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ACCESSION NBR:9010010272 DOC.DATE: 90/09/17 NOTARIZED: NO DOCKET #
FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
AUTH.NAME AUTHOR AFFILIATION
DROSTE,J.B. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
BLIND,A.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-008-00:on 900807,degradation of divider barrier seal
located between containment & crane walls occurred.

W/9 / 1tr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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	NRR/DET/ECMB 9H	1 1	NRR/DET/EMEB 7E	1 1
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	NRR/DST/SELB 8D	1 1	NRR/DST/SICB 7E	1 1
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	REG FILE 02	1 1	RES/DSIR/EIB	1 1
	RGN3 FILE 01	1 1		
EXTERNAL:	EG&G BRYCE,J.H	3 3	L ST LOBBY WARD	1 1
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September 17, 1990

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating Licenses DPR-75
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73
entitled Licensee Event Reporting System, the following
report is being submitted:

90-008-00

Sincerely,

A handwritten signature in cursive script that reads 'A.A. Blind'.

A.A. Blind
Plant Manager

AAB:clj

Attachment

cc: D.H. Williams, Jr.
A.B. Davis, Region III
M.P. Alexich
P.A. Barrett
J.E. Borggren
R.F. Kroeger
B. Walters - Ft. Wayne
NRC Resident Inspector
J.G. Gitter, NRC
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G. Charnoff, Esq.
Dottie Sherman, ANI Library
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S.J. Brewer/B.P. Lauzau
B.A. Svensson

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) D. C. COOK PLANT - UNIT 2										DOCKET NUMBER (2) 0 5 0 0 0 3 1 6 1										PAGE (3) 1 OF 0 6	
TITLE (4) DEGRADATION OF DIVIDER BARRIER SEAL LOCATED BETWEEN CONTAINMENT WALL AND CRANE WALL																					
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 8	0 7	9 0	9 0	0 0 8	0 0	0 9	1 7	9 0	COOK PLANT - UNIT 1			0 5 0 0 0 3 1 5									
OPERATING MODE (9) 6			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																		
POWER LEVEL (10) 0 0 0		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)							
		20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)							
		20.405(a)(1)(ii)				50.38(c)(2)				50.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
		20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(A)											
		20.405(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)											
		20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME J. B. DROSTE - PLANT ENGINEERING SUPERINTENDENT										TELEPHONE NUMBER 6 1 6 4 6 5 - 5 9 0 1											
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs											
X	B	C	S	E	A	L	0	0	6	6	N										
SUPPLEMENTAL REPORT EXPECTED (14)																					
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO		EXPECTED SUBMISSION DATE (15)									
												MONTH DAY YEAR									

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

On August 7, 1990, with Unit 2 in Mode 6 (Refueling), while removing samples of the Divider Barrier Seal, the samples would split when removed from the seating surfaces or separate longitudinally along cracks not visible prior to removal. Surveillance 4.6.5.9.a requires that samples of the Divider Barrier Seal be removed for laboratory analysis. Test coupons of the Divider Barrier Seal material were depleted and portions of the actual barrier seal had to be removed. It could not be conclusively determined what caused the Divider Barrier Seal material to degrade in such a manner.

Safety evaluations for both units were performed to determine the impact of the Divider Barrier Seal degradation. The evaluations concluded that the barrier seals would have performed their designed safety function even when degraded, and did not represent a significant threat to public safety.

The entire Unit 2 Divider Barrier Seal is being replaced during the current refueling outage. The Unit 1 original Divider Barrier Seal (3807 model) will be replaced during the upcoming refueling outage (October - November, 1990).



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

Condition Prior to Occurrence

Unit-2 was in Mode 6 (Refueling Outage).

Description of Event

On August 7, 1990, when seal material was being removed for lab analysis, portions were found to be badly degraded. Test coupon samples, of the Divider Barrier Seal material, were depleted and samples of installed Divider Barrier Seal (EIIIS/BC-SEAL) had to be used for lab analysis as required by Surveillance 4.6.5.9.a.

The seal material (by Uniroyal, Model No. 3807) was found to be cracked and split. The seal material would separate upon removal and handling. Portions would split when removed from sealing surfaces or separate longitudinally along cracks not visible prior to removal. The cracks were in the area of the raised seating surface (see attached drawing). In the past, Uniroyal 41-300 seal material had been used to replace portions of the 3807 seal material. The 41-300 material showed no signs of degradation.

Cause of Event

It could not be conclusively determined what caused the Divider Barrier Seal material to degrade in such a manner. It is possible that the 3807 seal material can not deal with the localized stress imposed upon it by the backing plate. The 41-300 seal material has been used to replace degraded portions of the 3807 material since 1981. Samples of both the 41-300 material and 3807 material were sent in for laboratory analysis. The physical properties (tensile strength and elongation at break) of the 41-300 seal material are far superior to the 3807 material. There has not been any indication that the previously installed 41-300 seal material had degraded.

Analysis of Event

Construction of the Cook Nuclear Plant containment is such that the ice condenser is supported by the crane wall with a gap left between the ice condenser floor and the outer containment wall. The purpose of this gap is to decouple the two structures in a seismic event. The Divider Barrier Seal is a flexible rubber strip which seals the gap between the crane wall and the containment wall without coupling the structures. As a result, it serves two functions.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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D. C. COOK PLANT - UNIT 2

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

Analysis of Event Continued

1. The seal must prevent a bypass flow area between lower and upper containment so that, in the event of a Loss Of Coolant Accident (LOCA), steam flow from the break is directed through the ice condenser. Any bypass of the ice condenser may result in an increase in containment pressure during a LOCA. If excessive bypass area exists, containment pressure could exceed the design value of 12 psig.
2. The seal must not transfer any load between the crane wall and outer containment wall during a seismic event.

The increase in bypass area due to the degraded seals is calculated below to determine if the total bypass flow area is within the accident analysis assumptions. This calculation contains several conservatisms:

1. There is a total of 646 linear feet of seal and, it was assumed all the Unit 2 seal material is cracked, even though only five areas have been found cracked during the Visual Inspection.
2. Some of the susceptible sealing material has been replaced on Unit 2. The replacement seal is of the improved 41-300 material which has not been found in a degraded state.

Two types of seals exist, one with a backing plate made of steel and one without a backing plate. There is approximately 490 linear feet of the seal type with a backing plate and it has been conservatively estimated that, given the identified defect, this type of seal would open to a 1/16-inch gap. This would produce a bypass area of (490 ft.) (1/16 inch) (ft./12inch) = 2.55 sq. ft. There are 156 linear feet of seal type without a backing plate and it has been conservatively estimated that, given the identified defect, this type of seal would open to a 1.25 - inch gap. This would produce a bypass area of (156ft.) (1.25 inch) (ft./12 inch) = 16.25 sq. ft.

A minimum ice condenser bypass area of 5.36 sq. ft. is assumed in the UFSAR containment pressure response analysis (Section 14.3.4.4, pages 14.3.4-14-25). The worst-case accident analysis of Chapter 14 (Section 14.3.4.4, pages 14.3.4-53) shows that the containment design pressure of 12 psig will not be exceeded with a total maximum bypass flow area of 35 sq. ft. The additional 18.8 sq. ft. potential bypass area past the Divider Barrier Seal, i.e., 2.55 sq. ft. plus 16.25 sq. ft., to the minimum assumed for the UFSAR analysis (5.36 sq. ft.) produces a total of 24.16 sq. ft., which is still below the 35 sq. ft. of the worst-case accident analysis. Therefore, we believe that the

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

Analysis of Event Continued

Divider Barrier Seal of Unit 2 would have performed its designed safety function even if degraded as indicated from the inspections.

Since most of the seal material had been installed during initial construction, there is reason to believe the seal material was cracked while the plant was operating at power, and therefore, was in a condition prohibited by Technical Specifications. A safety evaluation completed on September 4, 1990 concluded that cracking of the Unit 2 containment Divider Barrier Seal is reportable per the requirements of 10CFR50.73(a)(2)(i)(B), but did not represent a significant threat to public safety.

Unit 1 Impact Review

Since the Unit 1 Divider Barrier Seal is also fabricated from Uniroyal 3807 material, an evaluation of the functionality of the Unit 1 Divider Barrier Seal was conducted to determine if the seal would be able to perform, as assumed, in the Updated Final Safety Analysis Report (UFSAR), Chapter 14 accident analysis. Discussions on the subject were held via a conference call with NRC Region III and NRR on August 10, 1990.

In Unit 1, the increase in bypass area due to degraded seals, is calculated below to determine if the total bypass flow area is within the accident analysis. This calculation contains several conservatisms:

1. There is a total of 744 feet of seal in Unit 1 and, even though there is no evidence of degradation on the Unit 1 seal at this time, it is assumed all 744 feet of seal are defective.
2. Some of the susceptible sealing material had previously been replaced in Unit 1. The replacement seal is of the improved 41-300 material which has not been found in a degraded state.

Two types of seals exist, one with a backing plate made of steel and one without a backing plate. There are approximately 490 linear feet of the seal type with a backing plate and it has been conservatively estimated that this type of seal would open to a 1/16 inch gap. This would produce a bypass area of (490 ft.) (1/16 inch) (ft./12 inch) = 2.55 sq. ft. There are 254 linear feet of the seal type without a backing plate and it has been conservatively estimated that, with this defect, this type of seal would open to a 1.25 inch gap. This would produce a bypass area of (254 ft.) (1.25 inch) (ft./12 inch) = 26.46 sq. ft.



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TEXT CONTINUATION

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

Unit 1 Impact Review Continued

A minimum ice condenser bypass area of 5.36 sq. ft. is assumed in the UFSAR containment pressure response analysis (Section 14.3.4.4.7.3, pages 14.3.4-64, 65). The worst-case accident analysis of Chapter 14 (Section 14.3.4.4.7.3, page 14.3.4-66) shows that the containment design 12 psig will not be exceeded with a total maximum bypass flow area of 35 sq. ft. The additional 29.01 sq. ft. potential bypass area past the divider barrier seal, i.e., 2.55 sq. ft. plus 26.46 sq. ft., to the minimum assumed for the UFSAR analysis (5.36 sq. ft.) produces a total of 34.37 sq. ft., which is still below the 35 sq. ft. of the worst-case accident analysis. It is assumed, therefore, that the divider barrier seal of Unit 1 would perform its designed safety function even if degraded as indicated from the Unit 2 inspections.

In conclusion, continued operation of Unit 1 to the end of the current cycle does not result in a significant concern regarding public health and safety.

Corrective Actions

The entire Divider Barrier Seal is being replaced with Uniroyal, Model No. 41-300 material. The Unit 1 Divider Barrier Seal is also constructed from No. 3807 material. The 3807 material will be replaced during the upcoming refueling outage (Oct. - Nov., 1990).

Failed Component Identification

Component I.D.: Divider Barrier Seal (EIIS/BC-SEAL)
Manufacturer: Uniroyal
Model: 3807

Previous Similar Events

050-315/79-29
050-315/80-14
050-315/81-14
050-315/82-66

050-316/79-43
050-316/81-12

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TEXT (If more space is required, use additional NRC Form 308A's) (17)

TYPICAL INSTALLATION OF DIVIDER BARRIER SEAL
WITH BACKING PLATES

