

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8806270349 DOC. DATE: 88/06/20 NOTARIZED: NO

DOCKET #

FACIL: 50-269 Oconee Nuclear Station, Unit 1, Duke Power Co.

05000269

AUTH. NAME AUTHOR AFFILIATION
 NORTH, P. J. Duke Power Co.
 TUCKER, H. B. Duke Power Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-005-00: on 880518, 188 penetration fire barriers declared inoperable because qualifying documentation not substantiated. Caused by design deficiency. Inoperable barriers identified & fire watch patrols begun. W/880620 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 9
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: AEOD/Ornstein: 1cy.

05000269

	RECIPIENT ID CODE/NAME	COPIES L TTR ENCL	RECIPIENT ID CODE/NAME	COPIES L TTR ENCL
	PD2-3 LA	1 1	PD2-3 PD	1 1
	PASTIS, H	1 1		
INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	2 2
	AEOD/DOA	1 1	AEOD/DSP/NAS	1 1
	AEOD/DSP/ROAB	2 2	AEOD/DSP/TPAB	1 1
	ARM/DCTS/DAB	1 1	DEDRO	1 1
	NRR/DEST/ADS 7E	1 0	NRR/DEST/CEB 8H	1 1
	NRR/DEST/ESB 8D	1 1	NRR/DEST/ICSB 7	1 1
	NRR/DEST/MEB 9H	1 1	NRR/DEST/MTB 9H	1 1
	NRR/DEST/PSB 8D	1 1	NRR/DEST/RSB 8E	1 1
	NRR/DEST/SGB 8D	1 1	NRR/DLPQ/HFB 10	1 1
	NRR/DLPQ/QAB 10	1 1	NRR/DOEA/EAB 11	1 1
	NRR/DREP/RAB 10	1 1	NRR/DREP/RPB 10	2 2
	NRR/DRIS/SIB 9A	1 1	NUDOCS-ABSTRACT	1 1
	<u>REG FILE</u> 02	1 1	RES TELFORD, J	1 1
	RES7DE/EIB	1 1	RES/DRPS DEPY	1 1
	RGN2 FILE 01	1 1		
EXTERNAL:	EG&G WILLIAMS, S	4 4	FORD BLDG HOY, A	1 1
	H ST LOBBY WARD	1 1	LPDR	1 1
	NRC PDR	1 1	NSIC HARRIS, J	1 1
	NSIC MAYS, G	1 1		
NOTES:		1 1		

TOTAL NUMBER OF COPIES REQUIRED: L TTR 46 ENCL 45

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9	PAGE (3) 1 OF 0 8
---	--------------------------------------	----------------------

TITLE (4) Inoperable Fire Barrier Penetration Seals result in a Condition Prohibited by Technical Specifications Due to a 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	5	18	88	00	5	0	6	20	Oconee Unit 2		0 5 0 0 0 2 1 7 0
0	5	18	88	00	5	0	6	20	Oconee Unit 3		0 5 0 0 0 2 1 8 7

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9) N	20.402(b)	20.406(e)	50.73(a)(2)(iv)	73.71(b)
	20.406(a)(1)(i)	50.38(a)(1)	50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 356A)
	20.406(a)(1)(iii)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	50.73(a)(2)(iii)	50.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Philip J. North, Licensing	7 0 4 3 7 3 - 7 4 5 6

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On May 18, 1988, 188 penetration fire barriers were declared inoperable because documentation qualifying their specific arrangements as a tested 3 hour fire rated assembly could not be substantiated. These penetrations were installed during plant construction using criteria and specifications supplied to the Station by Design Engineering. This incident was discovered as a result of Design Engineering review and a QA audit. All three units were at 100% power during this incident.

This incident resulted in a condition prohibited by Technical Specification 3.17.6. Tech Spec 3.17.6 states "All fire barriers penetrations protecting safety related areas shall be operable."

Immediate correction actions included a walkdown to identify all inoperable penetration fire barriers, and initiation of fire watch patrols.

The root cause of this incident was determined to be a Design Deficiency due to the failure to supply accurate installation specifications.

8806270349 880620
PDR ADOCK 05000269
S PDR

IE22

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9 8 8	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 8	0 0 5	0 0	0 2	OF	0 8

TEXT (If more space is required, use additional NRC Form 368A's) (17)

Background

The Oconee Nuclear Station (ONS) fire protection program uses the concept of defense-in-depth to achieve a high degree of fire safety. The program provides an adequate balance in: preventing fires from starting; detecting and suppressing fires quickly to limit damage; and designing plant safety systems so that a fire which does start and burns for a considerable time will not affect the plant's ability to achieve and maintain a safe shutdown condition. Penetration fire barriers are an important part of this fire protection program.

The functional integrity of the penetration fire barriers ensures that fires will be confined or adequately retarded from spreading to adjacent portions of the plant. This design feature minimizes the possibility of a single fire rapidly involving several areas of the plant prior to detection and extinguishment. The penetration fire barriers are a passive element in the facility fire protection program and are subject to periodic inspections.

Technical Specification 3.17.6 requires that all fire barrier penetrations protecting safety related areas shall be operable. During the period of time when a barrier is not functional, a fire watch patrol is required to inspect the affected area frequently as a precaution in addition to the fire detection instrumentation [EIIIS:IC] in the area. If the fire detection instrumentation in the area is not operable, a continuous fire watch is required to be maintained in the vicinity of the affected barrier until the barrier is restored to functional status.

SEQUENCE OF EVENTS

Date Unknown

- Penetration fire barriers installed.

May 2, 1988

- A Design Engineer reviewed NRC Information Notice 88-04 "Inadequate Qualification and Documentation of Fire Barrier Penetration Seals."

- The Design Engineer developed concerns over the use of 10 inches of foam as a 3 hour penetration fire barrier at ONS.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	- 0 0 5	- 0 0	0 3	OF 0 8

TEXT (If more space is required, use additional NRC Form 368A's) (17)

May 6, 1988

- The Design Engineer found letter stating that 10 inch depth of foam is acceptable.
- The Design Engineer reviewed Southwest Research Institute test report Project Number 03-5656-003

May 6, 1988

- The Design Engineer found no reference to testing 10" depth of silicone foam in mechanical penetrations in the test report.

May 9, 1988

- Annual Quality Assurance fire protection audit began at ONS.
- Black and Veatch vendor instructed to review fire barriers in accordance with NRC Information Notice 88-04.

May 10, 1988

- The Design Engineer contacts a vendor, North Brothers, for assistance with qualifying 10 inch depth of foam.

May 11, 1988

- Black and Veatch vendor had concern about fire barrier using 1/2" steel plate welded on sleeve.

May 11 thru 13, 1988

- Design Engineering cannot locate test results qualifying 1/2 inch steel plate as a 3 hour fire barrier.

May 17, 1988

- Design Engineering completed heat transfer calculations on 1/2" steel plate.
- Design Engineering determined cables close enough to steel plate to spontaneously combust during fire.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 8	- 0 0 5	- 0 0	0 4	OF	0 8

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

- The Design Engineer received test results from North Brothers on using foam in penetrations.
- North Brothers did not have test results qualifying 10 inches of silicone foam was a qualified 3 hour fire barrier.

May 18, 1988

- Design Engineering declares penetration fire barriers using 1/2 inch steel plate welded on sleeve inoperable.
- Design Engineering declares penetration fire barriers using 10 inch of silicone foam inoperable.
- Walkdown performed to identify all inoperable penetration fire barriers.
- Fire watch was initiated on all affected penetration fire barriers.
- Work requests were written to repair the inoperable penetration fire barriers.

Description of Incident

On May 2, 1988, a Design Engineer reviewed NRC Information Notice 88-04 "Inadequate Qualification and Documentation of Fire Barrier Penetration Seals." The notice was distributed by the NRC to alert holders of operating licenses or construction permits that some installed fire barrier seal designs may not be adequately qualified for the design rating of the penetrated fire barrier. The NRC had identified instances where installed fire barrier penetration seal designs could not be verified as qualified for the design rating of the penetrated fire barrier. In some cases, test qualification 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. The Design Engineer reviewed this notice against the adequacy of in-plant fire barrier penetration seals at ONS.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9	LER NUMBER (6)			PAGE (3)		
		YEAR 8 8	SEQUENTIAL NUMBER - 0 0 5	REVISION NUMBER - 0 0 0			
					0 5	OF	0 8

TEXT (If more space is required, use additional NRC Form 368A's) (17)

During the review, the Design Engineer noted that Design Specifications and Mechanical Maintenance procedures allowed the use of 10 inch depth of silicone foam and the removal of the form boards on mechanical penetrations. The Design Engineer questioned the use of 10 inch depth of foam at ONS based on his experiences at Catawba and McGuire Nuclear Stations which use a 12 inch depth of foam. The Design Engineer attempted to locate documentation that qualified the 10 inch depth of foam as a tested three hour fire rated assembly. On May 6, the Design Engineer found a letter dated July 18, 1983, on ONS mechanical fire stop penetration seals. This letter was addressed to the Station and stated "Instead of a 12-inch minimum spacing between dams a 10-inch spacing is considered acceptable....The 10-inch thickness is considered acceptable based on Southwest Research Institute's Project No. 03-5656-003 'Fire Qualification Test On Silicone Foam Floor Penetration Seals' dated November 30, 1979." The Design Engineer then reviewed this test report and found no reference to testing a 10 inch depth of silicone foam in mechanical penetrations.

On May 9, the annual Quality Assurance fire protection audit began at ONS. This audit is required at least once every 24 months per Technical Specification 6.1.3.4, and was not administered as a result of NRC Information Notice 88-04. Some of the areas to be audited were fire detection surveillance, fire drills, personnel qualification, control of combustibles, fire protection impairment, damage control (Appendix R), plant modifications of fire protection, and emergency lighting. The audit team consisted of four individuals from the General Office. Also a consultant from Black and Veatch (BV) was requested by the group to assist. The Lead Auditor assigned the BV consultant the responsibility of reviewing in-plant fire barrier penetration seals in accordance with NRC Information Notice 88-04. During the audit, the Design Engineer was at ONS to assist the BV Consultant in becoming familiar with the station. Meanwhile, the Design Engineer aware he had not located the required documentation qualifying a 10 inch depth of silicone foam as a three hour fire rated assembly, called North Brothers (Dow Corning RTV Silicone Foam Distributors) on May 10, for assistance in qualifying this specific arrangement.

On May 11, the BV Consultant was performing a walk down of penetration seals. He developed concerns about the operability of the Unit 3 cable room floor spare penetration seal. This seal was rated as a three hour fire barrier and consisted of a 1/2 inch steel plate welded to the top of a 12 inch diameter spare sleeve. The BV Consultant requested documentation of the qualification of this arrangement. Design Engineering searched for the documentation but could not locate it. However, Design Engineering did locate documentation qualifying a pipe in a penetration sealed by silicone foam with a steel plate welded to the bottom of the pipe. But the documentation found did not adequately determine the qualification of this particular steel plate

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9 8 8	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8	- 0 0 5	- 0 0	0 6	OF 0 8

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

arrangement. From May 13 until May 17, Design Engineering conducted heat transfer calculations on the steel plate arrangement. The calculations showed that cables were located close enough to the steel plate to be exposed to temperatures above their spontaneous combustion temperature during a standard three hour furnace test. In addition on May 17, Design Engineering received a test report from North Brothers. The test report did not show that 10 inch foam depth was a qualified three hour fire rated penetration seal.

On May 18, following a discussion between Design Engineering and ONS Compliance it was determined penetration seal arrangements utilizing a 1/2 inch plate welded on a sleeve or a 10 inch depth of silicone foam were inoperable. This decision was based on the lack of documentation and actions expected to be taken in NRC Information Notice 88-04. Because these fire barrier penetration seals were inoperable, ONS was in a condition prohibited by Technical Specification 3.17.6. Thus, this incident is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B).

Cause of Occurrence:

The root cause of this incident was determined to be a Design Deficiency due to the failure to supply installation specifications for mechanical penetration fire barriers.

The specifications for installing mechanical penetration fire barriers provided to ONS by Design Engineering were erroneous and resulted in the incorrect installation of several penetration fire barriers. The conclusion is based on the fact that the specification for installing mechanical penetration fire barriers stated that silicone foam shall be installed to a minimum thickness of 10 inches. The correct minimum thickness is 12 inches. Also, a letter dated January 22, 1985, from Design Engineering to ONS stated spare penetrations which currently consist of a pipe sleeve with a steel plate welded to one end are acceptable.

Design Engineering and Quality Assurance performed a proper and effective followup of NRC Information Notice 88-04. Following the review of the notice Design Engineering performed a review of ONS fire barrier penetration seals and identified potential problem areas. Also, Quality Assurance included in their audit the review of ONS fire barrier penetration seals to ensure they were in accordance with the Information Notice.

A review of Licensee Event Reports over the past 3 years did not identify any similar incident. Therefore, this incident is considered non-recurring. This incident did not involve a component failure that was reportable to NPRDS. There were no release of radioactive materials, radiation exposures, or personnel injuries involved with this incident.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	0 0 5	0 0	0 7	OF 0 8

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

CORRECTIVE ACTIONS

The immediate correction actions were to:

- o Declare penetration seal arrangements utilizing a 1/2 inch plate welded on a sleeve or a 10 inch depth of silicone foam inoperable;
- o Walkdown all three units to identify inoperable penetration seals. 188 inoperable penetrations were identified;
- o Initiate fire watch patrols as required by Technical Specifications.

Subsequent corrective actions were to:

- o Revise the mechanical penetration firestops installation specification to reflect silicone foam shall be installed to a minimum thickness of 12 inches or foam boards could be replaced on existing 10 inch seals.
- o Revise the mechanical penetration firestops installation specification to state: "Spare sleeves provide with a steel plate on the frontside may be foamed in accordance with Figure I";
- o Perform a document research on other ONS penetrations to verify them acceptable;
- o Initiate work requests to repair/replace all identified inoperable fire barrier penetration seals;
- o Revise "Fire Protection-Penetration-Fire Barrier Inspection" procedures to include information provided in the mechanical penetration firestops installation specification;
- o Revise the "Fire Protection, Fire Barriers, Repairing Opening in Mechanical Penetrations Using Dow Corning 3-6548 Silicone RTV Foam" to include information provided in the mechanical penetration firestops installation specification.

Planned corrective action is to repair/replace identified inoperable mechanical penetration fire barriers by August 1, 1988.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 9	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	- 0 0 5	- 0 0	0 8	OF 0 8

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

Analysis of Occurrence:

The inoperability of the fire barriers discussed in this report did not affect other aspects of the fire protection program at ONS, such as the automatic fire detection systems and the automatic and/or manual fire suppression systems [EIIS:KP]. The on-site fire brigade was available at all times. Immediately after declaring the fire barriers inoperable, one-hour fire watch patrols were established, further reducing the probability for a fire to remain undetected and to propagate to other plant locations.

No equipment or systems were affected by this incident. The chance of a fire in any of these areas is remote. The use of high heat sources, such as welding or burning on a job in these areas, is restricted and requires a burning permit and fire watch. If a fire had started the "Operational Guidelines Following Fire In Auxiliary Building, Turbine Building Or Vital Areas" and "Shutdown Following A Fire" procedures are available to provide adequate guidance for the safe shutdown of the plant. In addition, the control rooms are constructed and furnished with non-flammable equipment. If in the unlikely event of a fire the control room had to be evacuated, the Standby Shutdown Facility (SSF) would be available to provide shutdown capability to the plant.

Based on the above analysis, the health and safety of the public were not affected.

DUKE POWER COMPANY

P.O. BOX 33189

CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

June 20, 1988

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
LER 269/88-05

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report (LER) 269/88-05 concerning inoperable fire barrier penetration seals. This report is submitted pursuant to 10CFR50.73(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, for
Hal B. Tucker

PJN/345/bhp

Attachment

xc: Dr. J. Nelson Grace
Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

American Nuclear Insurers
c/o Dottie Sherman, ANI Library
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

Ms. Helen Pastis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

Mr. P.H. Skinner
NRC Resident Inspector
Oconee Nuclear Station

M&M Nuclear Consultants
1221 Avenue of the Americas
New York, NY 10020

DE22
1/1