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October 29, 1998
1940-98-20642

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Document No. 50-219
Licensee Event Report 98-014: Failure of the Isolation Condenser Tube Bundle
Due to Thermal Stresses/Transgranular Stress
Corrosion Cracking Caused by Leaky Valve

Enclosed is Licensee Event Report 98-014. This event did not impact the health and safety of the public.

If any additional information or assistance is required, please contact Mr. John Rogers of my staff at 609-971-4893.

Very truly yours,

for

Michael B. Roche
Vice President and Director
Oyster Creek

MBR/JJR

Enclosure

cc: Oyster Creek NRC Project Manager
Administrator, Region I
Senior Resident Inspector

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PDR ADOCK 05000219
S PDR

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Oyster Creek Unit 1		DOCKET NUMBER (2) 50 - 219	PAGE (3) 1 of 3
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TITLE (4)
Failure of the Isolation Condenser Tube Bundles Due to Thermal Stresses/Transgranular Stress Corrosion Cracking Caused by Leaky Valve

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 NAME	DOCKET NUMBER
09	28	98	98	014	00	10	29	98		05000
										05000

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (Check one or more) (11)									
POWER LEVEL (10) 0	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 73.71						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> OTHER						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)							
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)							

LICENSEE CONTACT FOR THIS LER (12)

NAME Sylvain Schwartz	TELEPHONE NUMBER (Include Area Code) 609-971-4558
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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

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION		
YES (If yes, complete EXPECTED SUBMISSION DATE.)	<input checked="" type="checkbox"/>	NO		MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 28, 1998 while performing a hydrostatic test of B Isolation Condenser it was determined that both tube bundles had cracks in the top tubes. On September 29, 1998, this condition was determined to be reportable.

The cause of these cracks has been determined to be cyclic thermal stresses and /or transgranular stress corrosion cracking (TGSCC) caused by leakage past the Condensate Return Valve. The leaking valve exposed the tube bundles to thermal cycle fatigue by voiding of the top tubes and TGSCC resulting from high shell operating temperatures.

Corrective actions included replacement of the failed tube bundles and repair of the Condensate Return Valve.

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TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

DATE OF OCCURRENCE

The condition described herein was discovered on September 28, 1998, and determined to be reportable on September 29, 1998.

IDENTIFICATION OF OCCURRENCE

While conducting hydrostatic testing of Isolation Condensers A and B (EIIS BL), it was discovered that leakage had developed in the B Isolation Condenser tube bundles. This was determined to be reportable under 10 CFR 50.73(a)(2)(ii).

CONDITIONS PRIOR TO OCCURRENCE

The plant was in a refueling outage with the reactor in the cold shutdown condition. However, the plant had been operating in all modes prior to discovery.

DESCRIPTION OF OCCURRENCE

On September 28, 1998, during hydrostatic testing of B Isolation Condenser it was determined that both tube bundles had cracks at the top tubes. Hydrostatic testing was being performed in response to an industry concern based on an evaluation of similar failures at Nine Mile Point (NMP) Unit 1.

APPARENT CAUSE OF OCCURRENCE

The cause of the event has been determined to be cyclic thermal stresses and /or transgranular stress corrosion cracking (TGSCC) caused by the condition created by leakage past the Condensate Return Valve. The leaking valve caused the steam/water interface to be in the tube bundles. The steam/water interface in the tubes caused thermal cycle fatigue. The additional heat exchange increased shell operating temperature and exposed the tube bundles to TGSCC. Had the steam/water interface been maintained well above the elevation of the tube bundle, no damage would have occurred.

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ANALYSIS OF OCCURRENCE AND SAFETY SIGNIFICANCE

The root cause determination of the B Isolation Condenser is based on metallurgical evidence assembled from the evaluation of similar failures at Nine Mile Point (NMP) Unit 1, corroborated by the results of NDE examinations performed at OCNCS. Local hydraulic instability due to small oscillations of the level of the condensate that largely fill the tubes creates local thermal stress in the tube, particularly characterized as a through-wall bending stress. This condition could cause fatigue damage in or near the tube where it is joined to the tubesheet.

In addition, NMP evidence clearly shows distinct TGSCC initiating on the OD surface in the area of the transition at the tubesheet joint. Similar evidence was discovered at OCNCS by Eddy Current examination of one of the removed tube bundles.

Non-Destructive Examinations of the damaged tubes determined that the through-wall crack found during hydrotesting was circumferential approximately 1 inch long. This is significantly smaller than the critical flaw size (3.4 inches) determined analytically to be the minimum circumferential through-wall crack capable of causing a tube rupture upon initiation of the Isolation Condenser.

The safety significance of this event is considered minimal. Samples taken from the shell side of the Isolation Condenser during cycle 16 showed no radioactive isotopes which could be attributed to the through-wall leakage. Therefore, no offsite dose can be ascribed to this condition. Additionally, existing plant procedures require sampling for airborne radioactive releases downwind from the Isolation Condensers upon initiation of the system. Therefore, methods already existed and were in place for detection of leakage during initiation of the Isolation Condensers.

CORRECTIVE ACTIONS

Corrective actions included replacement of the failed tube bundles and repair of the Condensate Return Valve.

SIMILAR EVENTS

None.