CONNECTICUT YANKEE ATOMIC POWER COMPANY

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

September 26, 1996
Re: 10CFR50.73(a)(2)(v)
B15920

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 50-213/96-018-00

This letter forwards the Licensee Event Report 96-018-00, 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 50-213/96-018-00

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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NRC FORM 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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)

Feedwater Bypass Valves May Not Isolate Under Certain Accident Conditions

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT NUMBER (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
| 08 | 22 | 96 | 96 | -- 018 -- | 00 | 09 | 26 | 96 | FACILITY NAME | DOCKET NUMBER 05000 |

OPERATING MODE (9): 5

POWER LEVEL (10): 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 20.402(b) | | 20.405(c) | | 50.73(a)(2)(iv) | | 73.71(b) |
| | 20.405(a)(1)(i) | | 50.36(c)(1) | X | 50.73(a)(2)(v) | | 73.71(c) |
| | 20.405(a)(1)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(vii) | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| | 20.405(a)(1)(iii) | | 50.73(a)(2)(i) | | 50.73(a)(2)(viii)(A) | | |
| | 20.405(a)(1)(iv) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(viii)(B) | | |
| | 20.405(a)(1)(v) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Stephen Willard, Associate 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)

| | YES (If yes, complete EXPECTED SUBMISSION DATE) | X | NO | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|---|---|

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


On August 22, 1996, at 2200 hours, with the plant in Mode 5 (cold shutdown), an engineering analysis determined that the feedwater regulating bypass valves would not fully isolate feedwater flow as required for a main steam line break inside containment. This condition was discovered during a follow-up to a similar problem with the main feedwater regulating valves (LER 96-012-00). The failure to isolate feedwater for a steam line break inside containment could result in exceeding maximum containment design conditions. This event did not involve any actual equipment failures. This condition was determined reportable on August 30, 1996, at approximately 1520 hours with the plant shut down in Mode 5. The cause of this condition was an erroneous assumption that the feedwater bypass valves would close and isolate against the differential pressure experienced between the steam generator feed pump and a faulted steam generator. Additionally, credit was taken for isolation of the bypass valves from the control room ten minutes after the accident, however the control air system which operates the valves is not a credited system. Corrective action consists of implementing modifications during the current refueling outage which will result in the capability to fully isolate the individual bypass lines independent of a control air failure.

**REQUIRED NUMBER OF DIGITS/CHARACTERS FOR EACH BLOCK**

| BLOCK NUMBER | NUMBER OF DIGITS/CHARACTERS | TITLE |
|---|---|---|
| 1 | UP TO 46 | FACILITY NAME |
| 2 | 8 TOTAL<br>3 IN ADDITION TO 05000 | DOCKET NUMBER |
| 3 | VARIES | PAGE NUMBER |
| 4 | UP TO 76 | TITLE |
| 5 | 6 TOTAL<br>2 PER BLOCK | EVENT DATE |
| 6 | 7 TOTAL<br>2 FOR YEAR<br>3 FOR SEQUENTIAL NUMBER<br>2 FOR REVISION NUMBER | LER NUMBER |
| 7 | 6 TOTAL<br>2 PER BLOCK | REPORT DATE |
| 8 | UP TO 18 -- FACILITY NAME<br><br>8 TOTAL -- DOCKET NUMBER<br>3 IN ADDITION TO 05000 | OTHER FACILITIES INVOLVED |
| 9 | 1 | OPERATING MODE |
| 10 | 3 | POWER LEVEL |
| 11 | 1<br>CHECK BOX THAT APPLIES | REQUIREMENTS OF 10 CFR |
| 12 | UP TO 50 FOR NAME<br>14 FOR TELEPHONE | LICENSEE CONTACT |
| 13 | CAUSE VARIES<br>2 FOR SYSTEM<br>4 FOR COMPONENT<br>4 FOR MANUFACTURER<br>NPRDS VARIES | EACH COMPONENT FAILURE |
| 14 | 1<br>CHECK BOX THAT APPLIES | SUPPLEMENTAL REPORT EXPECTED |
| 15 | 6 TOTAL<br>2 PER BLOCK | EXPECTED SUBMISSION DATE |

## REQUIRED NUMBER OF DIGITS/CHARACTERS FOR EACH BLOCK

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| 12 | UP TO 50 FOR NAME<br>14 FOR TELEPHONE | LICENSEE CONTACT |
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| 14 | 1<br>CHECK BOX THAT APPLIES | SUPPLEMENTAL REPORT EXPECTED |
| 15 | 6 TOTAL<br>2 PER BLOCK | EXPECTED SUBMISSION DATE |

BACKGROUND INFORMATION

The four 3 inch feedwater (EIIS Code: SJ) bypass lines provide water to the steam generators via a flow path that circumvents the motor operated main feedwater isolation valves and the main feedwater regulating valves. The bypass lines are used during shutdown, startup and low power operation under low feedwater flow conditions. They are also the credited flow path for auxiliary feedwater (EIIS Code: BA) supply to the steam generators under accident conditions.

Each line consists of three normally open manual isolation valves, two inlet check valves (one from the main feedwater supply and one from auxiliary feedwater) and an air operated bypass valve (EIIS Code: FCV). The bypass valves (FW-HICV-1301-1,2,3,4) are 1 1/2 inch, air to close, spring to open, manufactured by Masoneilan. They are normally closed during full power operation. On an auxiliary feedwater actuation signal they go full open until manual operator action is taken at the main control board to throttle flow

EVENT DESCRIPTION

On August 22, 1996, at 2200 hours, with the plant in Mode 5 (cold shutdown), an engineering analysis determined that the feedwater regulating bypass valves would not fully isolate feedwater flow as required for a main steam line break inside containment. It was determined that the feedwater bypass valves would not close and isolate against the differential pressure experienced between the steam generator feed pump and a faulted steam generator. Additionally, credit was taken for isolation of the bypass valves from the control room ten minutes after the accident, however the control air system which operates the valves is not a credited system. This invalidates the accident analysis assumption that feed flow through the bypass line can be isolated by the operators within ten minutes. This condition was discovered during a follow-up to a similar problem with the main feedwater regulating valves (LER 96-012-00). The failure to isolate feedwater for a steam line break inside containment could result in exceeding maximum containment design conditions. This event did not involve any actual equipment failures. This condition was determined reportable on August 30, 1996, at approximately 1520 hours with the plant shut down in Mode 5.

CAUSE OF THE EVENT

The cause of this condition was an erroneous assumption that the feedwater bypass valves would close and isolate against the differential pressure experienced between the steam generator feed pump and a faulted steam generator. It appears that actuator thrusts and required valve closing forces were never calculated.

Another error was assuming availability of the control air system which is not a credited system.

SAFETY ASSESSMENT

This condition is reportable under 10CFR50.73(a)(2)(v)(D) as any event or condition that alone could have prevented the fulfillment of the safety function of systems that are needed to mitigate the consequences of an accident.

The design basis analysis for a steam line break accident inside containment assumes that operators terminate auxiliary feedwater flow to the faulted steam generator from the control room within ten minutes. An engineering evaluation determined that the bypass valves would be unable to close given the valve characteristics and system parameters. Therefore, feedwater to an affected steam generator would not be isolated and could result in an over pressurization and high temperature condition of the containment structure.

The probability of containment failure as a function of elevated temperatures and pressures have been evaluated for the Probabilistic Risk Assessment (PRA) analysis. Elevated temperature effects on containment for temperatures less than 800 degrees F have little influence on containment response. The median containment pressure for failure is 90 psig, which is 225% of the design pressure of 40 psig.

The ultimate temperature and pressure that would be reached during this event is unknown, however, they are not expected to exceed the design basis parameters (260 degrees F and 40 psig). The safety significance of this event is judged to be low since operators would manually isolate the feedwater bypass valves. Emergency Operating Procedure E-2, "Faulted Steam Generator" requires operators to locally close the bypass manual outlet isolation valve regardless of whether the main feedline bypass valve fails to close.

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | PAGE (3) |
|---|---|---|---|---|---|
| Haddam Neck | 05000-213 | 96 | - 018 - | 00 | 4 OF 4 |

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

CORRECTIVE ACTION

A modification will be implemented prior to startup from the current refueling outage such that an individual flow path can be isolated from the main control board within the time frame specified by the accident analysis. The isolation device will be independent of a control air failure and it will be capable of closing against the maximum differential pressure experienced in the bounding condition of a main steam line break.

As part of the Configuration Management Plan, all engineering calculations required to support safety analysis assumptions and other parameters assumed to be safety significant, will be identified. The results of the calculations will be reviewed to verify that they support the safety analysis assumptions.

ADDITIONAL INFORMATION

Commitments

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

B15920-1 A modification will be implemented prior to startup from the current refueling outage such that an individual flow path can be isolated from the main control board within the time frame specified by the accident analysis.

PREVIOUS SIMILAR EVENTS

LER 96-012-00, "Feedwater Regulating Valve May Not Close During Steam Line Break"