



CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

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

November 20, 1996

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

B16029

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 50-213/96-029-00

This letter forwards the Licensee Event Report 96-029-00, 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/eda

Attachment: LER 50-213/96-029-00

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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LICENSEE EVENT REPORT (LER)

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

Haddam Neck

DOCKET NUMBER (2)

05000213

PAGE (3)

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TITLE (4)

Primary Auxiliary Building Internal Flood Protection Design Deficiencies Identified

| 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 |
| 10 | 24 | 96 | 96 | 029 | 00 | 11 | 20 | 96 | FACILITY NAME | DOCKET NUMBER |
| 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)(iii) | | 50.73(a)(2)(iii) | | 73.71 | |
| | | | 20.2203(a)(2)(iii) | | 20.2203(a)(4) | | 50.73(a)(2)(iv) | | OTHER | |
| | | | 20.2203(a)(2)(iii) | | 50.36(c)(1) | | <input checked="" type="checkbox"/> 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

Clint Gladding, Design Engineering Manager

TELEPHONE NUMBER (Include Area Code)

(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 |
|-------|--------|-----------|--------------|------------------------|-------|--------|-----------|--------------|------------------------|
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SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED
SUBMISSION

MONTH

DAY

YEAR

YES

(If yes, complete EXPECTED SUBMISSION DATE).

☒ NO

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

On October 24, 1996, at 1530 hours, with the plant in Mode 5 (cold shutdown), Design Engineering personnel determined that certain floor penetrations in the Primary Auxiliary Building (PAB) were unsealed which partially invalidates the basis for current internal flooding analyses. In addition, exit door louvers at the east and west ends of the PAB were found to be installed 6 inches above the bottom of the door instead of the 2 1/4 inches specified in design drawings. These combined effects could disable the residual heat removal (RHR) pump motors in the event of internal flooding. RHR pumps are required in Modes 1 through 6. The cause of the event is inadequate design review and inadequate design implementation. Immediate corrective action was to establish a flood watch responsible for notifying the control room and opening the PAB doors in the event of an internal flood. The flood watch remained in place until the reactor core was offloaded on November 15, 1996 and the RHR system was no longer required to be operable. Long term corrective action consists of modifying the floor penetrations and the louvered doors prior to re-entering Mode 6. Implementation of the long term corrective action is contingent upon resumption of operation of the Haddam Neck plant. This event is reportable under 10CFR50.73(a)(2)(v)(B) as any condition that alone could have prevented the fulfillment of the safety function of structures that are needed to remove residual heat.

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

BACKGROUND INFORMATION

The Haddam Neck Plant was evaluated for the effects of internal flooding in 1972. The Primary Auxiliary Building (PAB) was modified accordingly with flood barriers and liquid level alarms (EIIS Code: LA) to protect safety related equipment. The current internal flooding analyses depend, in part, on the sealing of floor penetrations at Elevation 21' 6" (grade level). Additional mitigating features include flood-relief louvers (EIIS Code: LV) installed in the exit doors (EIIS Code: DR) at the east and west ends of the passageway at Elevation 21' 6".

The current flooding analysis postulates a 7,250 gpm break in a service water (EIIS Code: BI) line in the PAB. The water rises on the floor above Elevation 21' 6" and trips at least one of two redundant flood level detectors 1.5 inches above the floor at each end of the PAB, which alarm in the Control Room. Operators would identify that a flood is occurring due to a break in the service water system in the PAB, and trip the service water pumps (EIIS Code: P). If at power, operators would then commence an orderly, safe, shutdown within 12 minutes of receiving the alarm.

During this period the flood waters on PAB El 21' 6" will rise above the bottom of the door louver opening, previously assumed to be 2 1/4 inches above the floor, and will begin to flow out of the PAB. This outflow will be less than the inflow from the service water break, but the louver will limit the total volume available to flood the RHR (EIIS Code: BP) Pit.

At 3, 6, and 9 inches above PAB Elevation 21' 6" water begins to flow over other curbs above the floor, and then to the area directly above the RHR Pit.

Within 12 minutes after receiving the alarm the operator is assumed to trip service water pumps and the flood source would cease. Flow would continue out the door louvers. Flow would also continue over the curbs until the level dropped below 3 inches.

EVENT DESCRIPTION

On October 24, 1996, at 1530 hours, with the plant in Mode 5 (cold shutdown), Design Engineering personnel determined that certain floor penetrations in the Primary Auxiliary Building (PAB) were unsealed which partially invalidates the basis for current internal flooding analyses. In addition, exit door louvers at the east and west ends of the PAB were found to be installed 6 inches above the bottom of the door instead of the 2 1/4 inches specified in design drawings. These conditions could permit flooding of the RHR pit through a path previously unanalyzed. These combined effects could disable the residual heat removal (RHR) pump motors in the event of internal flooding. RHR pumps are required in Modes 1 through 6. Furthermore, if the flooding rises above the lower louver elevation, other paths exist into the pipe trench through the steam generator blowdown room (elevation 22') which were not included in the current analysis.

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

CAUSE OF THE EVENT

The cause of the event is attributed to the following:

- Inadequate design review. The previous flooding evaluation did not specifically assume that the pipe trench penetrations were unsealed nor did it specifically assume there was a communication path between the pipe trench and the RHR pit.
- Inadequate design implementation. The exit door louvers at the east and west ends of the PAB were found to be installed 6 inches above the bottom of the door instead of the 2 1/4 inches specified in design drawings.

SAFETY ASSESSMENT

This event is reportable under 10CFR50.73(a)(2)(v)(B) as a condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat.

An engineering evaluation of the effects of flooding with the currently-unsealed floor penetrations and installed door louvers at 6 inches was completed. Preliminary results indicate that the volume which would accumulate in the PAB in the 12 minutes currently assumed for operator action to trip the service water pumps, following the flood alarm, would disable the RHR Pump motors.

If the plant was in Modes 1 or 2, there would have been no impact on achieving Mode 3.

If the plant was in Mode 3, there would have been no impact on achieving Mode 4.

The plant could have been maintained in Mode 4 using auxiliary feedwater and the charging system, which would not have been affected by the flood. The RHR pit would be pumped out, necessary repairs made to one of the RHR pump motors and RHR could be restored to permit entry into Mode 5.

If a simultaneous Loss of Offsite Power occurred, the Diesel Generators would be unavailable due to the loss of Service Water. Emergency Operating Procedures (EOPs) for Station Blackout would be utilized to maintain Mode 4 until the affected service water header could be isolated.

If a loss of RHR occurred in Modes 5 or 6 due to internal flooding, the operators would use abnormal operating procedure AOP 3.2-12, "Loss of RHR System" and implement one of the mitigation strategies, depending on plant conditions, to maintain core cooling until RHR could be restored.

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Based on available alternate equipment and EOPs the plant could have been brought to and maintained at a safe shutdown condition following the postulated internal flooding event. Therefore, the safety significance of this condition is judged to be low.

CORRECTIVE ACTION

Immediate corrective action was to establish a flood watch responsible for notifying the control room and opening the PAB doors in the event of an internal flood. The flood watch remained in place until the reactor core was offloaded on November 15, 1966, at 1111 hours, and the RHR system was no longer required to be operable. Long term corrective action consists of modifying the floor penetrations and the louvered doors prior to re-entering Mode 6.

Since 1972 the design change process has been significantly improved which makes these oversights unlikely today.

Implementation of the long term corrective action is contingent upon resumption of operation of the Haddam Neck plant.

ADDITIONAL INFORMATION

Commitments

B16029-1 Long term corrective action consists of modifying the floor penetrations and the louvered doors prior to re-entering Mode 6.

Implementation of the commitments is contingent upon resumption of operation of the Haddam Neck plant.

PREVIOUS SIMILAR EVENTS

LER 96-008-00, "Removal of Floor Blocks Invalidates Internal Flooding Analysis"