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)(i)
10CFR50.73(a)(2)(ii)
B15992

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 50-213/96-027-00

This letter forwards the Licensee Event Report 96-027-00, 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 50-213/96-027-00

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

9611130548 961107
PDR ADOCK 05000213
S PDR

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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)
Haddam Neck	05000-213	1 of 4

TITLE (4)

Boron Injection Flow Path Below Minimum Required Temperature

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	10	96	96	027	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)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	X 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)	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)
John Majewski, Senior 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 10, 1996, at 1717 hours, with the plant in Mode 5 (cold shutdown) it was determined that the temperature on certain heat traced portions of the boric acid system piping was below the minimum required by the plant's Technical Specifications. The cause of this condition was determined to be inadequate design of the heat trace controls in that the resistance temperature detectors (RTD), which monitor piping temperature, and turn the heat trace on and off, were located on a section of piping where the temperature was higher than on other portions of the piping. A contributing factor was that certain portions of piping were heat traced with 9 watt per foot heat trace cable and the remainder of the piping was heat traced with 6 watt per foot heat trace cable. Initial corrective action involved declaring the boration flow paths which depend on the piping heat trace system inoperable. Additionally, an alternate boron injection flow path was aligned to satisfy the Technical Specification requirements. The 9 watt per foot heat trace was replaced with the 6 watt per foot type. In addition, the RTDs will be relocated to the coolest part of the associated piping thereby ensuring that the entire piping run is heated above the Technical Specification minimum temperature.

BACKGROUND INFORMATION

There are two sources of borated water for use in reactivity control at the Haddam Neck plant, namely the boric acid mix tank (BAMT) and the refueling water storage tank (RWST). Technical Specifications require that the BAMT and at least one associated heat trace system be operable in Modes 1, 2, 3, and 4 with a contained water volume of 12,000 gallons, a boron concentration between 14,000 and 22, 500 ppm and a minimum solution temperature of 140 degrees F. In Modes 5 and 6 the BAMT must contain at least 5,000 gallons. The Technical Specifications allow either the BAMT or RWST to be used as the borated water source in Modes 5 or 6. If the RWST is used, it and at least one associated heat trace system (EIIS Code: FD) must be operable with a minimum contained water volume of 50,000 gallons, a minimum boron concentration of 2200 ppm, and a minimum temperature of 60 degrees F. The RWST and BAMT each have their own heat trace systems that maintain the water at the required temperature. Boric acid solution from the BAMT can be delivered to the reactor coolant system (RCS) in two ways. One way is to use one of the two boric acid pumps, which take suction on the BAMT, to supply the two centrifugal charging pumps. The second way is a gravity feed from the BAMT to the suction of the positive displacement charging pump.

The boric acid solution in the BAMT is heated by steam supplied from the plant heating steam system. An electric resistance heat trace system is provided to maintain the fluid in the piping at the required temperature. The purpose of heating the boric acid solution is to keep the solution above the solubility temperature and thus prevent precipitation of the concentrated boric acid solution. The electric heat trace on the boric acid system piping consists of 14 circuits (7 primary and 7 backup). Each circuit is controlled on and off to maintain the piping at the desired temperature by a resistance temperature detector (RTD) attached to the piping associated with that particular heat trace circuit. All of the heat traced piping in the boric acid system is insulated to minimize heat loss from the system.

EVENT DESCRIPTION

On October 10, 1996, at 1717 hours, with the plant in Mode 5 (cold shutdown) it was determined that the temperature on certain heat traced portions of the boric acid system piping was below the minimum required by the plant's Technical Specifications. This discovery was made as part of a review of system readiness to support planned Mode 6 (refueling) operations. Another discovery made during this review was that certain temperature instruments associated with the boric acid heat trace system were not periodically calibrated as part of a preventive maintenance program. As a result, temperature measurements were taken at various locations along the heat traced boric acid piping using a portable calibrated test instrument. These measurements revealed that the temperature at several piping locations specifically, the gravity feed to the positive displacement charging pump, the junction of the boric acid pump discharge to the charging pump suction piping, and the junction of the boric acid pump minimum flow recirculation line to the BAMT were below the minimum of 140 degrees F required by the plant's Technical Specification.

CAUSE OF THE EVENT

The cause of this condition was determined to be inadequate design of the heat trace controls in that the resistance temperature detectors (RTD), which monitor piping temperature, and turn the heat trace on

and off, were located on a section of the piping where the temperature was higher than on other portion of the piping. A contributing factor was that certain portions of the piping were heat traced with 9 watt per foot heat trace cable and the remainder of the piping was heat traced with 6 watt per foot heat trace cable.

Troubleshooting performed on the heat trace circuit associated with the gravity feed flow path from the BAMT to the positive displacement charging pump revealed that a portion of the piping was heat traced with 9 watt per foot heat trace cable and the remainder of the piping was heat traced with 6 watt per foot heat trace cable. Also, it was discovered that the RTDs which cycle the heat trace on and off in that particular circuit were located on the section of piping which was heated by the high power heat trace cable. This caused the piping where the RTDs were located to reach the setpoint temperature and de-energize the circuit before the other portions of piping could reach the minimum required temperature. The cause of the lower than required temperatures on the boric acid pump minimum flow recirculation line and the boric acid to charging pump suction line has not been determined at this time. A supplemental report will be issued after the cause has been determined.

SAFETY ASSESSMENT

Since this condition was suspected to have existed previously and could have adversely affected the boron injection flow paths with the plant in operation, it is being reported under 10CFR50.73(a)(2)(ii) as a condition found while the reactor was shut down that had it been found while the reactor was in operation could have resulted in the plant being in an unanalyzed condition.

This event is also reportable under 10CFR50.73(a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications.

The Haddam Neck safety analyses do not credit the injection of boron from the BAMT or the operation of the heat trace system for mitigation of any design basis accidents.

The boric acid supply from the BAMT, as well as the boric acid heat trace system, are classified as non safety related.

Even though it is suspected that this condition existed during power operation, it did not adversely affect the boron injection flow paths from the BAMT. This was proven by satisfactory performance of surveillance procedure SUR 5.1-146 on August 9, 1996. This surveillance is performed every refueling during shutdown to Mode 5. Boric acid form the BAMT is injected to the RCS through each of the flow paths as indicated by an increase in pressurizer level, drop in BAMT level and electronic flow measurements. Additionally, the metering pump was used following the nitrogen intrusion to the charging system event (LER 96-021-00) of September 1, 1996 with suction supplied from the RWST. The suction supply to the metering pump from the BAMT via MOV-349 and from the RWST via MOV-386 is a common line downstream of the MOVs. The fact that this line was used succesfully to pump water with the metering pump proves that it was unaffected by the lower than required temperatures. Also, this section of line is always flushed with RWST water following injection of concentrated boric acid. Water at the RWST boron concentration does not need to be kept at 140 degrees F.

With regard to the lower than required temperature on the boric acid pump minimum flow line, no adverse effects have been seen on this line either. The boric acid pumps are surveillance tested on a weekly basis by running them on recirculation. Pump performance and flow through this line during these tests have been satisfactory.

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

CORRECTIVE ACTION

Following the discovery of this condition, the boric acid flow paths from the BAMT were declared inoperable. Initial corrective action involved aligning a boron injection flow path from the RWST to the suction of the charging pumps to satisfy the Technical Specification requirements.

The 9 watt per foot heat trace on the gravity feed form the BAMT to the positive displacement charging pump was replaced with 6 watt per foot type. This will provide uniform heating of the piping along its entire length.

Also, the RTDs on the BAMT gravity feed line will be relocated to the coolest part of the piping as determined by temperature measurements taken during troubleshooting. This will ensure that the entire piping length will be heated above the minimum required by the Technical Specifications.

ADDITIONAL INFORMATION

Commitments

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

B15992-1 The RTDs on the BAMT gravity feed line will be relocated to the coolest part of the piping as determined by temperature measurements taken during troubleshooting.

B15992-2 A supplemental report will be issued.

PREVIOUS SIMILAR EVENTS

None.