



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 8, 2001

MEMORANDUM TO: File

FROM:

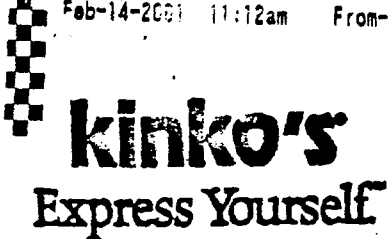
Sikhindra K. Mitra  
Engineering Section  
Licensing Renewal and Standardization Branch  
Division of Regulatory Improvement Program  
Office of Nuclear Reactor Regulation

SUBJECT:

On February 14, 2001, I received an electronic mail from Mr. Paul Colianni of Duke Energy transmitting an fax and e-mails from Paul Shemanski and Samson Lee to P.T. Kuo.

Attachment: As stated

cc: PUBLIC



## fax cover sheet

Orlando - Orange County Convention Center Telephone: 407.363.2831 Fax: 407.363.4731

Date 14 FEB 2001Number of pages 3 (2200-0000 page)to: Name PAUL SHEMANSKIfrom: Name PAUL COLAIANNICompany HRCCompany DUKE ENERGYTelephone 301-415-1377

Telephone \_\_\_\_\_

Fax 301-415-2444

410-224-2716 - 8-30-9Am.

Comments MARKUP OF POSSIBLE CHANGES TO GALL PROGRAM.UNDERLINE = ADDED~~STRIKEOUT~~ = DELETEDI WILL CALL YOU IN ABOUT AN HOUR. - PaulMore than 900 locations worldwide. For the location nearest you, call 1-800-2-KINKOS. Visit our Web site at [www.kinkos.com](http://www.kinkos.com).

## XI.E1

## Non-EQ Electrical Cables and Connections

## INTRODUCTION

In most areas within a nuclear power plant, the actual ambient environments are less severe than the nominal plant environment. However, in a limited number of localized areas, the actual environments may be more severe than the nominal plant environment. Conductor insulation materials used in cables and connections may degrade more rapidly than expected in these adverse localized equipment environments. The purpose of the aging management program described herein is to provide reasonable assurance that the intended functions of electrical cables and connections exposed to adverse localized equipment environments caused by heat or radiation will be maintained consistent with the current licensing basis through the period of extended operation. This program meets NUREG/CR-5643, IEEE Std. P1205, SAND96-0344, and EPRI TR-109619.

The program described herein is written specifically to address cables and connections at plants whose configuration is such that most (if not all) cables and connections installed in adverse localized environments are accessible. The program, as described, can be thought of as a sampling program, i.e., selected cables and connections from accessible areas (the inspection sample) would represent, with reasonable assurance, all cables and connections in the adverse localized equipment environments. When an unacceptable condition or situation is identified for a cable or connection in the inspection sample, a determination is made as to whether the same condition or situation is applicable to other accessible or inaccessible cables or connections. As such, this program focus may not be appropriate for plants with a significantly different configuration.

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 (60FR22477) states, *"The major concern is that failures of deteriorated cable systems (cables, connections, and penetrations) might be induced during accident conditions."* The electrical cables and connections covered by this aging management program, being non-EQ, 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:* The inspection program includes accessible (i.e., able to be approached and viewed easily) electrical cables and connections within the scope of license renewal. ~~that are installed in adverse localized environments caused by heat or radiation in the presence of oxygen. An adverse localized environment is a condition in a limited plant area that is significantly more severe than the specified service condition for the electrical cable or connection.~~
- (2) *Preventive Actions:* No actions are taken as part of this program to prevent or mitigate aging degradation.
- (3) *Parameters Monitored/Inspected:* Accessible electrical cables and connections installed in structures within the scope of license renewal ~~adverse localized environments~~ are visually inspected for cable and connection jacket surface anomalies such as embrittlement, discoloration, cracking or surface contamination.
- (4) *Detection of Aging Effects:* Cable and connection jacket surface anomalies are precursor indications of conductor insulation aging degradation from heat or radiation in the presence of oxygen and may indicate the existence of an adverse localized equipment environment. An adverse localized equipment environment is a condition in a limited plant area that is significantly more severe than the specified service condition for the electrical cable or connection. Accessible electrical cables and connections installed in structures within the scope of license renewal ~~adverse localized environments~~ are visually inspected at least once every 10 years, which is an adequate period to preclude failures of the conductor insulation.
- (5) *Monitoring and Trending:* Trending actions are not included as part of this program because the ability to trend inspection results is limited. Although not a requirement, trending would provide additional information on the rate of degradation. The choice of a specific inspection method should take this into consideration.
- (6) *Acceptance Criteria:* No unacceptable, visual indications of cable and connection jacket surface anomalies, which suggest that conductor insulation degradation exists, as determined by engineering evaluation. An unacceptable indication is defined as a noted condition or situation that, if left unmanaged, could lead to a loss of the intended function.

- (7) *Corrective Actions:* Further investigation is performed on electrical cables and connections when the acceptance criteria are not met in order to ensure that the intended functions will be maintained consistent with the current licensing basis. Corrective actions may include, but are not limited to, testing, shielding or otherwise changing the environment, relocation or replacement of the affected cable or connection. When an unacceptable condition or situation is identified, a determination is made as to whether the same condition or situation is applicable to other accessible or inaccessible cables or connections. As discussed in the appendix to this report, the staff finds 10 CFR Part 50, Appendix B, acceptable in addressing corrective actions.
- (8) *Confirmation Process:* As discussed in the appendix to this report, the staff finds 10 CFR Part 50, Appendix B, acceptable in addressing confirmation process.
- (9) *Administrative Controls:* As discussed in the appendix to this report, the staff finds 10 CFR Part 50, Appendix B, acceptable in addressing administrative controls.
- (10) *Operating Experience:* Operating experience has shown that adverse localized environments caused by heat or radiation for electrical cables and connections may exist next to or above (within three feet of) steam generators, pressurizers or hot process pipes such as feedwater lines.

## REFERENCES

NUREG/CR-5643, *Insights Gained From Aging Research*, March 1992

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

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.

EPRI TR-109619, *Guideline for the Management of Adverse Localized Equipment Environments*, June 1999.

**From:** Paul Shemanski  
**To:** PTK  
**Date:** 3/7/01 12:19PM  
**Subject:** Call From NEI

Doug Walters called me concerning a markup of possible changes to the GALL program for non-EQ electrical cables and connections. The proposed changes which were faxed to me on 2/14/01 by Paul Colainni (Duke Energy) were reviewed by members of the license renewal electrical working group in which Paul Colaianni is the lead. Some members of the industry working group interpreted the proposed changes as an "expansion in scope" to now include all electrical cables and connections. The draft August, 2000 version of GALL inspection program included all accessible cables and connections installed in "adverse localized environments" caused by heat or radiation. I told Doug Walters that the intent of the proposed changes was to clarify the evaluation and technical basis in GALL and **NOT** to expand the scope of the inspection of cables and connections. Doug is going to talk with members of the license renewal industry electrical working group and will call you or Sam Lee either endorsing the proposed changes or recommending that they not be implemented at this time.

**CC:** SKM1; SSL1

**From:** Samson Lee  
**To:** ptk  
**Date:** 3/7/01 2:53PM  
**Subject:** Call from NEI

PT:

Doug Walters of NEI called and indicated that he has looked at Paul Colainni (Duke Energy) GALL comments on non-EQ cables, which were previously faxed to the staff. He found the scope of the program has been expanded. He would recommend to the NEI group that NRC not consider those comments. However, he would recommend to the group that NRC should consider Paul Colaianni's comment on the timing of the inspections to maintain consistency between the SRP and GALL.

Thanks,  
Sam

**CC:** Pcs; Skm1