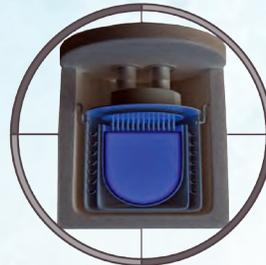
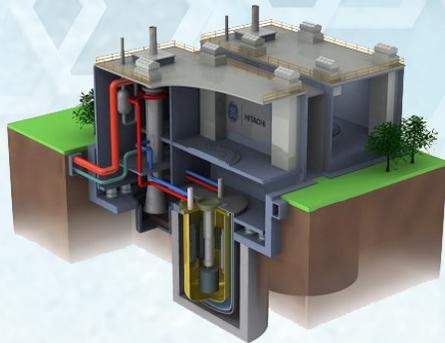




ONLINE MONITORING

In Small Modular Reactors



PROJECT DESCRIPTION

For commercial nuclear power generation, Small Modular Reactors (SMRs) are at the forefront of innovation. These reactors are factory built and shipped by rail or barge to the construction site. Their relative power output and cost, compared to traditional nuclear plants, allows them to be far more accessible to untouched nuclear markets such as remote locations and developing countries, as well as cost-sensitive utilities in the U.S. Currently, all SMR designs are still under development with significant engineering challenges remaining. Furthermore, the Instrumentation and Control (I&C) systems, which enable observation and safe and efficient operation of the reactors, are still being designed.

One issue differentiating SMRs from traditional reactors is a higher level of automation enabled by the simplicity and large safety margins, enabling long-term power generation with minimal maintenance and few full-time personnel. As such, existing Online Monitoring (OLM) technologies are well suited for SMRs to provide for predictive maintenance as a way to optimize maintenance costs and reduce manpower requirements. The research and development (R&D) needed to adapt current OLM methods to SMR architecture is currently underway at AMS. This is being achieved through a Department of Energy (DOE) project, which AMS is conducting in partnership with the University of Tennessee (UT).

TECHNICAL APPROACH

In order to determine what type of OLM system would be optimal for SMR applications, various SMR designs are being evaluated for operating conditions and physical limitations in spacing and size. This will allow for the selection of an appropriate sensor suite for OLM inputs. Additionally, work is being performed by the UT Department of Nuclear Engineering to simulate SMR operation and provide data for OLM analysis to enable early detection of sensor faults and process anomalies.

Benefits of OLM to SMRS Include:

- Calibration Verification of Sensors During Operation
- Drift Monitoring of Instrumentation
- Enhanced Safety Through Improved State Awareness
- Early Detection of Process and Equipment Degradation
- Optimal Maintenance and Capital Replacement Decisions
- Remote Monitoring of SMR Components
- In-Situ Response Time Measurement of Pressure, Level, and Flow Transmitters As Well As Temperature Sensors and Neutron Detectors
- Optimal Sensor Placement for Measurement of Process Parameters

10CFR50 Appendix B Program

For more information please contact: Darrell W. Mitchell | Technical Services Manager
Ext: 108 Email: darrell@ams-corp.com

Ryan D. O'Hagan | Engineering Project Manager
Ext: 103 Email: ryan@ams-corp.com

AMS Technology Center
9119 Cross Park Drive
Knoxville, TN 37923, USA

TEL 865 691 1756
FAX 865 691 9344

EMAIL info@ams-corp.com
WEB www.ams-corp.com

© 2018 AMS CORPORATION