

**U.S. DEPARTMENT OF ENERGY  
INTERNATIONAL NUCLEAR ENERGY RESEARCH INITIATIVE  
DOE/ROK**

**ABSTRACT**

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**Condition Monitoring through Advanced Sensor and Computational Technology**

**Primary Investigator (U.S.):** Vincent Luk, Sandia National Laboratories (SNL)

**Project Number:** 2002-021K

**Primary Investigator (Republic of Korea):** J-T Kim, Republic of Korea Atomic Energy Research Institute (KAERI)

**Project Start Date:** December 11, 2001

**Project End Date:** December 30, 2004

**Collaborators:** Seoul National University, Pusan National University, Chungnam National University

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Deployment of advanced condition monitoring systems offers the prospect of improved performance, assessment, and operation, simplified design, enhanced safety, and reduced overall cost of advanced and next generation nuclear power plants (NPPs). For advanced and next generation NPP designs, the opportunity exists to develop and implement real-time and continuous monitoring systems by integrating advanced sensor and computational technology into design and operational concepts. This research project encompasses an international collaborative effort to develop and demonstrate advanced sensor and computational technology for continuous monitoring of the condition of components, structures, and systems in advanced and next-generation NPPs. This project includes the investigation and adaptation of several advanced sensor technologies from Korean and U.S. National Lab research communities for application to the NPP industry. Also, the project team will develop advanced sophisticated signal processing, noise reduction, and pattern recognition techniques and algorithms from other fields, such as satellites, robotics, and radar systems, as well as evaluate encryption and data authentication techniques for the wireless transmission of sensor data. Selected sensors and computational techniques will be demonstrated on prototypical components, structures, and systems.