

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) PALISADES NUCLEAR PLANT	DOCKET NUMBER (2) 0 5 0 0 0 2 5 5	PAGE (3) 1 OF 0 1 3
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TITLE (4)
CRACKING OF CONTROL ROD DRIVE SEAL HOUSING

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)
1	2	17	8	6	8	6	0	4	N/A		0 5 0 0 0
									N/A		0 5 0 0 0

OPERATING MODE (9) **N**

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

20.402(b)	20.406(e)	80.73(a)(2)(iv)	73.71(b)
20.406(a)(1)(i)	80.38(a)(1)	80.73(a)(2)(v)	73.71(a)
20.406(a)(1)(ii)	80.38(a)(2)	80.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 308A)
20.406(a)(1)(iii)	80.73(a)(2)(i)	80.73(a)(2)(vii)(A)	
20.406(a)(1)(iv)	<input checked="" type="checkbox"/> 80.73(a)(2)(ii)	80.73(a)(2)(vii)(B)	
20.406(a)(1)(v)	80.73(a)(2)(iii)	80.73(a)(2)(viii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME C S Kozup, Technical Engineer, Palisades	TELEPHONE NUMBER 6 1 6 7 6 4 - 8 9 1 3
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
X	AA	SEAL	C490	Yes					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR
0 4	1 7	8 6

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

With the Plant in hot shutdown condition (ie, 530 degrees, 2150 psia), engineering walkdowns identified control rod drive mechanism (CRDM) number 25 to be exhibiting primary coolant system leakage of approximately 0.12 gallons per minute. The CRD seal housing [SEAL;AA] was removed and, during bench testing, exhibited leakage from the drive shaft tube penetration. On December 17, 1986, dye penetrant inspections identified positive circumferential indications around the inner drive shaft housing.

Subsequent investigations indicated that CRD seal housing 25 was one of three seal housings procured in 1977. The two other CRD seal housings were identified to be installed in positions 23 and 28. On January 7, 1987, they were removed and, from dye penetrant inspections, indicated similar cracking. ASME Section XI requirements were exceeded by testing an additional eleven installed CRD seal housings. No similar indications were noted.

Vendor analysis has indicated a contaminant caused transgranular stress corrosion cracking on the inner diameter of the motor sleeve housing. Records indicate the three CRD seal housings were manufactured from the same materials and comprised the entire manufacturing lot. This is believed to be an isolated incident and not to represent a safety hazard.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

Description

With the Plant in hot shutdown condition (ie, 530 degrees, 2150 psia), engineering walkdowns identified control rod drive mechanism (CRDM) number 25 (serial number: 2966-101) to be exhibiting primary coolant system [PCS] leakage of approximately 0.12 gallons per minute. The CRD seal housing [SEAL;AA] was removed from the reactor head and, during bench testing, exhibited leakage from the drive shaft tube penetration. Subsequently, on December 17, 1986, dye penetrant inspections identified positive circumferential indications around the inner diameter of the motor tube sleeve.

On December 17, 1986, due to positive dye penetrant indications on CRD seal housing 25, an additional six seal housings were dye penetrant tested per ASME Section XI. No similar positive indications were noted.

On December 19, 1986, CRD seal housing 25 was sent to Combustion Engineering to determine the primary failure mechanism via destructive and metallurgic examination. A records search initiated by both the licensee and vendor indicated that CRD seal housing 25 was one of three spare CRD seal housings procured from Combustion Engineering in 1977. Also indicated was that the seal housings were manufactured from the same materials and comprised the entire manufacturing lot. The remaining seal housings were determined to be on the reactor head in positions 23 and 28.

On January 7, 1987, CRD seal housings 23 and 28 (serial numbers 2966-103 and 2966-102, respectively) were removed and dye penetrant tested. Both seal housings exhibited positive indications similar to CRD seal housing 25. Subsequently, both seal housings were sent to Combustion Engineering for further examination.

On January 9, 1987, due to the additional findings on seal housing 23 and 28, and per ASME Section XI, five additional CRD seal housings were removed and dye penetrant tested. No similar positive indications were noted.

Preliminary results from the Combustion Engineering destructive and metallurgic analysis indicate the circumferential cracking was initiated by the inner diameter of the motor tube sleeve being exposed to a contaminant during manufacturing or handling prior to licensee receipt. The exact nature of the contaminant is not known to date; however, it is believed to be the cause of the transgranular stress corrosion cracking.

Cause of the Event

The cause of the transgranular stress corrosion cracking appears to be a contaminant found on the inner diameter of the motor tube sleeve. The exact nature of the contaminant is not known to date; however, all results (ie, no other seal housings tested show defects) indicate that it

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originated during the manufacturing or handling procedure prior to licensee acceptance.

The presence of the contaminant and evidence of transgranular stress corrosion cracking appears to be an isolated case, associated with the entire manufacturing lot comprised of CRD seal housings 23, 25 and 28 (serial numbers 2966-103, 2966-101 and 2966-102).

Upon licensee receipt of the final Combustion Engineering analysis and identification of the contaminant, a supplemental LER will be submitted.

Analysis of the Event

The significance of a total failure (ie, 360 degrees through wall crack of the motor tube sleeve) would have been a resultant small line break loss of coolant accident equivalent to a two and a quarter inch diameter pipe break. Loss of coolant accidents due to pipe break have been analyzed from small breaks up to a complete double-ended severance of a 42 inch diameter PCS pipe break and are compensated by the Emergency Core Cooling System and it's associated limiting conditions of operation.

Since it has been demonstrated that this occurrence is isolated to the three CRD seal housings manufactured and procured in the same lot, that the three affected CRD seal housings have been removed and destroyed during testing and that all original CRD seal housings dye penetrant tested per ASME Section XI requirements showed no reportable indications, it is concluded that this item was not a safety concern.

Corrective Actions

All ASME Section XI code requirements have been exceeded to date with the subsequent dye penetrant testing of eleven additional CRDM seal housings, with no positive indications. Combustion Engineering has been contracted and is in the process of performing destructive and metallurgical examinations upon the faulty seal housings to confirm the root cause of the failure.

Consumers Power Company is currently evaluating the benefit which may be gained by performing additional dye penetrant tests as part of the inservice inspection program. No further examinations are required by ASME Section XI.

Additional Information

Failed components: Control Rod Drive Mechanism seal housings manufactured by Combustion Engineering - Serial numbers 2966-101, 2966-102 and 2966-103.

No previously submitted LERs were identified where a similar root cause determination was made.



Consumers
Power

**POWERING
MICHIGAN'S PROGRESS**

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February 16, 1987

US Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -
LICENSEE EVENT REPORT 86-040, REVISION 1 - CRACKING OF
CONTROL ROD DRIVE SEAL HOUSING

Licensee Event Report (LER) 86-040, (Cracking of Control Rod Drive Seal
Housing) is attached. This event was reportable to the NRC per
10CFR50.73(a)(2)(ii). This revision reports the results of our engineering
evaluation as specified by the original LER 86-040, dated January 16, 1987.

Brian D Johnson
Staff Licensing Engineer

CC Administrator, Region III, USNRC
NRC Resident Inspector - Palisades

Attachment

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