



CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

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

March 18, 1994

Re: 10CFR50.73(a)(2)(i)
10CFR50.73(a)(2)(v)
10CFR50.73(a)(2)(vii)


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 50-213/94-005-00

Gentlemen:

This letter forwards the Licensee Event Report 94-005-00, required to be submitted, pursuant to the requirements of the Haddam Neck Plant's Technical Specifications.

Very truly yours,


John P. Stetz
Vice President

JPS/mlg

Attachment: LER 50-213/94-005-00

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
475 Allendale Road
King of Prussia, PA 19406

William Raymond
Sr. Resident Inspector
Haddam Neck

Handwritten initials/signature

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Haddam Neck DOCKET NUMBER (2): 0 5 0 0 0 2 1 1 3 PAGE (3): 1 OF 0 5

Pressurizer PORVs Failed to Fully Stroke Open During Testing

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	VERSION PREFIX	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)	
0	2	19	94	94	005	0	0	3		0 5 0 0 0	
										0 5 0 0 0	

OPERATING MODE (8): 5 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)

POWER LEVEL (10): <u>0 1 0 0</u>	20.405(a)(1)(i)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
	20.405(a)(1)(ii)	50.36(a)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)	73.71(e)
	20.405(a)(1)(iii)	50.36(a)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 350A)
	20.405(a)(1)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
	20.405(a)(1)(v)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
	20.405(a)(1)(vi)	50.73(a)(2)(iii)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<u>M. F. Marino, Systems Engineering</u>	<u>210 326 171-12 1515 16</u>

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

CAUSE	SYSTEM	COMPONENT	MANUFAC. TURER	REPORTABLE TO NRCDS	CAUSE	SYSTEM	COMPONENT	MANUFAC. TURER	REPORTABLE TO NRCDS
B	A/B	I/R/V	C16/315	N					

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)

ABSTRACT

On February 19, 1994 at 1345 hours, with the plant in Mode 5 (Cold Shutdown) while performing a stroke test of the pressurizer Pilot-Operated Relief Valves (PORVs) it was determined that the valves would not fully open. The problem was traced to a leak in the diaphragm assembly of the PORVs (PR-AOV-568 & 570). This leak was caused by improper assembly of the diaphragm in the actuator due to incomplete communication between the manufacturer and the licensee. Both PORV diaphragms were replaced during the 1993 refueling outage with a new style. Corrective action consisted of replacing the new style diaphragms with the original material which had no history of this kind of failure. It is not known how long the PORVs had been inoperable prior to this surveillance, but it is believed to have been longer than the ACTION time allowed. Therefore, this event is reportable under 10CFR50.73(a)(2)(i)(B), since it resulted in a condition prohibited by the plant's Technical Specifications. It is also reportable under 10CFR50.73(a)(2)(v)(D) and 50.73(a)(2)(vii) as a common mode failure.

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TEXT (if more space is required, use additional NRC Form 306A's) (17)

BACKGROUND INFORMATION

The primary purpose of the pressurizer Pilot Operated Relief Valves (PORVs) (EIIS Code: AB) is to limit Reactor Coolant System (RCS) pressure to below the pressurizer safety valve setpoint, thus limiting the operating frequency of the code safety valves. The PORVs open automatically on two out of three high pressurizer pressure signals. The air operated pressurizer PORVs (PR-AOV-568 and 570) receive their air supply from the containment control air system (EIIS Code: LD) and an air accumulator. The control room operators have the ability to open either PORV manually to establish a "bleed" path for use in the "feed-and-bleed" method of core cooling ("feed" via safety injection and "bleed" via the PORVs). This is required when the steam generators are not available for decay heat removal.

The control air system includes a 107 gallon emergency air accumulator to support PORV operation for the "feed-and-bleed" method of core cooling in the event of a failure of both non-safety related containment air compressors. The air supply lines which lead to the PORVs (Figure 1) are each provided with a pressure regulator (CA-PRV-836A & B) (EIIS Code: LD). These regulators reduce the air pressure being supplied from 120 psig to 85 psig.

The portion of the containment control air system that supplies air to the PORVs from the accumulator serves a safety related function. It is isolated from the remainder of the containment control air system by two safety related check valves.

EVENT DESCRIPTION

On February 19, 1994, at 1345 hours, with the plant in Mode 5 (Cold Shutdown) for a maintenance outage, while performing Surveillance 5.7-112, "Inservice Testing of Power Operated Relief Valves PR-AOV-568 and 570 and Associated SOVs", both PORVs failed to fully open. This surveillance verifies the ability to fully stroke and the time to stroke the PORVs in accordance with Technical Specification 4.4.4.1 and 4.4.4.6. Since the PORVs were last tested during the 1993 refueling outage, ending July 1993, the actual time of failure is unknown but is conservatively estimated to have been longer than allowed by the Technical Specification ACTION statement. Investigation of the failure revealed two problems:

- 1) Both PORV diaphragms leaked between the cover and the diaphragm.
- 2) The air regulators supplying both PORVs were set too low (77.3 PSIG and 75.1 versus the required 85 PSIG). The air regulator problem is secondary and would not alone have caused the failures.

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

CAUSE OF THE EVENT

The leaking diaphragms were caused by loose diaphragm cover bolts. Both PORV diaphragms were replaced during the 1993 refueling outage with a new style. The principle change was the substitution of a longer lasting material (EPDM) for the old Buna-N material. The manufacturer also changed the shape of the diaphragm somewhat although this was never communicated to the licensee. This change resulted in some difficulty installing the diaphragm. To overcome this a commonly used lubricant (Moly 55) was applied to aid installation. The PORVs were subsequently re-tested satisfactorily. Subsequent to the February 1994 failures an in-depth discussion with the manufacturer on the possible causes for failure revealed several aids to overcome installation problems. The most significant was the use of a sealant around the diaphragm's bolt circle. It is believed that the presence of lubricant instead of the sealant allowed some extrusion of the diaphragm from between the base and cover and away from the bolt holes. This extrusion also led to small tears at several diaphragm bolt holes, allowing the bolts to loosen over time.

The cause of this event was incomplete communication between the manufacturer and the licensee.

SAFETY ASSESSMENT

This event is reportable under 10CFR50.73(a)(2)(i)(B) since it resulted in a condition prohibited by the plant's Technical Specifications. It is also reportable under 10CFR50.73(a)(2)(v)(D) and 50.73(a)(2)(vii) as a common mode failure.

The operation of the pressurizer PORVs (PR-AOV-568 and 570) during a design basis accident is not required to prevent the violation of the pressure and temperature safety limits. In post-small break LOCA conditions the HPSI recirculation line back to the RWST is isolated and it is assumed that the PORVs are opened to ensure that the HPSI pumps are not dead headed. In this event the valves would open and perform their intended function for a short period of time. However, the air leakage would have resulted in the eventual loss of air and closure of the PORVs. The closure of the PORVs would result in the loss of forced flow and core cooling would occur by natural circulation. The safety significance of the event is low since, for a small break LOCA, charging flow would continue to supply coolant to the core. For large break LOCAs, the system pressure would be low enough to allow for recirculation using the HPSI pumps.

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

The operation of these valves is also required for a beyond design basis feed and bleed type accident (when the steam generators are unavailable to remove core decay heat). Although the use of the main and auxiliary feedwater systems is the primary and preferred method of safe shutdown, feed and bleed remains limiting to meeting the Probabilistic Risk Assessment (PRA) core melt frequency goal and is credited as an available safe shutdown method for the following applications:

1. Loss of main and auxiliary feedwater
2. High energy pipe breaks
3. Internally generated missile
4. Tornado missiles/wind protection

The eventual loss of air to the PORVs results in an increase in the core melt frequency.

CORRECTIVE ACTION

Corrective actions that have been completed relating to this event include the following:

1. Significant extrusion of the diaphragms was noted, raising questions as to the long term adequacy of this new style. Therefore, the new style diaphragms were replaced with the original Buna-N material which had no history of this kind of failure.
2. Discussions were conducted with the vendor regarding the incomplete communications issue.
3. The PORV air regulators were replaced.

ADDITIONAL INFORMATION

System	Component	Manufacturer	Model Number
LD	Air Regulator	ITT Conoflow (I208)	GFH25XT2365G
AB	PORV diaphragm	Copes-Vulcan (C635)	264331

PREVIOUS SIMILAR EVENTS

LER 93-007-00

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Haddam Neck

0 5 0 0 0 | 2 1 | 3 9 | 4 - 0 | 0 5 - 0 | 0 0 5 OF 0 5

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

Figure 1

