May 7, 2007

L-MT-07-041
10 CFR 50.54(f)
GL 2007-01

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Monticello Nuclear Generating Plant
Docket 50-263
License No. DPR-22

Response to NRC Generic Letter 2007-01: Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients

By letter dated February 7, 2007, the NRC issued Generic Letter (GL) 2007-01. This GL requires addressees to submit a written response within 90 days of this GL.

In accordance with the provisions of 10 CFR 50.54(f), Nuclear Management Company, LLC, (NMC) is hereby providing the response to NRC Generic Letter 2007-01: "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," for the Monticello Nuclear Generating Plant (MNGP).

Enclosure 1 to this letter provides the NMC response to NRC GL 2007-01 for MNGP.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 7, 2007.

John T. Conway
Site Vice President
Monticello Nuclear Generating Plant
Nuclear Management Company, LLC

Enclosure (1)

cc: Administrator, Region III, USNRC
Project Manager, Monticello Nuclear Generating Plant, USNRC
Resident Inspector, Monticello Nuclear Generating Plant, USNRC

ENCLOSURE 1
NMC Response to NRC Generic Letter 2007-01 for MNGP:
Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients

1.0 INTRODUCTION

NRC design criteria require that cables, which are routed underground, be capable of performing their function when subjected to anticipated environmental conditions such as moisture or flooding. Further, the design should minimize the probability of power interruption when transferring power between sources. The cable failures that could disable risk-significant equipment are expected to have monitoring programs to demonstrate that the cables can perform their safety function when called on. However, the recent industry cable failure data indicates a trend in unanticipated failures of underground/inaccessible cables that are important to safety.

Some licensees have detected cable degradation prior to failures through techniques for measuring and trending the condition of cable insulation. Licensees can assess the condition of cable insulation with reasonable confidence using one or more of the following testing techniques: partial discharge testing, time domain reflectometry, dissipation factor testing, and very low frequency AC testing. Licensees can replace faulty cables during scheduled refueling outages prior to cable failure that would challenge plant safety.

2.0 REQUESTED INFORMATION

Addressees are requested to submit the following information to NRC within 90 days of the date of this generic letter:

(1) Provide a history of inaccessible or underground power cable failures for all cables that are within the scope of 10 CFR 50.65 (the Maintenance Rule) and for all voltage levels. Indicate the type, manufacturer, date of failure, type of service, voltage class, years of service, and the root causes for the failure.

(2) Describe inspection, testing and monitoring programs to detect the degradation of inaccessible or underground power cables that support EDGs, offsite power, ESW, service water, component cooling water and other systems that are within the scope of 10 CFR 50.65 (the Maintenance Rule).

3.0 REQUIRED RESPONSE

In accordance with 10 CFR 50.54(f), NMC is requested to submit written responses to this generic letter. This information is sought to very NMC's compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of the Generic Letter. The Generic Letter discusses two response options:

3.1 Addressees may choose to submit written response providing the information requested above within the requested time period.

3.2 Addressees who choose not to provide information requested or cannot meet the requested completion dates are required to submit written responses within 30 days of the date of this generic letter. The responses must address any alternative course of action proposed, including the basis for the acceptability of the proposed alternative course of action.

4.0 NMC RESPONSE FOR MONTICELLO NUCLEAR GENERATING PLANT

NMC is providing the response as described in Option 3.1 above for MNGP.

4.1 Provide a history of inaccessible or underground power cable failures for all cables that are within the scope of 10 CFR 50.65 (The Maintenance Rule) and for all voltage levels. Indicate the type, manufacturer, date of failure, type of service, voltage class, years of service, and the root causes for the failure.

NMC Response:

History of Inaccessible/Underground Power Cable Failures at MNGP

The list of power cable failures that have occurred at MNGP for cables within the scope of the Maintenance Rule is provided in the table below:

Description	Type / Part No.	Manu-facturer	Insulation/Jacket Material	Date of failure	Type of Service	Voltage Class	Years of Service*	Root Cause of Failure
1AR Transformer to #10 Transformer Cable 15kV	Unspcfd /SI58040	General Electric	BTYL / NEOPRENE	1984	HIGH VOLTAGE > 4.16KV	15000V	13 (Original plant cable)	In-Service Failure - Investigation revealed that the ground fault was due to high moisture content within the cable. Water leakage from an inadequate pothead seal (SEAL) was the probable cause of the cable failure.
#12 CRD Pump Power Cables	RHW / SI58042	General Electric	BTYL / NEOPRENE	1994	4.16KV POWER	5000V	23 (Original plant cable)	Testing Failure - During routine cable megger testing, cable exhibited a sharp decrease in megger reading
480V Feeders to Off Gas Storage MCCs	Unspcfd/ SI58007	General Electric	BTYL / NEOPRENE	1997	POWER & CONTROL BELOW 600V	600V	24	In-Service Failure - Cause is assumed to be a cross divisional fault in the underground section of cables. Energy released during the fault (6000amps) must have eliminated the fault by vaporizing moisture and/or part of the conductor

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4kV feeder to Load Centers LC-107	RHW / SI58042	General Electric	BTYL / NEOPRENE	1998	4.16KV POWER	5000V	27 (Original plant cable)	In-Service Failure - Ground fault on feeder to LC-107 caused MCC trip as result of aged cable. Conduit was found to contain 150 gallons of water. Feeder to LC-108 preventative replacement due to common functionality
4kV feeder to Load Centers LC-108							27 (Original plant cable)	
Power Cables for ECCS Area Drain Pumps (P-88A-D)	Unspcfd/ SI58136	General Electric	BTYL / NEOPRENE	1999	POWER & CONTROL BELOW 600V	600V	28 Original plant cable	Degraded Condition - Sections of the cable's insulation have experienced brittleness and cracking

* - Based on a plant commercial operation date of 1971.

In addition, MNGP has experienced degradation and testing failures of cables not within the Maintenance Rule scope. The list below of additional cable failures at MNGP is provided to facilitate a comprehensive list for data collection of cable issues:

Description	Type / Part No.	Manu-facturer	Insulation/Jacket Material	Year of Replacement	Type of Service	Voltage Class	Years of Service	Reason for Replacement
Power Cables for V-EF-17A	Unspcfd/ SI58136	General Electric	BTYL / NEOPRENE	1996	POWER & CONTROL BELOW 600V	600V	25 Original plant cable	Degraded Condition - Sections of the cable's insulation have experienced brittle and cracking
Plant 4kV feeder to substation X41	RHW / SI58042	General Electric	BTYL / NEOPRENE	1997	4.16KV POWER	5000V	26 Original plant cable	Degraded Condition - Cable shows signs of aging. Conductor insulation is brittle and cracking
4kV feeder to the two (2) Condensate Pumps	RHW / SI58042	General Electric	BTYL / NEOPRENE	1998	4.16KV POWER	5000V	27 Original plant cable	Testing Failure - Replaced due to reduced megger readings
480V Feeder to Rx Bldg MCC-132	Unspcfd/ SI58007	General Electric	BTYL / NEOPRENE	2001	POWER BELOW 600V	600V	30 Original plant cable	Testing Failure - Grounding on phase C found during megger testing
Power Cabling for V-CH-2	RHH/ SI58007	General Electric	BTYL / NEOPRENE	2005	POWER BELOW 600V	600V	34 Original plant cable	Degraded Condition - Sections of the cable's insulation have experienced brittle and cracking

4.2 Describe inspection, testing and monitoring programs to detect the degradation of inaccessible or underground power cables that support EGSs, offsite power, ESW, service water, component cooling water and other systems that are within the scope of 10 CFR 50.65 (The Maintenance Rule)

NMC Response:

Inspection, Testing and Monitoring Programs at MNGP

The Cable Condition Monitoring Program at MNGP was created as a result of a previous NRC commitment. The Cable Condition Monitoring Program was initiated to identify cables which require replacement prior to failure. All cables required for continued plant operation are included in this program. This program assigned risk factors to cables based on ampacity, insulation type, installed location, criticality, radiation exposure, temperature exposure, etc. Those cables with the highest risk factor received priority for visual inspections, more frequent testing and replacement.

Initial identification of cables for replacement is based on cable failures. Cables identified as having insulation and installed locations similar to those cables which have failed have been targeted for replacement. To date, butyl rubber cables either direct buried or installed in underground conduits have the highest failure rate. Both 480V and 4.16kV rated cables are susceptible. Control cables, other than those located in high radiation or high temperature areas, have not been of concern to date.

An Engineering Work Instruction was created to identify the methodology to determine which cables are at high risk and recommended for replacement.

Project team meetings were held between 1998 and 2003 to develop the targeted cable list for replacement. MNGP has used the cable data collected from this program and have assigned a Cable Risk Factor (CRF) to each cable.

In addition, MNGP has committed to implement additional programs for cable condition monitoring with the recent license renewal project. These programs are scheduled for full implementation prior to the period of extended operation. The following describes the two programs that are being developed at MNGP:

4.2.1 Inaccessible Medium Voltage (2kV to 34.5kV) Cables Not Subject to 10CFR50.49 EQ Requirements.

The purpose of this aging management program is to demonstrate that inaccessible, non-EQ medium-voltage cables susceptible to aging effects caused by moisture and voltage stress will be adequately managed so that there is reasonable assurance that the cables will perform their intended function in accordance with the current licensing basis during the period of extended operation.

Most electrical cables at MNGP are located in dry environments. However, some cables may be exposed to condensation and wetting in inaccessible locations, such as conduits, cable trenches, cable troughs, duct banks, underground vaults or direct buried installations. When an energized medium-voltage cable is exposed to wet conditions for which it is not designed, water treeing or a decrease in the dielectric strength of the conductor insulation can occur. This can potentially lead to electrical failure.

In this aging management program, periodic actions are taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water, as needed. In-scope, medium-voltage cables exposed to significant moisture and significant voltage are tested to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, polarization index, or other testing that is state-of-the-art at the time the test is performed.

4.2.2 Electrical Cables & Connections Not Subject to 10CFR 50.49 Environmental Qualification Requirements

The Electrical Cables & Connections Not Subject To 10CFR 50.49 Environmental Qualification Requirements Program is a new MNGP program that manages the aging of conductor insulation material on cable, connectors, and other electrical insulation materials that are installed in adverse localized environment caused by heat, radiation, or moisture. An adverse localized environment is a condition in a limited plant area that is significant if it could appreciably increase the rate of aging of a component or have an immediate adverse effect on operability.

In most areas of the plant, the actual ambient environments 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. Cable and connection insulation materials may degrade more rapidly than expected in these adverse localized environments.

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 10CFR 50.49, the electrical cables and connections 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.

The scope of this program includes accessible non-EQ electrical cables and connections, including control and instrumentation circuits, within the scope of license renewal.

The program provides reasonable assurance that the intended functions of electrical cables and connections within scope of license renewal that are not subject to the environmental qualification requirements of 10CFR 50.49 and are exposed to adverse localized environments caused by heat, radiation, or moisture are 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. P1205-2000, SAND96-0344, and EPRI TR-109619.

The Program addresses cables and connections whose configuration is such that most cables and connections installed in adverse localized environments are accessible. This program is a sampling program in which selected cables and connections from accessible areas are inspected and represent, with reasonable assurance, all cables and connections in the adverse localized environments. If 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.

4.3 Cable Testing at MNGP

MNGP follows the NMC Corporate Directive CD 5.33 "Underground Electrical Cable Management Standard" as the framework for the expectations for cable management programs. The following Engineering Work Instruction at MNGP has been developed to provide more in-depth descriptions and requirements:

"Cable Condition Monitoring Program"

The purpose of the MNGP Cable Condition Monitoring Program is to identify cables which require replacement prior to failure. The program will evaluate and recommend replacement of electrical cables which are required to maintain plant safety and reliability.

The cables replaced in the past due to degradation have been identified primarily by the methods of visual inspection or insulation resistance testing. Insulation resistance testing is performed in accordance with MNGP procedures for insulation resistance and continuity checks of electrical conductors rated at 600V or less and at greater than 600V.

5.0 SUMMARY

The following is a summary of the power cable replacements at MNGP:

- Four (4) cables have been replaced due to in-service failure.
- Three (3) cables have been replaced due to testing failures. Test method used was insulation resistance check with a megger.
- Four (4) cables have been replaced due to observed cable degradation. Observed brittle and cracking insulation is the basis for cable replacement.
- All cables replaced are Butyl Rubber insulated with a Neoprene jacket supplied by General Electric.

The Cable Condition Monitoring Program at MNGP was initiated in 1998 to determine which cables are targeted for replacement based on assigned risk factors. MNGP has replaced cables under this program and has plans to replace other high risk cables. As part of the license renewal effort, MNGP is committed to implementing aging management programs which will provide for additional monitoring of cable conditions.