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ACCESSION NBR: 9003020069 DOC. DATE: 90/02/23 NOTARIZED: NO DOCKET #
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylvania 05000387
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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-004-00: on 890203, INBD of MSIVs concluded to be inconsistent w/actual valve operating characteristics. W/8 ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: LPDR 1 cy Transcripts. 05000387

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	RES/DSIR/EIB	1		1	RGN1 FILE 01	1		1
EXTERNAL:	EG&G WILLIAMS, S	4		4	L ST LOBBY WARD	1		1
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Pennsylvania Power & Light Company

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February 23, 1990

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 90-004-00
FILE R41-2
PLAS - 409

Docket No. 50-387
License No. NPF-14

Attached is Licensee Event Report 90-004-00. Although it was determined that this condition is not reportable, this Voluntary report is being submitted in accordance with an agreement made with the Commission.

H.G. Stanley
H.G. Stanley
Superintendent of Plant - Susquehanna

PPR/mjm

cc: Mr. W. T. Russell
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TK20
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

FACILITY NAME (1) Susquehanna Steam Electric Station - Unit 1						DOCKET NUMBER (2) 0 5 0 0 0 3 8 7			PAGE (3) 1 OF 0 5		
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TITLE (4) Design Bases of Inboard MSIVs Concluded to be Inconsistent With Actual Valve Operating Characteristics and Realistic Accident Conditions

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)												
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)										
0	2	0	3	8	9	9	0	0	0	0	4	0	0	0	2	2	3	9	0	Unit 2	0 5 0 0 0 3 8 8
																					0 5 0 0 0

OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)									
POWER LEVEL (10) 1 0 0		20.402(b)		20.406(e)		50.73(e)(2)(iv)		73.71(b)			
		20.406(a)(1)(i)		50.38(c)(1)		50.73(e)(2)(v)		73.71(c)			
		20.406(a)(1)(ii)		50.38(c)(2)		50.73(e)(2)(vii)	X	OTHER (Specify in Abstract below and in Text NRC Form 366A)			
		20.406(a)(1)(iii)		50.73(a)(2)(i)		50.73(e)(2)(viii)(A)		Voluntary			
		20.406(a)(1)(iv)		50.73(a)(2)(ii)		50.73(e)(2)(viii)(B)					
	20.406(a)(1)(v)		50.73(a)(2)(iii)		50.73(e)(2)(ix)						

LICENSEE CONTACT FOR THIS LER (12)

NAME P.P. Rusanowsky - Power Production Engineer		TELEPHONE NUMBER 7 1 7 5 4 2 - 3 7 5 9	
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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) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces or approximately fifteen single-space typewritten lines) (16)

An engineering evaluation, initiated based on several industry event reports issued in 1988 concerning a failure of Main Steam Isolation Valves (MSIVs) to close completely at another licensed facility, was completed on February 3, 1989. This evaluation concluded that the design bases for our Inboard (INBD) MSIVs was inconsistent with actual valve operating characteristics and realistic accident conditions. This evaluation also concluded that the INBD MSIVs were capable of closing during the worst case postulated pipe rupture based on a more realistic, but still conservative, set of design bases. It was initially concluded and subsequently reconfirmed that this condition was not reportable. Even though the MSIVs were concluded to be fully operable and capable of performing their intended safety function, numerous, prudent measures were taken to enhance and further ensure their operation. These measures included several, different tests to collect data and demonstrate their operability, a formal engineering Safety Assessment of the condition, enhancements to applicable surveillance procedures, and a modification to reduce valve operating friction. Although not reportable, this condition was discussed with the Commission. This voluntary report is being submitted in accordance with an agreement made with the Commission. Since the safety systems and components associated with this report were not in a degraded condition and were capable of fulfilling their safety functions, the health and safety of the public were not compromised.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

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

BACKGROUND INFORMATION

The Primary Containment Isolation System (EIIS Code: JM) uses eight Main Steam Isolation Valves (MSIVs; EIIS code: SB) to isolate the four Main Steam Lines; two MSIVs per line, one inside Primary Containment (INBD MSIV) and one outside (OUTBD MSIV). The MSIVs are opened and held open pneumatically and closed using both pneumatic and spring force. The spring force is developed when the springs are compressed as the valve is opened. The MSIVs are designed such that the closing, pneumatic force is opposed by the ambient pressure of the environment in which the valve is located; Primary Containment Drywell for the INBD MSIVs and Reactor Building Steam Tunnel for the OUTBD MSIVs. A pipe rupture inside the Drywell would increase the ambient pressure of the Drywell to an extent which is dependent on the severity of the rupture. The Drywell pressure increase during the worst case pipe rupture, Designed Basis Accident, is significant and affects the operation of the INBD MSIVs. The Reactor Building Steam Tunnel pressure increase for any postulated line break is not significant and hence the operation of the OUTBD MSIVs would not be affected.

CIRCUMSTANCE

Several industry event reports were issued in 1988 concerning the failure of MSIVs to close completely with spring force alone under normal atmospheric conditions at another licensed facility. The cause of these failures was related to excessive valve packing friction. After reviewing these reports, our Nuclear Plant Engineering group initiated an evaluation to assess the closing capabilities of our MSIVs. This evaluation was completed on February 3, 1989 and concluded that MSIV closure performance was related to several variables which include:

- a) Pneumatic pressure
- b) Valve packing friction
- c) Ambient pressure

They also concluded that the INBD MSIVs required both pneumatic force and spring force to close under the elevated Drywell pressure conditions associated with the Design Basis Accident (DBA). This finding was concluded to be inconsistent with the Final Safety Analysis Report (FSAR) Section 5.4.5 which states that the MSIVs should be able to close with pneumatic force and, or spring force with the Drywell at its design pressure (53 psia). They also evaluated INBD MSIV closure performance for the worst case DBA. In this case peak Drywell pressure, as shown in FSAR Figure 6.2-2, reaches 40.5 psig and quickly drops off to 35 psig. Under these conditions, INBD MSIV closure performance was found to be acceptable.



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ACTIONS TAKEN

To collect additional data on MSIV closure and to enhance and further ensure their performance, the following actions have been taken.

- 1) To evaluate the effects of valve packing friction on actual MSIV closure, a test was performed on the Unit 1 OUTBD MSIVs, which are essentially identical to the INBD MSIVs, on February 3, 1989. The test determined actual packing friction forces and demonstrated the ability of the MSIVs to close on spring force alone under normal atmospheric conditions.
- 2) On February 6, 1989, Non-Conformance Reports were submitted for both Unit 1 and Unit 2 documenting the results of the Nuclear Plant Engineering evaluation. Based on their conclusion that the INBD MSIVs can be expected to close during the worst case DBA and the fact that the Unit 1 OUTBD MSIVs were demonstrated to be capable of completely closing on spring force alone, it was determined that there were no reasons to suspect the operability of the INBD MSIVs.
- 3) On March 16, 1989, as a prudent measure to ensure that the INBD MSIVs have an adequate pneumatic supply for closing, the appropriate surveillance procedures were revised to require shiftly documentation of the pneumatic supply pressure and to incorporate a minimum acceptable pressure developed as an integral part of a more realistic set of design bases.
- 4) On May 25, 1989, a formal Safety Assessment was completed to:
 - a) document the details of the evaluation regarding INBD MSIV operability during a DRA using the more realistic design bases.
 - b) to reconcile the more realistic design bases with applicable accident and transient analyses.
 - c) document the safety evaluation used to conclude that operating the plant within the more realistic design bases is not an unreviewed safety question.
- 5) On May 25, 1989, a Change Request was submitted to the FSAR to implement the more realistic design bases. A Safety Assessment which concluded that the changes did not constitute an unreviewed safety question was submitted with the Change Request.
- 6) During the Unit 1 Fourth Refueling and Inspection Outage the Unit 1 INBD MSIVs were repacked with a low friction graphite packing to minimize valve stem friction and a friction test was performed on each MSIV. The acceptance criteria for this test were also developed as an integral part of the more realistic design bases.

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TEXT (if more space is required, use additional NRC Form 366A's) (17)

- 7) Although all initial evaluations concluded that this situation was not reportable, a Significant Operating Occurrence Report was issued on June 14, 1989 to ensure that all reportability aspects had been fully assessed. Using existing reporting guidelines, both the Nuclear Department Licensing group and the Susquehanna Site Compliance group re-evaluated the situation and confirmed that it was not reportable. These conclusions were based primarily on the following considerations.
- a) Detailed engineering evaluations concluded that the INBD MSIVs were fully operable under the more realistic design bases.
 - b) Failure of an INBD MSIV to close would not prevent the Primary Containment Isolation System from fulfilling its intended safety function since the OUTBD MSIVs provide the required isolation redundancy.
 - c) Based on the above, the MSIVs, a principal safety barrier, are not seriously degraded and we are not in an unanalyzed condition that significantly compromises plant safety or in a condition outside the design basis of the plant that significantly compromises plant safety.
- 8) On October 15, 1989, to further ensure that the INBD MSIVs have an adequate pneumatic supply, a leakage test was performed on the pneumatic supply to the Unit 2 INBD MSIVs with satisfactory results. The acceptance criteria for the test were also developed as an integral part of the more realistic design bases. This leakage test will be conducted on the Unit 1 INBD MSIVs during its next scheduled refueling and inspection outage.
- 9) During the Unit 2 Third Refueling and Inspection Outage the Unit 2 INBD MSIVs were also repacked with the same low friction graphite packing used on the Unit 1 INBD MSIVs and the same friction test was performed on each valve.
- 10) The packing on all of the OUTBD MSIVs will also be replaced. One of the Unit 1 and three of the Unit 2 OUTBD MSIVs have been repacked so far.

REPORTABILITY/ANALYSIS

Since this is not a reportable event, the 10CFR50.73(d) requirement to submit a Licensee Event Report within 30 days of discovery of a reportable event is not applicable.

However, revised reporting guidelines for design basis conditions have been developed and were reviewed with Region I personnel on December 19, 1989. These new guidelines lower the threshold we will use for reporting conditions of this nature under the Code of Federal Regulations.



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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Since the safety systems and components associated with this report were not in a degraded condition and were capable of fulfilling their safety functions, the health and safety of the public were not compromised.

ADDITIONAL INFORMATION

Failed Component Identification: (Not applicable since there were no component failures).