

**NEER FY 2001
PROJECT ABSTRACT**

Grant Number:	01ID14114
Project Title:	Automated On-Line Monitoring and Diagnostics of the Integrated of Nuclear Plant Steam Generators and Heat Exchangers
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Abstract:	<p>The proposed three-year project will be planned for the integration of new, innovative, and existing technologies to develop an automated fault diagnostics and characterization system for nuclear plant heat exchangers and steam generators. Problems in steam generators are a dominating factor in plant operation, maintenance, and economic competitiveness. Benefits to be derived from this project will include minimizing the cost of steam generator inspection, increased reliability of fault detection and quantification, enhanced system safety, aging management and life extension, and design-level changes for on-line monitoring. These issues are of critical importance in the design of the next generation reactors. The research will focus on the development of an automated system for process and structural integrity monitoring of steam generators and heat exchangers. The project will consist of an important task of developing smartness in the tubing structures using embedded piezo-electric sensors for continuous on-line monitoring. Wireless transmission of sensor data and e-monitoring applications will be demonstrated. The development of sensor arrays distributed throughout the structure and processing information from distributed sensors for on-line diagnostics are the anticipated contributions of the project.</p> <p>The following major tasks will be undertaken to accomplish the objectives of the proposed research.</p> <ul style="list-style-type: none">• Development of an automated information processing method for on-line fault monitoring using distributed measurements and hybrid data.• Development of a sensor suite for on-line structural integrity monitoring of heat exchanger and steam generator tubing, leading to the design of a smart structure.• Development of wireless transmission of data and application to e-monitoring.• Integration of the modules for autonomous monitoring and diagnostics.• Laboratory testing of the integrated system to validate remote monitoring of annular tubing structures.