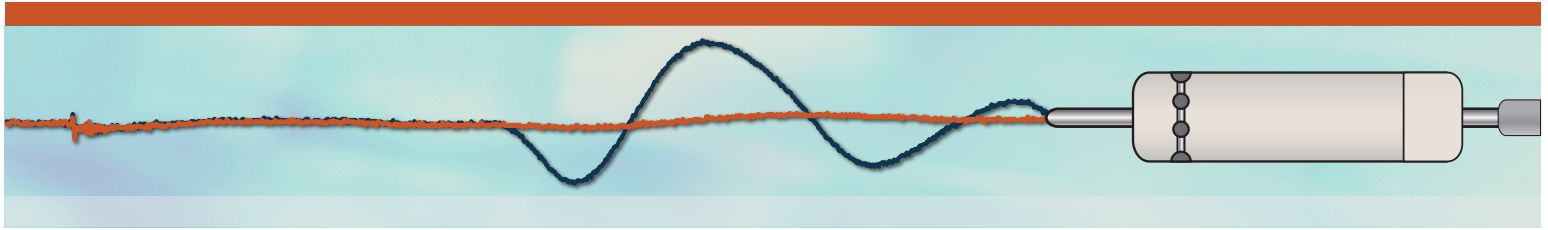




NI TESTING PROGRAM FOR BWR PLANTS



About

SRM/IRM Cable Testing and EMI Troubleshooting

Nuclear instrumentation (NI) systems in BWR plants often suffer from electrical noise issues that can cause plant SCRAMs or threaten on-time start-ups. To address this, AMS has developed an NI testing program for Source Range Monitors and Intermediate Range Monitors (SRMs and IRMs) which employs periodic health checks made through electrical measurements of each detector and its cable and connector properties. These measurements are performed remotely from the control room area using AMS' Cable Characterization System (CHAR). This integrated test unit (Figure 1) has been used in numerous nuclear power plants over the last 20 years to both identify and determine the precise location of problems in NI circuits.

In addition to cable testing, NI troubleshooting often involves Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) measurements that are normally performed in the same visit to the plant as the cable tests (Figure 2). These additional measurements and expertise help to inform recommendations for any repairs or EMI mitigation needed.

Automated LPRM Testing to Reduce Metal Whisker Growth

In addition to cable testing and EMI/RFI measurements, comprehensive NI testing in BWRs also includes Current-Voltage (IV) measurements performed on Local Power Range Monitors (LPRMs). These measurements are performed to prevent or eliminate LPRM metal whisker growth that can cause spiking in the channels or electrical shorts in the detectors. The AMS CHAR system provides multiplexing capabilities capable of testing up to forty 2-conductor cables sequentially to help streamline and shorten time required for the work.

Benefits

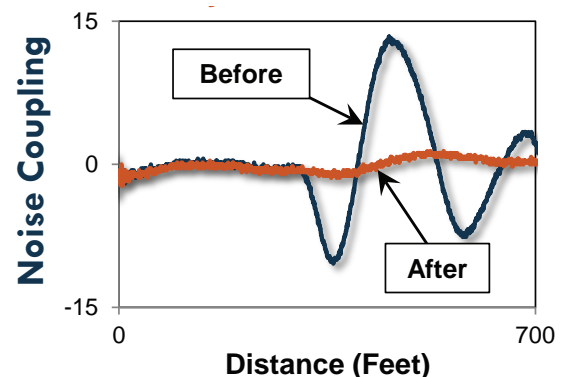
- Reduction of lost generation from SRM/IRM-related issues
- Establish baseline data for future troubleshooting to significantly reduce the time required to resolve future NI problems
- Automation of LPRM "IV Testing" to reduce test time by up to 80%
- Reduction in costs associated with operational issues resulting from LPRM spiking and unexpected failures



Figure 1. CHAR System with Automated Multiplexing Capabilities



Figure 2. EMI/RFI Test Equipment



Diagnostic Test Data Showing Location of IRM Noise Coupling

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*** 10CFR50 Appendix B Program**

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