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DUKE POWER

September 18, 1995

U. S. Nuclear Regulatory Commission
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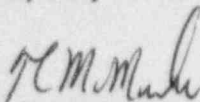
Subject: McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
NRC Inspection Report No. 50-369, 370/95-19
Violation 50-369, 370/95-19-01
Reply to a Notice of Violation

Gentlemen:

Enclosed is a response to a Notice of Violation dated August 22, 1995 concerning the failure of turbochargers associated with the emergency diesel generators. I declare under penalty of perjury that the statements set forth herein are true and correct to the best of my knowledge.

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

Very Truly Yours,


T. C. McMeekin

Attachment

xc: (w/attachment)

Mr. S. D. Ebner
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
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Atlanta, Georgia 30323

Mr. George Maxwell
Senior Resident Inspector
McGuire Nuclear Station

Mr. Victor Nerses
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**McGuire Nuclear Station
Reply to a Notice of Violation**

Violation 50-369, 370/95-19-01

10 CFR 50, Appendix B, Criterion III, Design Control, requires, in part, that measures be established for the selection and review of parts for suitability of application that are essential to the safety-related functions of structures, systems, and components.

Duke Power Company Topical Quality Assurance Program, (Duke 1-A), Amendment 19, Section 17.3.2.2, which implements 10 CFR 50, Appendix B, Criterion III, requires the implementation of design control measures commensurate with those applied to the original design of safety-related equipment to assure that the quality of the equipment is not compromised by modifications.

Contrary to the above, design control measures commensurate with those applied to the original design of safety-related equipment were not implemented on the replacement of the Unit 1 and Unit 2 Emergency Diesel Generator (EDG) turbochargers. Specifically, the licensee's design review, documented in Acceptable Substitute Evaluation, SID-2010.02-00-0010, VTR 500-HA Turbocharger, dated February 10, 1993, was inadequate in that it failed to comprehensively review a vendor design change to the jet assist wall insert of the turbocharger. As a result, an unanticipated resonance frequency failure mechanism was introduced and, subsequently, the 2A and 2B turbochargers failed during routine EDG operability surveillance testing on June 12 and 27, 1995. This failure vulnerability applied to all four station EDGs. (01013).

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

Reply to Violation 50-369, 370/95-19-01

1. Reason for the violation:

The reason for the violation is Design Oversight, resulting in an unanticipated interaction of components. The significance of a design change to the turbo wall insert was misjudged during the Acceptable Substitute evaluation of the new turbos.

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

The following immediate corrective actions were taken:

- a) EDG 2B was declared inoperable and an investigation was initiated to evaluate the potential of a common mode failure.
- b) ABB Turbo Systems was contacted to assist in determining the root cause of the failures.
- c) A third party consultant (Failure Analysis Associates), with expertise in rotating equipment failure analysis, was contracted to assist in determining the root cause of the failures.

The following subsequent corrective actions were completed by July 27, 1995:

- a) The EDG 2B turbo rotor, air inlet casing/wall insert assembly, bearings, and lube oil pumps were replaced.

- b) The EDG 2A turbo (with only 2 hours operation since the June 14, 1995 repair) wall insert was replaced and the compressor impeller was dye penetrant tested and reinstalled. The bearings and lube oil pumps were also reused.
- c) The EDG 1A turbo (with 40-50 hours operation since installation) wall insert and rotor were replaced. The bearings and lube oil pumps were reused.
- d) The EDG 1B turbo wall insert, rotor and turbine side bearing were replaced. The compressor side bearing and oil pumps were reused.
- e) A Nuclear Network Message was issued explaining the turbo failures experienced at McGuire.
- f) A metallurgical analysis, which included material composition and hardness testing, was performed and documented for the failed 2A and 2B compressor impeller, wall insert and bearings.
- g) An independent third party failure analysis/review of the turbo failures was performed by Failure Analysis Associates.
- h) Acoustic/vibration testing was conducted and documented on compressor impeller blading.
- i) An ABB Turbo Systems project team reviewed the acoustic test data and concurred that the 17 inlet nozzle wall insert design was the cause of the failures.
- j) A Root Cause Fault Tree Analysis was completed.
- k) A Minor Modification was completed deleting use of the 17 inlet nozzle wall insert.
- l) The D. C. Cook and Brunswick Nuclear Stations were provided information regarding the failures.

In addition, Component Engineering completed an Engineering Root Cause Analysis Report of the turbo failures that incorporated the results of the final ABB Failure Analysis Report. This corrective action was completed on August 30, 1995.

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

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

- a) Engineering personnel will enhance the Acceptable Substitute and Modification Programs to address rotating equipment changes affecting natural frequency and critical speeds by December 1, 1995.
- b) Engineering personnel will implement a more systematic equipment failure root cause analysis process by December 1, 1995 (McGuire Nuclear Station) and February 1, 1996 (Nuclear Generation Department).

- c) Engineering personnel will evaluate a common mode failure review process for safety significant components to determine if additional guidance is needed by December 31, 1995 (McGuire Nuclear Station) and February 1, 1996 (Nuclear Generation Department).
- d) Engineering personnel will perform a review of common mode failure potential for modifications to be implemented during the Unit 1 and 2 EOC10 outages. These reviews will be completed by December 1, 1995 (Unit 1) and March 1, 1996 (Unit 2).

4. Date when full compliance will be achieved:

McGuire Nuclear Station will be in full compliance by March 1, 1996.