CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT
362 INJUN HOLLOW ROAD • EAST HAMPTON, CT 06424-3099

November 7, 1996
Re: 10CFR50.73(a)(2)(ii)
B15991

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

Reference: Facility Operating License No. DPR-61
Docket No. 50-213
Reportable Occurrence LER 50-213/96-026-00

This letter forwards the Licensee Event Report 96-026-00, required to be submitted, pursuant to the requirements of the Haddam Neck Plant's Technical Specifications.

Very truly yours,

J. J. LaPlatney
Unit Director

JJL/cab

Attachment: LER 50-213/96-026-00

cc: Mr. H. J. Miller
Regional Administrator, Region I
475 Allendale Road
King of Prussia, PA 19406

Mr. William J. Raymond
Sr. Resident Inspector
Haddam Neck

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IE22

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

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.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)
Weld Flaws Found in Service Water Piping for Spent Fuel Cooling

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
10	09	96	96	026	00	11	07	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	X 50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Richard Kasuga, Engineer	(860)267-2556

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)		EXPECTED SUBMISSION	MONTH	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO	01	15	97

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

On October 9, 1996, at 1705 hours, with the plant in Mode 5 (cold shutdown) for the cycle 19 refueling outage, an apparent 29 inch crack was found in a six inch service water pipe to the spent fuel pool (SFP) heat exchangers. Preliminary indication was that this flaw appeared to be a near through-wall crack. However, subsequent failure analysis determined that the indication was a 0.008 inch deep lap which is a minor fabrication defect. This condition was initially reported on October 9,1996 as a prompt report. However, based on the failure analysis results, this event was subsequently determined not to be reportable. On October 19, 1996, at 1600 hours, a follow-up inspection identified flaws in two tee-to-pipe welds in the service water return line from the SFP heat exchangers and the piping was declared inoperable. A failure analysis of the degraded tee will be conducted to determine the cause of the weld flaws. Initial corrective action consisted of establishing a flood watch in the spent fuel building and preparing temporary jumper hoses, available for use following a seismic event, to establish an alternate flow path. The tee was replaced and the piping was returned to service on October 30, 1996. A supplemental report will be submitted detailing the results of the failure analysis.

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

BACKGROUND INFORMATION

The spent fuel cooling system (EIIS Code: DA) cools and circulates the borated water in the spent fuel pool. Two cooling pumps can circulate the water through two heat exchangers (EIIS Code: HX), which are cooled by the service water system (EIIS Code: BI), and return the water to the spent fuel pool. The system is designed to allow a full core off-load while providing adequate cooling for spent fuel already in the pool. The service water line which contained the flawed tee welds was installed in 1975 to allow installation of a second spent fuel pool heat exchanger.

EVENT DESCRIPTION

On October 9, 1996, at 1705 hours, with the plant in Mode 5 (cold shutdown) for the cycle 19 refueling outage, an apparent 29 inch crack was found in a six inch service water pipe to the spent fuel pool (SFP) heat exchangers. The apparent crack was located near an integral pipe restraint (support welded to pipe). Preliminary indication, using ultrasonic inspection techniques, was that this flaw appeared to be a near through-wall crack. However, subsequent failure analysis determined that the indication was a 0.008 inch deep lap which is a minor fabrication defect. This condition was initially reported on October 9, 1996 as a prompt report. However, based on the failure analysis results, this event was subsequently determined not to be reportable.

On October 19, 1996, at 1600 hours, a follow-up inspection identified flaws in two tee-to-pipe welds in the service water return line from the SFP heat exchangers and the piping was declared inoperable. The weld joints were radiographed and the areas of corrosion were ultrasonically examined to completely size the flaws and degradation. Localized readings of the remaining weld/pipe wall thickness were as low as 0.052 inches. The piping was determined to be inoperable after all design loads (seismic, pressure, dead weight and thermal) were considered based on ASME Section XI (Appendix H), Generic Letter 90-05 calculations and Generic Letter 91-18 guidelines.

CAUSE OF THE EVENT

A complete failure analysis of the degraded tee will be conducted to determine the cause of the weld degradation. Preliminary results indicate significant areas of lack of root weld penetration and poor weld fit up.

A supplemental report will be submitted detailing the final results of the failure analysis.

SAFETY ASSESSMENT

This event is being reported under 10CFR50.73(a)(2)(v)(B) as any event that alone could have prevented the fulfillment of the safety function of a system needed to remove residual heat.

The identified flaws range from one which is 1/2 inch x 1/8 inch and 0.052 inch remaining wall to 1/4 inch x 1/4 inch and 0.160 inch remaining wall. However, due to the requirements of the evaluation methodology used and the spacing between flaws, a very deep 360 degree flaw was assumed. Based on

the ultrasonic test data substantially more weld ligament remains. In addition, a similar, if not more severely degraded, weld from the emergency diesel generator supply line was tested by an outside lab in 1995 by applying 100 psig of internal pressure and bending to simulate seismic loads. The results of this test concluded that the ASME section XI (Appendix H) fracture mechanics analysis is a very conservative approach to evaluate service water weld flaws in carbon steel pipe. Based on this testing, the expected response of this piping to a seismic event would be flaw growth and pipe leakage, not a severing of the pipe. Since the degraded welds are downstream of the 'A/B' SFP heat exchangers, spent fuel pool cooling would not have been lost. It was concluded that the service water return line was available to perform its current function until the tee could be replaced.

The worst case result (assuming a double-ended rupture) would be the discharge of up to 900 gpm of service water onto the floor of the spent fuel building. No safety related equipment other than spent fuel cooling is located in this area. Also, Abnormal Operating Procedure AOP 3.2-59 provides various methods for recovering from a loss of spent fuel cooling due to fouling, mechanical failure, electrical failure, fire or flooding.

The spent fuel cooling system remained in operation throughout this event except for the short time period needed to install the temporary fire hoses to support replacement of the tee.

Based on the above, the safety significance of this event is judged to be low.

CORRECTIVE ACTION

Corrective action for the apparent 29 inch crack in the service water supply line consisted of isolating the pipe, installing a temporary alternate supply of service water utilizing fire hoses, inspecting all remaining service water system welded supports, cutting out the flawed pipe, performing a crack failure analysis and inspecting 5 selected service water supply/return welds.

Corrective actions taken as a result of the degraded return line weld consisted of establishing a flood watch in the spent fuel building, approving a temporary jumper using fire hoses to establish an alternate flow path during piping replacement and/or following a seismic event, and inspecting 5 additional SFP service water welds which were subsequently determined to be acceptable. The tee was replaced and the piping was returned to service on October 30, 1996. A failure analysis of the degraded tee will be conducted to determine the cause of the weld degradation.

ADDITIONAL INFORMATION

Commitments

The following are commitments made within this report. All other statements are for information only.

B15991-1 A failure analysis of the degraded tee will be conducted to determine the cause of the weld degradation.

B15991-2 A supplemental report will be submitted detailing the results of the failure analysis.

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

PREVIOUS SIMILAR EVENTS

LER 94-002-01, "Service Water System Declared Inoperable Due to Pipe Weld Flaws".

LER 95-017-00, "Degraded Weld in CAR Fan Service Water Return Piping".