



# AUTOMATED CABLE TESTING

For Control Rod Drive Mechanisms



## About

Recent experience in a number of nuclear power plants has demonstrated that routine cable testing of control rod drive mechanism (CRDM) cables should be performed to help prevent unplanned downtime or outage schedule delays. Environmental stressors experienced by CRDM cables, connectors, and coils can cause degradation and failures resulting in dropped rods. Additionally, occurrences at a number of sites have shown that the head connections for CRDMs can be damaged as part of the standard process of disconnecting and reconnecting the cables when removing the reactor vessel head for a refueling outage. Electrical testing of the CRDM cables and coils before removal or after restoring the reactor vessel head during a refueling outage provides data as to the health of the CRDM circuits and can provide forewarning of potential problems which are not typically found until plant start-up.

AMS has developed the integrated CHAR cable testing system with multiplexing capabilities which can automate testing of ALL rod control system cables in a single 12-hour shift. The testing performed includes:

1. Insulation Resistance measurements to identify potential ground faults and/or insulation degradation in CRDM head connector assemblies and penetrations
2. Impedance measurements of the CRDM coils and cable circuits (i.e. stationary, moveable, and lift)
3. Time Domain Reflectometry (TDR) to identify the location of CRDM cable circuit faults or problems

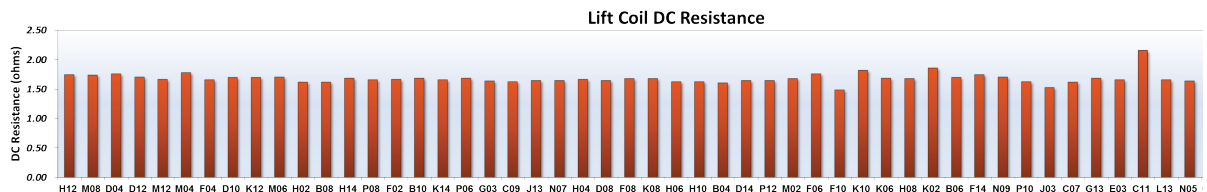
## Benefits

- Reduce testing time for all rod control cable circuits from 1 week to a single 12-hour shift
- Identify CRDM cable circuit problems after shutdown and/or before start-up (i.e. cable, connector, or coil problems)
- Prevent unplanned outage delays and downtime
- Test all CRDM circuits every outage rather than performing only a subset
- Trending CRDM cable circuit and coil health from outage to outage



**CRDM Connector Following Pin-to-Pin Short**

### Typical DC Resistance Data From CRDM Lift Coils



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