

POLICY ISSUE (Information)

January 31, 2007

SECY-07-0023

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations /RA/

SUBJECT: ISSUANCE OF GENERIC LETTER 2007-XX, "INACCESSIBLE OR
UNDERGROUND POWER CABLE FAILURES THAT DISABLE
ACCIDENT MITIGATION SYSTEMS OR CAUSE PLANT TRANSIENTS"

PURPOSE:

This paper informs the Commission that the staff intends to issue the subject generic letter (GL) by February 7, 2007. The GL is provided as Enclosure 1. Enclosure 2 provides the staff resolution of public comments. This paper does not address any new commitments or resource implications.

BACKGROUND:

A staff review of operational experience has shown that medium voltage cables, which are exposed to condensation and wetting in inaccessible locations such as conduits, cable trenches, cable troughs, duct banks, underground vaults, or direct-buried installations, can fail due to a decrease in dielectric strength of the conductor insulation. The staff has identified 23 Licensee Event Reports and morning reports since 1988 that describe failures of buried medium voltage cables where insulation failure appears to be the common cause of the failures. These reported events should be seen only as a portion of the failures since not all cables that fail lead to reportable conditions. In most cases, the failed cables were in service for about 10 years or more, and none of these cables were identified to be designed or qualified for long-term wetting or submergence.

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Some of the medium voltage underground cables supply power to safety-related equipment, including emergency diesel generator (EDG) feeders, emergency service water pumps, and offsite power to safety buses. A few of these cables are not generally energized; therefore, the licensee may not notice a dormant or impending failure.

During review of the power cable failures, the staff noted an increasing likelihood for more than one power cable failing because of continued degradation. When more than one cable fails during a plant accident scenario, the accident mitigation systems may be significantly degraded, and the level of degradation would depend on which particular cables failed. Some of the risk-significant cable failure scenarios are: (1) the failures of two cables that connect EDGs to respective safety buses; (2) the loss of service water and emergency service water from cable failures following a reactor trip; and (3) the loss of offsite power through the loss of offsite power feeders to safety buses.

DISCUSSION:

Information Notice (IN) 2002-12, "Submerged Safety-Related Electrical Cables," addressed medium voltage cables failures at Oyster Creek and Davis-Besse nuclear plants as well as several other plants known to have long-term flooding problems in manholes and duct banks in which safety-related cables were submerged. In response to the concern identified in IN 2002-12, several plants began system modifications and manhole restoration projects to replace faulty dewatering equipment and cable supports. Some other plants are addressing water removal problems, but have not begun a program for the early detection of potential failures.

Licensees can anticipate medium voltage cable failures before they occur through state-of-the-art methods of testing. Several effective methods of nondestructive cable testing are available to plants at this time: (1) partial discharge testing; (2) dissipation factor testing; (3) very low-frequency alternating current testing; (4) time domain reflectometry; and (5) direct current step-voltage testing. The NRC staff seeks information regarding monitoring of inaccessible or underground electrical cables in order to determine if additional regulatory action is warranted.

The staff reviewed the public comments and determined that no significant changes needed to be made to the proposed Generic Letter. Additionally, the staff discussed and resolved open items during the Advisory Committee on Reactor Safeguards meeting on May 31 through June 1, 2006.

As the underground cables continue to age, the probability of cable failure increases and the vulnerability for an unanticipated plant safety challenge increases. The continued functionality of underground cables exposed to a high-moisture environment is important to the safe operation of the plant.

COORDINATION:

The Advisory Committee on Reactor Safeguards reviewed the GL during its 533rd meeting on May 31 through June 1, 2006, and recommended that it be issued in letter dated June 15, 2006. The Committee to Review Generic Requirements (CRGR) reviewed the GL to ensure that the backfit requirements in 10 CFR 50.109 were met and endorsed issuing the GL during its 409th meeting on May 9, 2006. The staff incorporated the CRGR's comments into this GL.

The Office of the General Counsel has no legal objection to this paper. The Office of the Chief Financial Officer (OCFO) determined that a review of the GL was unnecessary, and that OCFO has no objections based on budget or financial management concerns. The GL is not a “rule” under the Small Business Regulatory Enforcement Fairness Act of 1996.

/RA/

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Executive Director
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Enclosures:

1. Generic Letter
2. Staff Resolution Of Public Comments

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