Overview of Trends in Nuclear Power Plant Sensors and Instrumentation

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Abstract – The majority of instruments that monitor process parameters in nuclear power plants (NPPs) have not changed significantly since the existing fleet of light-water reactors (LWRs) were initially constructed. Major advances in electronics and computer technology, particularly over the past two decades, have led to development of sensors and on-line monitoring systems with improved functionality and performance and at reduced costs. While Sensors and monitoring instrumentation technology has advanced rapidly, their adaptation for use in operating NPPs has been rather slow. Gradually, plants are incorporating these new technologies in all aspects of operation and maintenance to help improve safety, reliability and energy production efficiency. An overview of the emerging and future technological trends in sensors and measurement instruments in NPPs is presented here. A number of modern sensors and instruments for on-line monitoring of degradation as well as new testing and maintenance technologies for more efficient and effective life extension and maintenance activities are discussed.

Keywords – Sensors, Instrumentation, On-line monitoring, Nuclear Power Plants