

50-289

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FILE NUMBER
INCIDENT REPORT

TO: J.P.O'REILLY

FROM: METROPOLITAN EDISON CO.
READING, PA.
J.G.HERBEIN

DATE OF DOCUMENT

5/27/77

DATE RECEIVED

6/3/77

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DESCRIPTION

LTR. TRANS THE FOLLOWING.....

(2P)

ACKNOWLEDGED

PLANT NAME: THREE MILE ISLAND # 1
SAB

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ENCLOSURE

LICENSEE EVENT REPORT # 77-09/1T ON 3/12/77
CONCERNING STEAM GENERATOR LOCA RESTRAINTS BELT-
ING BEING FOUND LOOSE.....

(1P)

NOTE: IF PERSONNEL EXPOSURE IS INVOLVED
SEND DIRECTLY TO KREGER/J. COLLINS

FOR ACTION/INFORMATION

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CONTROL NUMBER

1476 26

771570208



METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603

TELEPHONE 215 - 929-3601

May 27, 1977
GQL 0738

REGULATORY DOCKET FILE COPY

Mr. J. P. O'Reilly, Director
Office of Inspection & Enforcement, Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406



Dear Sir:

Docket No. 50-289
Operating License No. DPR-50

In accordance with the Technical Specifications of our Three Mile Island Nuclear Station Unit 1 (TMI-1), we are reporting the following Reportable Occurrence.

- (1) Report Number: 77-09/1T
- (2a) Required Report Date: 05-27-77
- (2b) Date of Occurrence: 05-12-77
- (3) Facility: Three Mile Island Nuclear Station, Unit I
- (4) Identification of Occurrence:

Title: Steam Generator LOCA Restraint Bolting Was Found Loose

Type: A reportable occurrence, as defined by Technical Specification 6.9.2.A.(9), in that steam generator LOCA restraint bolting was found loose which could have resulted in the failure of these restraints and operation in a manner less conservative than assumed in the Final Safety Analysis Report.

- (5) Condition Prior to Occurrence:

Power: Core - 0
Elec. - 0

RC Flow: 152×10^6 lb/hr

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(5) Condition Prior to Occurrence: (cont.)

RC Pressure: 2170 psig
RC Temp: 532°F
PRZR Level: 96 inches
PRZR Temp: 651°F

(6) Description of Occurrence:

Steam generator restraints located at the elevation of the upper tube sheet which transfer forces from the generator into the secondary shield walls in the event of a circumferential rupture of the 36 inch Reactor Coolant System hot leg piping were found to be in a condition which could have allowed operation in a manner less conservative than that assumed in the accident analysis in the FSAR (Section 14.2.2.3, Loss of Coolant Accident). Some of the bolting which fastens the restraint clevis base plates to the steam generator shell were found to be loose contrary to the design requirement for "snug" tightness. Subsequent calculations by the vendor and the Met-Ed Corporate Technical Support Staff based on the "as found" gap measurements between the bolt heads and the clevis base plate resulted in the evaluation that the stresses on the bolting could have exceeded yield stress when the lateral LOCA loads combined with the maximum hypothetical earthquake loads were imposed.

(7) Apparent Cause of Occurrence:

This occurrence has been determined to be caused by either improperly tightening of the bolts during initial installation or loosening of the bolts due to thermal cycling and bolt relaxation in service.

(8) Analysis of Occurrence:

The loose bolting could have resulted in exceeding yield stress on the bolting under the lateral loads caused by the rupture of the reactor coolant hot leg combined with the maximum hypothetical earthquake loads. This loading could then have led to the failure of these restraints to perform their intended design function of minimizing the accident loads transmitted via the steam generator to main steam and feedwater piping. Therefore, the displacement of the steam generators under Design Basis Accident Conditions might no longer be small and might jeopardize the integrity of the steam generator.

(8) Analysis of Occurrence: (cont.)

The risk to the health and safety of the public was somewhat increased by this event, but the condition was corrected prior to reactor start-up and would only have had failure consequences if the low probability hot leg piping rupture had occurred.

(9) Corrective Action:

Immediate - Corrective action has consisted of tightening and installing locking devices on all accessible loose bolts to eliminate the possibility of future bolt relaxation. This corrective action has been evaluated by the vendor and the Corporate Technical Support Staff and found, by stress analysis, to provide satisfactory restraint action under design loads.

Long-Term - The bolting on these restraints will be inspected for tightness at the next convenient outage.

The Plant Operations Review Committee and Unit Superintendent have reviewed and approved the above corrective action and have taken steps to assure its completion.

(10) Failure Data:

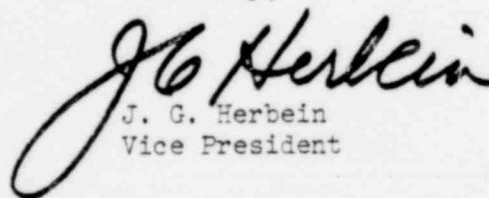
Babcock & Wilcox Once Through Steam Generator LOCA Restraint Bolting:

3" heavy Hex Bolt 8NC-2A (Carbon Steel SA540-Gr. B)
Socket Head Cap Screws (Carbon Steel SA540-Gr. B)

Similar Events:

None

Sincerely,



J. G. Herbein
Vice President

JGH:DGM:eg

Enclosure: LER

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