and postdoc at EPFL |

Proposals Submitted

| Title | Agency | PI, Co-PI and Collaborators | Funding Requested | Project Time | Date Submitted |
|---|---------------|--|--------------------------|---------------------|-----------------------|
| <i>Validation of Reactor Physics-Thermalhydraulics Coupled Calculations in Water-Cooled Research Reactors with Laminar Flow Regimes</i> | Swissnuclear | PI – K. Jordan, UF Collaborators – A. Pautz and G. Girardin, Swiss Federal Ins. of Tech., Lausanne | \$10,000 | 3 months | Apr. 13 |
| <i>Plutonium Assay In Spent Fuel Using Multispectral Active Neutron Interrogation Analysis</i> | DOE | K. Jordan, PI | \$800,000 | 3 yrs | Jan 13 |
| <i>Experimental Evaluation Of Methods For Digital I&C Software Reliability Characterization</i> | DOE | K. Jordan, PI | \$400,000 | 2 yrs | Jan 13 |

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| <i>Multiphysics-Based Optimization of SCWR-SMR Fuel Assemblies</i> | DOE | D. Schubring, PI UF | \$400,000 | 2 yrs | Jan 13 |
| <i>Advanced Computational Methods in Nuclear Analyses</i> | NRC | S. Goluoglu, PI UF | \$200,000 | 2 yrs | Jan 13 |
| <i>Beyond High-k Dielectrics: Basic Science of Radiation Effects in Materials for Multi-Functional Nanoelectromechanical Switches</i> | DTRA | J. Jones, PI UF | \$1,050,000 | 4 yrs | Jan 13 |

Grants Awarded

| Title | Agency | PI, Co-PIs and Collaborators | Period of Performance | Funding Awarded |
|---|---------------|-------------------------------------|------------------------------|------------------------|
| <i>Nuclear Safeguards Education at UF</i> | ORNL | S. Goluoglu, K. Jordan, UF | 1 yr | \$100,000 |