

Duke Power Company  
McGuire Nuclear Generation Department  
12700 Hagers Ferry Road (MG01VP)  
Huntersville, NC 28078-8985

T. C. McMEEKIN  
Vice President  
(704)875-4800  
(704)875-4809 Fax



**DUKE POWER**

October 24, 1996

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

Subject: McGuire Nuclear Station, Units 1 and 2  
Docket Nos. 50-369 and 50-370  
NRC Inspection Report No. 50-369, 370/96-07  
Violations 50-369,370/96-07-01, 96-07-05, 96-07-07 and Deviation 369,370/96-07-04  
Reply to a Notice of Violation and Notice of Deviation

Gentlemen:

Enclosed is a response to a Notice of Violation dated October 2, 1996 concerning failure to perform a Technical Specification surveillance, failure to perform an adequate 50.59 safety evaluation and inadequate corrective actions for an emergency diesel generator fuel line failure. Also enclosed is a response to a Notice of Deviation dated October 2, 1996 concerning the use of incorrect resistance temperature detectors to monitor auxiliary feedwater supply line temperature.

Should there be any questions concerning this response, contact Randy Cross at (704) 875-4179.

Very Truly Yours,

  
T. C. McMeekin

Attachment

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U. S. Nuclear Regulatory Commission  
October 24, 1996

xc: (w/attachment)

Mr. S. D. Ebner  
Regional Administrator, Region II  
U. S. Nuclear Regulatory Commission  
101 Marietta St., NW, Suite 2900  
Atlanta, Georgia 30323

Mr. Scott Shaeffer  
Senior Resident Inspector  
McGuire Nuclear Station

Mr. Victor Nerses  
U. S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
One White Flint North, Mail Stop 9H3  
Washington, D. C. 20555

**McGuire Nuclear Station  
Reply to a Notice of Violation**

Violation 50-369,370/96-07-05

10 CFR 50.59 (a)(1) authorizes the licensee to conduct tests or experiments not described in the safety analysis report without prior commission approval, unless the proposed test or experiment involves a change in the technical specifications incorporated in the license or an unreviewed safety question.

10 CFR 50.59 (b)(1) requires the licensee to maintain records of the conduct of tests and experiments not described in the safety analysis report. These records must include a written safety evaluation that provides the basis for the determination that the test or experiment did not involve an unreviewed safety question.

Contrary to the above, on August 6, 1996, the licensee conducted a test not described in the FSAR to verify an operability determination that a water hammer event would not occur with the presence of steam-voids in auxiliary feedwater piping. An adequate 50.59 safety evaluation to provide the basis for the determination that the test did not involve an unreviewed safety question was not performed prior to conducting this test.

This is a Severity Level IV violation (Supplement I).

Reply to Violation 50-369,370/96-07-05

1. Reason for the violation:

The reason for the violation is Inappropriate Action. The Reviewer that reviewed restricted change 60A to procedure OP/1/A/6250/02, Auxiliary Feedwater System Operating Procedure, for Unreviewed Safety Question (USQ) applicability incorrectly determined that the procedure change was not a test and therefore, the change would not result in a test or experiment not described in the Updated Final Safety Analysis Report (UFSAR).

2. Corrective steps that have been taken and the results achieved:

- a) The 50.59 evaluation was immediately reviewed by Engineering personnel to determine its adequacy. The review indicated that the 50.59 screening for Unreviewed Safety Question (USQ) consideration had been inappropriate. The review did confirm that Engineering personnel had correctly determined that no USQ existed under the test conditions. A revised 50.59 will document the information known to Engineering personnel at the time the initial 50.59 was performed.
- b) The inadequacy of the 50.59 was immediately discussed with the Engineering supervisors involved in the August 6, 1996 CA system operability evaluation. The Qualified Reviewer that actually performed the 50.59 evaluation was counseled on August 21, 1996.
- c) On August 20, 1996, the inadequate 50.59 evaluation and the related Problem Investigation Process (PIP) was discussed during a McGuire Systems Engineering group meeting as a lesson learned.

No similar events have occurred since implementation of these corrective actions.

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3. Corrective steps that will be taken to avoid further violations:

- a) A reading package will be provided to all McGuire Qualified Reviewers to address the lessons learned as a result of the inadequate review and emphasize the importance of performing conservative 50.59 safety evaluations. The reading package will be completed by all McGuire Qualified Reviewers by December 31, 1996.
- b) Nuclear System Directive (NSD) 209, 10 CFR 50.59, will be reviewed to determine if additional guidance to Qualified Reviewers is needed. This review will be completed by November 30, 1996.
- c) The initial 50.59 will be revised to document the information known to Engineering personnel at the time the 50.59 was performed. This corrective action will be completed by November 25, 1996.

4. Date when full compliance will be achieved:

McGuire Nuclear Station is now in full compliance with 10 CFR 50.59 requirements. All corrective actions will be completed by December 31, 1996.

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Violation 50-369,370/96-07-07

10 CFR 50 Appendix B, Criterion XVI, "Corrective Actions," states, that measures shall be established to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment and nonconformances are promptly identified and corrected. In the cases of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action is taken to preclude repetition.

Contrary to the above, during the period from June 19, 1996, to July 30, 1996, adequate corrective actions were not taken to preclude repetition of a fuel line coupling failure on the McGuire Unit I B Emergency Diesel Generator.

This is a Severity Level IV violation (Supplement I).

Reply to Violation 50-369,370/96-07-07

1. Reason for the violation:

The reason for the violation is a failure to recognize the need to aggressively implement the identified corrective actions to prevent additional fuel line failures. The decision to implement corrective actions during scheduled maintenance days to minimize emergency diesel generator (EDG) unavailability was based on an expectation that this was a trendable sub-component failure that would not result in the loss of the EDGs safety related function. Previous McGuire EDG-1B runs had shown a slow decrease in the 4-Right cylinder temperature which may have indicated a small undetectable fuel leak. There was no indication of any similar cylinder temperature decreases in other EDG-1B cylinders or with the other EDGs. McGuire and Brunswick (CP&L) Nordberg EDG history indicated no previous similar failures. A previously performed torsional analysis concluded that the EDG would continue to operate with failure of a cylinder fuel line. A visual inspection of all EDG fuel lines showed no evidence of tubing ferrule pullout or misalignment.

The second failure of the EDG-1B 4-Right cylinder fuel line occurred prior to implementation of the corrective actions. This failure occurred rapidly and was not trendable. However, this was also a sub-component failure that did not result in the loss of the EDG safety related function. Subsequent consultation with industry experts resulted in a more comprehensive and timely corrective action plan.

2. Corrective steps that have been taken and the results achieved:

- a) Following the original failure, a new fuel line was installed for the 4-Right cylinder. It was torqued to a procedure range of 40-60 ft-lbs. to prevent cracking of fuel oil delivery valve holder which was previously experienced. Torquing to 40-60 ft-lbs. had been sufficient in the past to prevent fuel leaks while not damaging the delivery valve holder. The EDG-1B successfully completed a monthly surveillance test with normal cylinder exhaust temperatures and no observed leakage.

Following the EDG-1B return to service the failure root cause was determined to be inadequate crimping of the ferrule sleeve onto the fuel line during manufacturing. Corrective actions were developed to expeditiously recrimp all fuel lines installed on the EDGs during the previous 1EOC10 and 2EOC10 outages. Work orders were written to perform the recrimping

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during the period July 18, 1996 through October 8, 1996 concurrent with normal EDG down day schedules to minimize EDG unavailability. On July 30, 1996, prior to initiation of these corrective actions, a second fuel line failure occurred on 1B EDG 4-Right cylinder during performance of the monthly surveillance per PT/1/A/4350/02B.

- b) Following the second fuel line failure, a station recovery team developed and implemented a plan to remove the 4-Right injector, fuel line and fuel pump for testing to determine the root cause of the failure. Industry consultants were included in this team to provide additional expertise concerning diesel fuel injection systems. The Failure Investigation Process (FIP) concluded that the most likely cause of the failure was insufficient crimping of the fuel line ferrule due to inadequate crimping torque during manufacturing. Overpressurization of the fuel line caused by partial spray tip blockage was a possible contributing factor.

Re-evaluation of the root cause for the fuel line failures reconfirmed the initial root cause of inadequate crimping of the ferrule sleeve onto the fuel line during manufacturing. Thus normal fuel oil injection pressure caused the fuel line outer diameter material in contact with the ferrule to yield. This yielding resulted in a failure of the fuel line connection, excessive fuel oil leakage for cylinder 4-Right and loss of cylinder power. The inadequate crimping resulted from the manufacture's use of a procedure that did not adequately specify crimping torque requirements. In addition, the manufacture's procedure did not adequately control the length of the fuel line extending past the ferrule to preclude bottoming the line into the fuel oil delivery valve holder.

- c) On August 1, 1996, all EDG-1B fuel line assemblies were removed, recrimped to 150 ft-lbs. on the pump end, trimmed to 0.060 - 0.085 inches from the ferrule, re-installed, and torqued to 40-60 ft-lbs. per new procedure MP/0/A/7400/87. In addition, a new injector and fuel pump were installed on the EDG-1B 4-Right cylinder. On August 2, 1996, the EDG-1B successfully completed a sixteen hour run to verify the recrimping process was adequate.
- d) During the period August 3, 1996 through August 6, 1996, all fuel line assemblies for EDGs 1A, 2A and 2B were removed, recrimped to 150 ft-lbs. on the pump end, trimmed to 0.060 - 0.085 inches from the ferrule, re-installed, and torqued to 40-60 ft-lbs. per new procedure MP/0/A/7400/87.

No similar events have occurred since implementation of these corrective actions.

3. Corrective steps that will be taken to avoid further violations:

The January 26, 1997 completion date for corrective actions 3.a, b and d below was determined based on EDG maintenance scheduled during the upcoming 1997 refueling outages.

- a) EDG spare parts specification MCS-1301.00-00-0007 will be updated to address new fuel line crimping and dimensional requirements. This update will be completed by January 26, 1997.
- b) All procedures affecting EDG fuel line installation or removal, including Maintenance procedure MP/0/A/7400/09, Nordberg Diesel Engine Cylinder Head Removal and Installation, and MP/0/A/7400/01, Nordberg Diesel Engine Fuel Oil Injection Pump Removal, Installation and Lift to Port Closure Check, have been placed on administrative hold to prevent use. These

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procedures will be revised to address the new crimping and dimension requirements prior to use, otherwise, the procedures will be revised by January 26, 1997.

- c) Engineering will evaluate the need to add fuel injector spray tip cleaning to the Nordberg Owner's Group six year preventative maintenance and to the McGuire preventative maintenance procedure. This evaluation will be completed by January 26, 1997.
- d) All spare fuel line assemblies stored in the station warehouse will be recrimped and machined in accordance with procedure MP/0/A/7400/87. This corrective action will be completed by January 26, 1997.
- e) A reading package discussing the EDG fuel line failures and the lessons learned will be provided to all McGuire Engineering personnel. The reading package will emphasize the need for aggressive corrective action when Root Cause Analysis results indicate a potential for recurring failures on similar plant equipment. This corrective action will be completed by December 31, 1996.

4. Date when full compliance will be achieved:

McGuire Nuclear Station is now in full compliance with 10 CFR 50 Appendix B, Criterion XVI. All corrective actions will be completed by January 26, 1997.

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Violation 50-369,370/96-07-01

Technical Specification 3.8.1.1 (d) requires that with a diesel generator inoperable, the operability of the other diesel must be demonstrated by performing surveillance requirement 4.8.1.1.2.a.4 and 4.8.1.1.2.a.5 within 24 hours.

Contrary to the above, the licensee failed to demonstrate the operability of the 1A emergency diesel generator within the required time after the 1B emergency diesel generator was determined to be inoperable.

This is a Severity Level IV violation (Supplement I).

Reply to Violation 50-369,370/96-07-01

1. Reason for the violation:

The reason for the violation is Inappropriate Action. The operator relied on memory to evaluate the conditional surveillance requirements for the remaining EDG when the Nuclear Service Water (RN) system was declared inoperable and the operator incorrectly determined that a conditional surveillance was not required. This determination was based on this particular failure not being a common mode failure and, therefore, the conditional surveillance (to run the opposite train EDG) was mistakenly felt to not be applicable. In addition, procedure PT/1,2/A/4350/25, Essential Auxiliary Power Source Verification, did not clearly provide guidance on the need to run the opposite train EDG.

2. Corrective steps that have been taken and the results achieved:

During the investigation of the failure to perform the conditional surveillance, System Engineering determined that the RN Train B was operable. Therefore, the EDG 1B was operable and the conditional surveillance of EDG 1A was not required.

- a) Management expectations were reinforced to ensure that Operations personnel understand the need to thoroughly research each Technical Specification entry for reportability, operability, conditional surveillance and notification concerns. This corrective action was completed on October 21, 1996.
- b) PT/1,2/A/4350/25, Essential Auxiliary Power Source Verification, the procedure for verifying the conditional surveillance for TS 3.8.1.1(d) Action Statement was revised to indicate that the opposite train EDG needs to be run anytime an EDG becomes inoperable due to an equipment failure. This corrective action was completed on October 17, 1996.

No similar events have occurred since implementation of these corrective actions.

3. Corrective steps that will be taken to avoid further violations:

No additional corrective actions are planned.

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4. Date when full compliance will be achieved:

McGuire Nuclear Station is now in full compliance with Technical Specification 3.8.1.1 (d).

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Deviation 50-369,370/96-07-04

McGuire Nuclear Station response to Generic Letter 88-03, Steam Binding of Auxiliary Feedwater Pumps, February 17, 1988, stated that the licensee would provide continuous monitoring of auxiliary feedwater piping to detect the formation of steam voids that could prevent the auxiliary feedwater pumps from performing their intended safety function.

Contrary to the above, continuous monitoring to detect steam voiding was not accomplished due to the installation of an incorrect type of resistance thermal detector (RTD) to provide accurate indication of auxiliary feedwater piping temperatures and activation of control room alarms when temperatures exceeded established administrative limits. This condition was identified on August 1, 1996.

Reply to Deviation 50-369,370/96-07-04

1. Reason for the deviation:

The reason for the deviation is Inappropriate Action. McGuire's May 26, 1988 response to Generic Letter 88-03 stated that strap-on thermocouples had been installed on auxiliary feedwater (CA) piping. However, RTD's designed for thermowell applications were installed which resulted in inaccurate temperature readings. McGuire personnel responsible for processing Nuclear Station Modifications (NSMs) when this modification was planned in the mid-1980s selected the incorrect type of RTD for this application.

2. Corrective steps that have been taken and the results achieved:

- a) Immediate corrective action was taken to begin verifying the CA piping surface temperature once every shift to ensure the CA procedure temperature limits were not exceeded. Subsequently, the commitment was temporarily revised using the 50.59 process until minor modifications were implemented.
- b) Minor modifications MGMM-8546 (Unit 1) and MGMM-8547 (Unit 2) were implemented to replace the existing RTD's with a strap-on surface mounted application. This corrective action was completed on September 23, 1996.

No similar events have occurred since implementation of these corrective actions.

3. Corrective steps that will be taken to avoid further deviations:

No additional corrective actions are planned.

4. Date when corrective action will be complete:

All corrective actions were completed by September 23, 1996.