

**License Renewal Meeting
on
Electrical Fuse Holder
Interim Staff Guidance (ISG) and
NEI's Proposed Changes to
GALL Aging Management Program (AMP)
for Non-Environmental Qualification Cable**

**Room O-7B4
March 13, 2003
(9:00 AM-1:00 PM)**

Meeting Agenda

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| 1. Welcome/Introductions | 10 minutes |
| 2. Discussion of NEI's proposed changes to GALL AMP
Chapter XI.E2 for non-environmental qualification cable | 90 minutes |
| 3. Discussion of the fuse holder ISG | 45 minutes |
| 4. AMPs for the fuse holder | 45 minutes |
| 5. Public comment | 10 minutes |
| 6. Summary | 30 minutes |

Enclosure 1

XI.E2 ELECTRICAL CABLES NOT SUBJECT TO 10 CFR 50.49 ENVIRONMENTAL QUALIFICATION REQUIREMENTS USED IN INSTRUMENTATION CIRCUITS

Program Description

In most areas within a nuclear power plant, the actual ambient environments (e.g., temperature, radiation, or moisture) are less severe than the plant design environment. However, in a limited number of localized areas, the actual environments may be more severe than the plant design environment for those areas. Conductor insulation materials used in electrical cables may degrade more rapidly than expected in these adverse localized environments. An adverse localized environment is a condition in a limited plant area that is significantly more severe than the specified service environment for the cable. An adverse variation in environment is significant if it could appreciably increase the rate of aging of a component or have an immediate adverse effect on operability.

Exposure of electrical cables to adverse localized environments caused by heat or radiation can result in reduced insulation resistance (IR). Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A significant reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in ~~the instrument loop~~ circuits.

The purpose of the aging management program described herein is to provide reasonable assurance that the intended functions of electrical cables that are not subject to the environmental qualification requirements of 10 CFR 50.49 and are used in instrumentation circuits with sensitive, low-level signals exposed to adverse localized environments caused by heat, radiation or moisture will be maintained consistent with the current licensing basis through the period of extended operation. This program considers the technical information and guidance provided in NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.

In this aging management program, ~~routine calibration tests performed as part of the plant surveillance test program~~ calibration results or findings of surveillance testing programs are used to identify the potential existence of aging degradation. For example, when an instrumentation loop circuit is found to be significantly out of calibration during routine surveillance testing, trouble shooting is performed on the loop, additional evaluation of the circuit is performed.

This aging management program applies to high-range-radiation and neutron flux monitoring instrumentation cables in addition to other cables used in high voltage, low-level signal applications that are sensitive to reduction in insulation resistance. An overlap exists between this program and program XI.E1 in that XI.E1 can be

applied to all instrumentation cables, but is not applied to high-range-radiation and neutron flux monitoring instrumentation cables if the XI.E2 program is applied.

As stated in NUREG/CR-5643, "The major concern with cables is the performance of aged cable when it is exposed to accident conditions." The statement of considerations for the final license renewal rule (60 Fed. Reg. 22477) states, "The major concern is that failures of deteriorated cable systems (cables, connections, and penetrations) might be induced during accident conditions." Since they are not subject to the environmental qualification requirements of 10 CFR 50.49, the electrical cables covered by this aging management program are either not exposed to harsh accident conditions or are not required to remain functional during or following an accident to which they are exposed.

Evaluation and Technical Basis

- 1. *Scope of Program:*** This program applies to electrical cables used in circuits with sensitive, high voltage, low-level signals such as radiation monitoring and nuclear instrumentation that are within the scope of license renewal.
- 2. *Preventive Actions:*** ~~This is a surveillance testing program and~~ No actions are taken as part of this program to prevent or mitigate aging degradation.
- 3. *Parameters Monitored/Inspected:*** The parameters monitored are determined from the specific calibrations or surveillances performed ~~plant technical specifications and are based on the~~ are specific to the instrumentation loop circuit under surveillance or being calibrated, as documented in plant surveillance ~~test~~ procedures.
- 4. *Detection of Aging Effects:*** Review of calibration results or findings of surveillance programs can ~~provides sufficient~~ indication of the need for corrective actions by monitoring key parameters and providing ~~trending~~ data based on acceptance criteria related to instrumentation ~~loop circuit~~ performance. Periodic reviews of results obtained during ~~The normal calibrations or surveillances frequency specified in the plant technical specifications~~ provides reasonable assurance that severe aging degradation will be detected prior to loss of the cable intended function. The first ~~tests~~ reviews for license renewal are to be completed before the period of extended operation.
- 5. *Monitoring and Trending:*** Trending actions are not included as part of this program because the ability to trend test results is dependent on the specific type of test chosen. Although not a requirement, test results that are trendable provide additional information on the rate of degradation.
- 6. *Acceptance Criteria:*** Calibration readings results or findings of surveillances are to be within the ~~loop-specific~~ acceptance criteria, as set out in the ~~plant technical specifications~~ surveillance ~~test~~ procedures.

7. **Corrective Actions:** Corrective actions such as recalibration and circuit trouble-shooting are implemented when calibration or surveillance results or findings of surveillances do not meet the acceptance criteria ~~an instrument loop is found to be out of calibration~~. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address corrective actions.
8. **Confirmation Process:** As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the confirmation process.
9. **Administrative Controls:** As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address administrative controls.
10. **Operating Experience:** Changes in instrument calibration data can be caused by degradation of the circuit cable and are a possible ~~one~~ indication of potential electrical cable degradation.

References

EPRI TR-109619, Guideline for the Management of Adverse Localized Equipment Environments, Electric Power Research Institute, Palo Alto, CA, June 1999.

IEEE Std. P1205-2000, IEEE Guide for Assessing, Monitoring and Mitigating Aging Effects on Class 1E Equipment Used in Nuclear Power Generating Stations.

NUREG/CR-5643, Insights Gained From Aging Research, U. S. Nuclear Regulatory Commission, March 1992.

SAND96-0344, Aging Management Guideline for Commercial Nuclear Power Plants - Electrical Cable and Terminations, prepared by Sandia National Laboratories for the U.S. Department of Energy, September 1996.