

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9011260174      DOC.DATE: 90/11/16      NOTARIZED: NO      DOCKET #  
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv      05000387  
 AUTH.NAME      AUTHOR AFFILIATION  
 CRIST, M.L.      Pennsylvania Power & Light Co.  
 STANLEY, H.G.      Pennsylvania Power & Light Co.  
 RECIP.NAME      RECIPIENT AFFILIATION

SUBJECT: LER 90-017-01: on 900806, secondary containment isolation  
 Div I automatic initiation due to relay failure.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: LPDR 1 cy Transcripts. 05000387 /

	RECIPIENT ID CODE/NAME	COPIES	L	T	R	ENCL	RECIPIENT ID CODE/NAME	COPIES	L	T	R	ENCL
	PD1-2 LA	1		1			PD1-2 PD	1		1		
	THADANI, M	1		1								
INTERNAL:	ACNW	2		2			ACRS	2		2		
	AEOD/DOA	1		1			AEOD/DSP/TPAB	1		1		
	AEOD/ROAB/DSP	2		2			NRR/DET/ECMB 9H	1		1		
	NRR/DET/EMEB 7E	1		1			NRR/DLPQ/LHFB11	1		1		
	NRR/DLPQ/LPEB10	1		1			NRR/DREP/PRPB11	2		2		
	NRR/DST/SELB 8D	1		1			NRR/DST/SICB 7E	1		1		
	NRR/DST/SPLB8D1	1		1			NRR/DST/SRXB 8E	1		1		
	<del>REG-FILE 02</del>	1		1			RES/DSIR/EIB	1		1		
	RGN1 FILE 01	1		1								
EXTERNAL:	EG&G BRYCE, J.H	3		3			L ST LOBBY WARD	1		1		
	NRC PDR	1		1			NSIC MAYS, G	1		1		
	NSIC MURPHY, G.A	1		1			NUDOCS FULL TXT	1		1		
NOTES:		2		2								

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,  
 ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION  
 LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED  
 TOTAL NUMBER OF COPIES REQUIRED: LTR 34 ENCL 34

*Alto-1-1*

R  
I  
D  
S  
/  
A  
D  
S  
/  
A  
D  
D  
S



Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

November 16, 1990

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

SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 90-017-01  
FILE R41-2  
PLAS -452

---

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

Attached is Licensee Event Report 90-017-01. This is an update to LER 90-017 which was made pursuant to 10CFR50.73(a)(2)(iv), in that an unplanned Engineered Safety Feature (ESF) actuation occurred when a portion of Division I Secondary Containment Isolation logic was actuated due to a spurious isolation signal.

  
H.G. Stanley  
Superintendent of Plant - Susquehanna

MLC/mjm

cc: Mr. T.T. Martin  
Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. G.S. Barber  
Sr. Resident Inspector  
U.S. Nuclear Regulatory Commission  
P.O. Box 35  
Berwick, PA 18603-0035

9011260174 901116  
PDR ADOCK 05000387  
E PDC





LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 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) <b>Susquehanna Steam Electric Station - Unit 1</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 3 8 7</b>	PAGE (3) <b>1 OF 0 4</b>
---	---	-----------------------------

TITLE (4)  
**Secondary Containment Isolation Division I Automatic & Manual Initiation Functions  
Lost Due to a Relay Failure**

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 8	0 6	9 0	9 0	0 1 7	0 1	1 1	1 1	1 6	SSES - Unit 2		0 5 0 0 0 3 8 8
											0 5 0 0 0

OPERATING MODE (9) <b>1</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) <b>0 6 10</b>	20.402(b)	20.406(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)					
	20.406(a)(1)(i)	50.36(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(c)					
	20.406(a)(1)(ii)	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)					
	20.406(a)(1)(iii)	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)						
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)						
	20.406(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)						

LICENSEE CONTACT FOR THIS LER (12)									
NAME <b>Michael L. Crist - Compliance Evaluator</b>							TELEPHONE NUMBER		
							AREA CODE		
							<b>7 1 7 5 4 2 1 - 3 2 8 9</b>		

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	
B	V	A	R	L	Y	G	1	0	8	0	N

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)				<input checked="" type="checkbox"/> NO		
				MONTH	DAY	YEAR

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

On August 6, 1990 at approximately 0815, with Unit 1 and Unit 2 operating in Condition 1 at 60% and 100% power respectively, one division of Secondary Containment Isolation was rendered inoperable when its logic power supply fuse blew due to a failed relay in the circuit. The initial investigation into the event did not discover the fuse had blown. A subsequent investigation found the blown fuse and the applicable LCO was entered at 2200 hours. The failed relay was determined from the circuit and a new fuse was installed. Upon re-energizing the logic, relay interaction caused, as expected, the isolation logic to trip. At 2255 hours the logic was reset and reactor building ventilation was restored to normal. On 8/08/90 the relay was replaced. The cause of the failure was a short in the relay coil. This failure resulted in high current which in turn caused the logic power supply fuse to blow. This event was determined to be reportable per 10CFR50.73(a)(2)(iv), in that an unplanned ESF actuation occurred. There were no safety consequences or compromise to public health or safety as a result of this event based on Division II Secondary Containment Isolation functions and both divisions of Primary Containment Isolation functions remaining operable throughout the event. An event review team (ERT) was established to review and analyze the event. Included in this analysis was a determination as to why the initial event investigation did not discover the blown fuse. The ERT identified a weakness in the work authorization investigation process. Actions to prevent recurrence include adding administrative procedure guidelines for determining when field investigations are prudent.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), 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)  Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2)  0 5 0 0 0 3 8 7	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 0	0 1 7	0 1	0 2	OF 0 4

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

EVENT DESCRIPTION

On August 6, 1990 at 0815 hours, with Unit 1 and Unit 2 operating in Condition 1 at 60% and 100% power respectively, Unit 1 Secondary Containment (EIS Code: VA) Zone III airlock isolation damper HD-17534H automatically closed due to failure of relay XYX6-07553A. The failure was discovered by an Electrical Maintenance Mechanic (utility, non-licensed) when he smelled smoke coming from panel OC876A. He immediately contacted the Control Room. Operations Personnel (utility, licensed and non-licensed) were dispatched to investigate. At this time it was determined that relay XYX6-07553A was the cause of the smoke. Initial investigation determined that the relay had burned open causing the Unit 1 Zone III airlock isolation damper HD-17534H to close. Other dampers which would have automatically closed due to this failure were already in the closed position. A work authorization was initiated to investigate and repair the failed relay XYX6-07553A.

At approximately 1800 hours, a nuclear plant operator (NPO, utility, non-licensed), while on rounds, discovered that two Secondary Containment airlock isolation dampers, HD-27534A and HD-27534C, indicated closed with their handswitch in the open position. Shift Supervision was notified. Due to the event earlier that day, an additional investigation was commenced. Review of electrical drawings revealed that these dampers are actuated by a different relay (XYX5-07553A) than the previously failed relay (XYX6-07553A). However, the two relays are in the same isolation logic channel. The NPO verified that the dampers were closed and Electrical Maintenance personnel (utility, non-licensed) determined that the power supply fuse (FU-5) to the Division I Secondary Containment Isolation Logic was blown. It was then determined that the Unit 1 and Unit 2 automatic and manual initiation functions of Division I Secondary Containment Isolation logic would not operate with this failed fuse. As such, at 2200 hours, Limiting Condition for Operation (LCO) 3.3.2 Action b was entered on both units.

The failed relay was determined from the circuit and a new fuse was installed. Upon re-energizing the logic, relay interaction caused, as expected, the isolation logic to trip. At 2255 hours the LCOs were cleared and the Zone III ventilation was restored to normal. During the time relay XYX6-07553A was inoperable the associated dampers were in the proper isolation position. Thus, Secondary Containment operability was not affected by the failed relay. On 8/08/90 relay XYX6-07753A was replaced and its functions were returned to normal.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 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)  Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2)  0 5 0 0 0 3 8 7	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 0	0 1 7	0 1	0 3	OF 0 4

TEXT (If more space is required, use additional NRC Form 306A's) (17)

CAUSE OF EVENT

The cause of the event was determined to be a failed relay in the Secondary Containment Division I Isolation logic. Initially, the relay coil was believed to have burned open, however, once the relay was removed from the circuit for testing it was determined that the failure mechanism was a shorted coil. This failure resulted in high current which persisted until the circuit's power supply fuse (FU-5) blew, resulting in loss of the ability to automatically and manually initiate Division I Secondary Containment Isolation. Specifically, for Zones I, II, and/or III, the ability to isolate a zone and subsequently initiate the Standby Gas Treatment System (SGTS, EIIS Code: VH) via Division I was lost. Ability to automatically and manually initiate Secondary Containment Isolation through Division II logic was not affected.

REPORTABILITY/ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(iv), in that an unplanned Engineered Safety Feature (ESF) actuation occurred when a portion of Division I Secondary Containment Isolation logic was actuated due to a spurious isolation signal.

There were no safety consequences or compromise to public health or safety as a result of this event. The design of Secondary Containment includes the ability to automatically or manually isolate Zones within Secondary Containment and initiate SGTS through either Division I or Division II logic. The Division II Secondary Containment Isolation functions were operable and associated ventilation equipment in service throughout this period of time. Both divisions of Primary Containment Isolation functions were unaffected by the relay failure. Lastly, the affected isolation dampers associated with the normally energized logic went to their proper isolation position.

In accordance with the guidance provided in NUREG 1022 Supplement 1, Item 14.1, the required submission date for this report was determined to be September 5, 1990.

CORRECTIVE ACTIONS

The immediate corrective actions consisted of determining the failed relay from the circuit and replacing fuse FU-5. On 8/08/90 the relay was replaced and all of its functions returned to normal.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 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)  Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2)  0 5   0   0   0   3   8   7	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9   0	-   0   1   7	-   0   1	0   4	OF 0   4

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

An event review team (ERT) was established to review, investigate, and analyze the event. The focus of the ERT was to determine why the initial investigation did not determine that the power supply fuse to the Secondary Containment Division I Isolation Logic scheme had blown. The ERT determined that the primary cause of the initial investigation failing to identify the blown fuse was that there was no immediate field investigation performed by Electrical Maintenance (EM) personnel.

Once relay XYX6-07553A was identified as the cause of the smoke at panel OC876A, a review of the effects of this relay failing was performed by the Shift Supervisor and the EM Foreman. At that time it was concluded that the relay coil failed 'open' and the circuit had remained energized since no associated Division I equipment trips or isolations were received. (Note, Division I trips or isolations were not received since Division II was in service at the time of the event.) As a result, the EM Foreman did not release the work authorization (WA) for immediate field investigation prior to the job planning process.

Contributing to this erroneous conclusion was the design of Secondary Containment Isolation Logic. The logic, energized-to-actuate, is not provided with a loss of power annunciator. An initial review of the logic by Technical Section Engineering personnel determined that the logic does conform to the applicable IEEE standards, however, Nuclear Plant Engineering (NPE) has been requested to perform an independent review of this assessment. Enhancements to the logic design are also being evaluated, i.e., the addition of loss-of-logic alarm and/or indication.

Actions to prevent recurrence include adding administrative procedure guidelines which will be used for determining when field investigation is prudent. Field investigation guidelines will also be provided in an EM work practice training course which is currently under development. The estimated completion date for these two actions is December 31, 1990.

ADDITIONAL INFORMATION

Failed Component: Relay: XYX6-07553A  
 Model: 12HFA51A49H  
 Type: HFA  
 Manufacturer: General Electric

Previous Similar Events: None