

NRC FORM 366
(12-81)
10 CFR 50U.S. NUCLEAR REGULATORY COMMISSION
LICENSEE EVENT REPORTAPPROVED BY CMB
3150-0011

CONTROL BLOCK:

(PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 M A P P S 1 2 0 0 - 0 0 0 0 0 0 - 0 0 3 4 1 1 1 1 4 5
7 8 9 LICENSEE CODE 14 15 LICENSE NUMBER 23 24 LICENSE TYPE 30 37 CAT 38

CON'T

01 REPORT SOURCE L 6 0 5 0 - 0 2 9 3 7 0 9 0 3 8 2 8 0 6 1 3 8 4 9
7 8 60 61 DOCKET NUMBER 68 69 EVENT DATE 74 75 REPORT DATE 80

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 On 9/3/82, at 75 percent power, "D" main steam line flow indicator went to zero.
03 The three other steam line flows increased. Operators closed both "D" line
04 MSIV's in accordance with action statement per T.S. 3.7.D.2. NRC was notified
05 via ENS. This event caused no threat to the public health and safety.
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07
08

09 SYSTEM CODE C D 11 CAUSE CODE E 12 CAUSE SUBCODE B 13 COMPONENT CODE V A L V E X 14 COMP. SUBCODE H 15 VALVE SUBCODE D 16
7 8 9 10 11 12 13 14 15 16 17
17 LER/RO REPORT NUMBER 8 2 21 EVENT YEAR 8 2 22 SEQUENTIAL REPORT NO. 0 3 6 23 OCCURRENCE CODE 0 3 24 REPORT TYPE X 25 REVISION NO. 1 26
18 ACTION TAKEN Z 18 19 FUTURE ACTION B 19 20 EFFECT ON PLANT B 20 21 SHUTDOWN METHOD Z 21 22 HOURS 0 0 0 0 23 ATTACHMENT SUBMITTED Y 23 24 NPRO-4 FORM SUB. N 24 25 PRIME COMP. SUPPLIER N 25 26 COMPONENT MANUFACTURER A 5 8 5 26
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 A broken valve stem, resulting from fatigue failure at a machined groove on
11 the stem of "D" MSIV has been found to be the cause. Modified replacement
12 stems will be installed in all eight MSIV's during RFO #6 to preclude
13 recurrence. Similar events are referred to in the following LER's (Ref.: 78-19,
14 79-23 and 79-26.

15 FACILITY STATUS C 28 % POWER 0 7 5 29 OTHER STATUS NA 30 METHOD OF DISCOVERY A 31 DISCOVERY DESCRIPTION 32
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
16 ACTIVITY CONTENT RELEASED OF RELEASE Z 33 Z 34 AMOUNT OF ACTIVITY NA 35 LOCATION OF RELEASE 36
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
17 PERSONNEL EXPOSURES NUMBER 0 0 0 37 TYPE Z 38 DESCRIPTION 39
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
18 PERSONNEL INJURIES NUMBER 0 0 0 40 DESCRIPTION 41
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
19 LOSS OF OR DAMAGE TO FACILITY TYPE Z 42 DESCRIPTION 43
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

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20 PUBLICITY ISSUED DESCRIPTION 45 NA 46
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

NAME OF PREPARER P. J. Hamilton

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IE22
11

ATTACHMENT TO LER 82-036/03X-1

On 9/3/82, at 75 percent power, "D" main steam line flow indicator went to zero, and the other three steam line flows increased. Operators closed both "D" line MSIV's in accordance with the action statement identified in T.S. 3.7.D.2.

The "D" inboard MSIV was determined to be the failed valve. Inspection of the disassembled valve revealed what appeared to be cyclic failure at a point where the stem backseat joins the upper portion of the shaft. For short-term corrective action, the stem was replaced-in-kind, the guide repaired, and the poppet polished. Following satisfactory leak rate testing, the valve was put back in service, and the broken stem was sent to the Massachusetts Institute of Technology (MIT) for analysis.

The following paragraph was taken, in part, from a report prepared by MIT concerning a metallurgical examination of the failed stem material taken from "D" inboard MSIV:

"An evaluation of a failure of 'D' MSIV stem was performed to determine probable cause of failure. The valve stem and fracture surface were examined using optical and Scanning Electron Microscopy (SEM). The conclusion of the analysis is that the most probable cause of failure was fatigue. The failure initiated most probably as a result of at least one, probably more, overload conditions in bending, which resulted in high residual tensile stresses at or near the root of a machined notch in the stem. The failure then proceeded by fatigue in bending due to flow induced vibrations in the stem. No evidence of failure as a result of metallurgical defects could be found."

Long-term corrective action involves refurbishment of all eight MSIV's during RFO #6 to preclude recurrence of this type of failure. The design modifications are as follows:

- Increased stem diameter to reduce stress due to closing force. The stem notch at the backseat will have a more tapered transition, reducing stress concentration.
- Addition of a poppet anti-rotation device which will reduce poppet guide wear, decrease deflection, and minimize flow induced or structure born vibrations.
- Self-aligning pilot poppet seat design with hard surfacing alloy (Stellite) on the guide surfaces.
- Elongated poppet design to aid in valve seating, and reduce potential for poppet to body cracking.

The failed valve is a 20-inch air operated valve manufactured by Atwood & Morrill Co.

BOSTON EDISON COMPANY
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WILLIAM D. HARRINGTON
SENIOR VICE PRESIDENT
NUCLEAR

June 13, 1984

BECO Ltr. #84-078

Dr. Thomas E. Murley
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
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King of Prussia, PA 19406

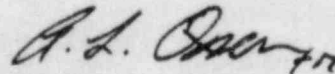
Docket No. 50-293
License DPR-35

Dear Sir:

The attached update Licensee Event Report LER 82-036/03X-1 "D MSIV Closed", is hereby submitted in accordance with the requirements of Pilgrim Nuclear Power Station Technical Specification 6.9.B.2.b.

If there are any questions on this subject, please do not hesitate to contact me.

Respectfully submitted,



William D. Harrington

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Enclosure: LER 82-036/03X-1

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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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