

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station										DOCKET NUMBER (2) 0 5 0 0 0 3 6 9 1 OF 0 7										PAGE (3) 1 OF 0 7			
TITLE (4) Capped Spare Sleeves Through Fire Barrier Penetrations Were Not Qualified As 3 Hour Fire Barriers - Design Deficiency																							
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)														
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES					DOCKET NUMBER(S)									
0	9	1	5	8	8	8	8	0	3	0	0	1	0	2	1	7	8	9	0 5 0 0 0 0				
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																				
POWER LEVEL (10)			20.402(b)			20.406(c)			50.73(a)(2)(iv)			73.71(b)											
1			20.406(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)			73.71(c)											
110.10			20.406(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)			OTHER (Specify in Abstract below and in Text, NRC Form 366A)											
			20.406(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)														
			20.406(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)														
			20.406(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(ix)														
LICENSEE CONTACT FOR THIS LER (12)																							
NAME										TELEPHONE NUMBER													
Steven E. LeRoy, Regulatory Compliance										7 0 4 3 7 3 - 6 2 3 3													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																							
CAUSE	SYSTEM	COMPONENT	MANUF- TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUF- TURER	REPORTABLE TO NPRDS													
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR							
YES (If yes, complete EXPECTED SUBMISSION DATE)												X NO											

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

In May 1988, Design Engineering (DE) began reviewing documentation for fire barrier penetration seal designs installed in Duke's three nuclear stations in response to NRC Information Notice No. 88-04. On 09/15/88 at 1100, McGuire Operations declared 96 spare sleeves through fire barrier penetrations with pipe caps installed on one end inoperable because DE did not have sufficient documentation to support this fire barrier seal design. The spare sleeves were located on both Unit 1 and Unit 2. Fire watches were established within one hour in the affected areas pursuant to Tech Spec 3.7.11, Fire Barrier Penetrations, and at approximately 1200, Construction and Maintenance Department initiated steps to restore the fire barrier penetrations to operable status by installing foam or the addition of a second pipe cap where appropriate. By 09/18/88, all affected spare sleeves had been repaired and Operations personnel had returned them to operable status. This event is assigned a cause of Design Deficiency because of incomplete documentation supporting the single pipe cap on spare sleeves seal design configuration resulting in a violation of Technical Specification 3.7.11, and 96 fire barrier penetration spare sleeves being declared inoperable.

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150-0104

EXPIRES 6/31/85

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McGuire Nuclear Station	0500036988	-030-0102	OF 07

TEXT (If more space is required, use additional NRC Form 365A's) (17)

INTRODUCTION

In May 1988, Design Engineering (DE) began reviewing documentation for fire barrier penetration seal designs installed in Duke's three nuclear stations in response to NRC Information Notice No. 88-04. On September 15, 1988 at 1100, McGuire Operations personnel declared 96 spare sleeves through fire barrier penetrations with pipe caps installed on one end inoperable because DE did not have sufficient documentation to support this fire barrier seal design. The spare sleeves were located on both Unit 1 and Unit 2.

Fire watches were established within one hour in the affected areas pursuant to Tech Spec 3.7.11, Fire Barrier Penetrations, and at approximately 1200, Construction and Maintenance Department initiated steps to restore the fire barrier penetrations to operable status by installing foam or the addition of a second pipe cap where appropriate. By 1530 on September 18, 1988, all affected spare sleeves had been repaired and Operations personnel had returned them to operable status.

This event is assigned a cause of Design Deficiency because of incomplete documentation supporting the single pipe cap on spare sleeves seal design configuration resulting in a violation of Technical Specification 3.7.11, and 96 fire barrier penetration spare sleeves being declared inoperable.

EVALUATION:

Background

The North wall of the Units 1 and 2 Turbine Building basements and the Service Building basement serves as a fire barrier for the Diesel Generator rooms and the Auxiliary Building. The walls are constructed of three feet thick reinforced concrete, and serve as a three hour fire barrier. The adjacent rooms within the Auxiliary Building are Electrical Switchgear rooms and adjacent to that are Mechanical Penetration rooms. The walls between these rooms are constructed of sheet rock and also serve as a three hour fire barrier. All the affected spare sleeves are located in these walls and in the floors between the 733 feet and 750 feet elevations of the Electrical Switchgear and Mechanical Penetration rooms.

On July 10, 1981, the Southwest Research Institute conducted a test for Duke Power Company involving a fire barrier penetration sleeve with a single pipe cap installed on one end. The capped end was located in the test furnace and the open end was outside the test furnace. With this configuration no smoke or flame passed through the sleeve and the maximum heat transition temperature (temperature recorded on the cold end from heat conduction through the metal sleeve) did not exceed the Duke Power Electrical Design Engineering requirement of 700 degrees-F.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

The test results fully satisfied Nuclear Industry standards specified in Institute of Electrical and Electronics Engineers (IEEE) Standard 634-1978. No documentation of the test being conducted with the single pipe cap installed on the end outside the test furnace and the open end inside the test furnace could be located.

Technical Specification (TS) 3.7.11 requires that all fire barrier penetrations be operable at all times. When a fire barrier penetration is determined inoperable, the action statement requires that a continuous fire watch, or an hourly fire watch after verifying the operability of the area fire detectors, be established within one hour.

Station Directive 2.11.5, McGuire Nuclear Station Fire Penetrations, states that fire doors or penetrations that are made inoperable by an extended opening or by use as a pathway for temporary hoses and cables shall be reported to the Control Room Senior Reactor Operator (SRO) by the responsible personnel prior to beginning work. Also, if a fire door or penetration is found or made to be inoperable, the personnel involved are responsible for notifying the Control Room SRO. The Control Room SRO is responsible for TS logging, determining fire watch requirements, initiation of Fire Watch Tags, and providing Fire Watch Tags to the responsible personnel for hanging. The Fire Watch Tags provide a means of documenting the fire watches.

NRC Information Notice No. 88-04, Inadequate Qualification and Documentation of Fire Barrier Seals, was distributed on February 5, 1988 to alert holders of operating licenses or construction permits for Nuclear Power Reactors that some installed fire barrier penetration seal designs may not be adequately qualified for the design rating of the penetrated fire barriers. NRC staff personnel identified instances of this and in some cases, qualification test documentation was not available. In other cases, qualification test documentation was available but incomplete or inadequate because all qualification requirements had not been satisfied or the installed seal design configuration or design parameters were significantly different from the tested seal. A supplement to Information Notice No. 88-04 was distributed by the NRC on August 9, 1988 alerting addressees to problems caused by potential misapplication of silicone foam material used in penetration openings at Nuclear Power plants.

Description of Event

In May 1988, Design Engineering (DE) personnel began reviewing test documentation for fire barrier penetration seal designs installed in Duke Power Company's three Nuclear Stations in response to NRC information Notice No. 88-04. Sufficient test documentation in support of one particular design of fire barrier seals (spare sleeves through fire barrier penetrations with a pipe cap or a welded steel plate installed only on one end) could not be located.

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TEXT (If more space is required, use additional NRC Form 366A (1/17))

Because of a similar design configuration at Oconee Nuclear Station that had incomplete supporting test documentation (Reference Oconee Problem Investigation Report No. 4-088-0120), on or about August 1, 1988, DE personnel requested McGuire Mechanical Maintenance (MNT) personnel conduct a survey to determine the number of single capped spare sleeves in fire barriers and the respective location of each. Construction and Maintenance Department (CMD) personnel were performing an 18 month surveillance Fire Barrier Inspection, PT/O/A/4250/04. On or about August 4, 1988, MNT Technical Support personnel requested CMD personnel to conduct the survey in conjunction with the inspection.

On September 8, 1988 at 1100, DE personnel initiated a Problem Investigation Report addressing spare sleeves through fire barrier penetrations with pipe caps only on one end that were not qualified as three hour rated fire barrier seals. On or about September 14, 1988, MNT personnel transmitted the fire barrier survey results, which identified 96 spare sleeves with single pipe caps, to DE personnel. On September 15, 1988 at 1100, Operations personnel declared the 96 spare sleeves inoperable after receiving a determination of inoperability by DE personnel. By approximately 1130, CMD personnel had posted Fire Watch Tags and Security personnel had established fire watches in the affected areas of the station pursuant to TS 3.7.11. At approximately 1200, CMD personnel commenced resolving the problem by installing fire barrier penetration foam in the affected spare sleeves according to WRs 74457 and 74458. Installation of an additional cap on the open end of sleeves in concrete barriers greater than 10 inches thick was done when appropriate size caps were available. By approximately 1530 on September 18, 1988, CMD personnel had completed repairs of all affected fire barrier penetration spare sleeves and Operations personnel had returned the sleeves to operable status.

Conclusion

This event is assigned a cause of Design Deficiency because of incomplete test documentation supporting the single pipe cap on spare sleeves design configuration. Test documentation involving a sleeve with a single pipe cap installed on the end inside the test furnace was available, but a duplicate test with the pipe cap installed on the end outside the test furnace was not requested by DE personnel because apparently at that time they did not believe this different configuration would yield differing results. Therefore, no supporting documentation of such a configuration was available. DE personnel that requested the test are no longer employed by Duke Power Company.

MNT Technical Support personnel had anticipated using O.Z. Gedney type CFSF pipe plugs to close the open spare sleeve ends, but on October 15, 1988, as CMD personnel were preparing to install them it was noticed that the sealing gaskets on some were a different width than on others.

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After reviewing requisition documentation it was determined that all of the O.Z. Gedney plugs had been ordered and received under the same manufacturer part number.

DE personnel contacted O.Z. Gedney personnel and discovered that the wider plug seal type (1 inch) satisfied the 3 hour and 680 degrees-F heat transition temperature Mechanical Design Engineering requirements, but the thinner plug seal type (3/4 inch) did not. DE personnel also discovered that to differentiate between the two types when ordering, a suffix letter "N" should be placed after the part number. Doing this should ensure that in the future the station has ordered the 3 hour and 680 degrees-F qualified plug.

MNT Technical Support personnel will initiate documentation to place the part numbers of the non-qualified type plug on the Prohibited Items List. This is a list of items that have been determined to be unsuitable for general use or certain applications due to documentable deficiencies, potential manufacturing/application problems, or special environmental considerations. The 3/4 inch type plugs in stock have been returned to the Vendor, and CMD personnel are conducting a survey of all installed O.Z. Gedney type plugs to ensure they are the 1 inch and qualified types. All 3/4 inch types found in committed fire barrier penetration spare sleeves will be replaced with the 1 inch type, filled with foam, or capped as appropriate.

McGuire Nuclear Station Installation Specification Manual for Electrical Design, MCS-1390.01-00-0056, will be changed from allowing installation of a single pipe cap on only one end to requiring a pipe cap be placed on both ends of a spare sleeve when capping is appropriate. This change was initiated on September 16, 1988 by Project Services personnel and according to McGuire Exempt Variation Notice No. 1453.

MNT Technical Support personnel will also submit a change to procedure MP/O/A/7650/64, Initial Penetration and Penetration Repairs, and procedure PT/O/A/4250/04, Fire Barrier Inspection, stating that pipe caps or a welded steel plate must be placed on both ends of a spare sleeve when capping is appropriate.

A review of McGuire License Event Reports (LER) revealed no incidents of TS violations associated with fire barrier penetrations or the fire barrier system that were attributed to a Design Deficiency as a root or contributory cause. There have been numerous other reportable events that involved inoperable fire barriers that were attributed to other cause codes. The corrective actions for these previous events included training of all station personnel on fire barrier and fire watch requirements and changes to Station Directives and procedures.

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TEXT (If more space is required, use additional NRC Form 255a's) (17)

This event is not reportable to the Nuclear Plant Reliability Data System (NPRDS).

CORRECTIVE ACTIONS:

Immediate: When Operations declared the 96 spare sleeves inoperable, Security personnel established fire watches and CMD personnel posted Fire Watch Tags in the affected areas.

- Subsequent:
- 1) CMD personnel installed foam or a second pipe cap in the affected fire barrier penetration spare sleeves as appropriate.
 - 2) Project Services personnel initiated McGuire Exempt Variation Notice No. 1453 to revise the Electrical Installation Specification MCS-1390.01-00-0056 to require double ended capping of those empty pipe sleeves when capping is appropriate.
 - 3) All O.Z. Gedney seals were deleted from stock using Requisition 7320 89 0398 and placed in surplus stock.
 - 4) New O.Z. Gedney seals were ordered specifying 1 inch gromets only.

- Planned:
- 1) MNT Technical Support personnel will submit a change to procedure MP/O/A/7650/64, Initial Penetration and Penetration Repairs, requiring double ended capping of spare circular openings when capping is appropriate.
 - 2) MNT Technical Support personnel will submit a change to procedure PT/O/A/4250/04, Fire Barrier Inspection, requiring double ended capping of spare pipe sleeves when capping is appropriate.

SAFETY ANALYSIS:

The non-qualified fire barrier penetration spare sleeve pipe caps were installed during initial construction of the station. The affected areas are protected by several types of fire detection systems which were installed also at the time of construction. In the event of a fire in these areas, the fire detection devices would actuate and alert Operations Control Room personnel. The Station Fire Brigade responding with back-up fire suppression equipment would also be able to mitigate the effects of a fire. The response time of the Fire Brigade during fire drills involving the affected areas has been approximately 6-8 minutes.

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TEXT / If more space is required, use additional NRC Form 366A (1/17)

There were no personnel injuries, radiation overexposures, or releases of radioactive material as a result of this event.

This event is considered to be of no significance with respect to the health and safety of the public.

Duke Power Company
P.O. Box 33198
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Hal B. Tucker
Vice President
Nuclear Production
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DUKE POWER

February 17, 1989

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

Subject: McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369, 50-370
Licensee Event Report 369/88-30-01

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a)(1) and (d), attached is revised Licensee Event Report No. 369/88-30-01 concerning fire barriers. This revision is being submitted to add additional corrective actions. This report is being submitted in accordance with 10CFR 50.73(a)(2)(i)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Hal B. Tucker

SEL/394/se1

Attachment

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