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ACCESSION NBR:9106100414 DOC.DATE: 91/06/07 NOTARIZED: NO DOCKET #
FACIL:50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
AUTH.NAME AUTHOR AFFILIATION
METER,J.J. Pennsylvania Power & Light Co.
STANLEY,H.G. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-007-00:on 910515,unplanned actuations of ESF occurred.Caused by spurious trip.'A' placed on alternate power supply & all isolations reset & investigation commenced to determine cause of EPA trip.W/910607 ltr.

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. 05000388

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EXTERNAL:	EG&G BRYCE,J.H	3	3	L ST LOBBY WARD	1	1
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June 7, 1991

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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 91-007-00
FILE R41-2
PLAS -487

Docket No. 50-388
License No. NPF-22

Attached is Licensee Event Report 91-007-00. This event was determined reportable per 10CFR50.73(a)(2)(iv) in that unplanned actuations of Engineered Safety Features occurred due to the loss of the primary power supply to the Division 1 Reactor Protection System power distribution panel when one Electrical Protection Assembly breaker tripped.

H.G. Stanley
Superintendent of Plant - Susquehanna

JJM/mjm

cc: Mr. T. T. Martin
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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH 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)	DOCKET NUMBER (2)	PAGE (3)
Susquehanna Steam Electric Station - Unit 2	0 5 0 0 0 3 8 8	1 OF 0 4

TITLE (4)

ESF Actuations Due to an RPS EPA Breaker Spurious Trip

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 5	1 5	9 1	9 1	— 0 0 7 —	0 0	0 6	0 7	9 1		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

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

	20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		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	
	AREA CODE	
J.J. Meter - Engineer II	7 1 7	5 4 2 - 1 8 7 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

At 1820 hours on May 15, 1991 with Unit 2 operating at 100% power, the primary power supply to the "A" Reactor Protection System (RPS) power distribution panel was lost when one of its Electrical Protection Assembly (EPA) breakers tripped. RPS as well as other Plant systems and components functioned properly and as expected in response to the event. No reactor parameters were affected and no Emergency Core Cooling Systems were actuated. The 'A' distribution panel was swapped to alternate power until the primary power supply was restored. There was no indication of abnormalities and all isolation signals were reset by 1830 hours. The primary power source EPA breaker was reset at 0100 hours on 5/16/91. Full power operation of the unit continued without interruption. While the exact cause of the trip was not definitively determined, the most probable cause for the trip was attributed to a faulty EPA logic card. A task team has been organized to enhance the reliability of the Reactor Protection System. In addition, an EPA study prepared by GE - Nuclear Energy for the BWR Owners Group is also under PP&L review to assess any operational or design changes that may be warranted. LER 90-007 (Docket No. 50-388/License No. NPF-22) will be updated to provide the results of the efforts to enhance RPS reliability. Since all Engineered Safety Feature (ESF) systems and components functioned properly and per design, there were no safety consequences or compromises to the health or safety of the public.

DESCRIPTION OF EVENT

At 1820 hours on May 15, 1991 with Unit 2 operating in CONDITION 1 at 100% power, the primary power supply to the "A" Reactor Protection System (RPS; EIIS Code: JC) power distribution panel 2Y201A was lost when one of its Electrical Protection Assembly (EPA) breakers tripped. This power interruption resulted in numerous Primary Containment Isolation System (EIIS Code: JM) actuations and automatic system initiations. RPS as well as other plant systems functioned as designed in response to the event. The major actuations were as follows:

1) Reactor Building HVAC (EIIS Code: VA) Zones II and III isolated.

2) Reactor Water Cleanup System (EIIS Code: CE) inboard isolation valve closed.

3) Cooling water isolation valves to the Reactor Recirc Pumps (EIIS Code: CC) closed.

4) "A" Standby Gas Treatment System (EIIS Code: BH) auto initiated.

5) "A" Control Room Emergency Outside Air Supply System (EIIS Code: VI) auto initiated.

Reactor parameters were not affected and no Emergency Core Cooling Systems (ECCS) actuated. The 'A' RPS bus was supplied by alternate power and all isolation signals were reset by 1830 hours. The primary power EPA breaker was reset at 0100 on 5/16/91 and full power operation of the unit continued without interruption.

CAUSE OF EVENT

The loss of power to the "A" RPS bus was due to an unexpected trip of a primary power supply EPA breaker. While the exact cause of the trip was not definitively determined, the most probable cause for the spurious trip of the EPA breaker was attributed to a faulty EPA logic card.

CORRECTIVE ACTIONS

The 'A' RPS bus was placed on alternate power supply and all isolations were reset within ten minutes of the primary supply EPA breaker trip. The primary EPA breaker was then reset at 0100 on 5/16/91.

An investigation was commenced to determine the cause of the EPA trip. The EPA logic card was replaced as being the most likely cause for the trip. The removed card was observed to have a ten percent voltage ripple on the power supply. Further testing will be conducted to determine if the condition contributed to the trip.

Prior to the May 15, 1991 trip, efforts were already underway to enhance the reliability of RPS. Since the event, the efforts have been expedited. A task team with members representing Technical Staff Engineering, Electrical Maintenance, Nuclear Plant Engineering, Electrical Testing, Operations and General Electric has been formed to address the reliability of the entire RPS system with initial efforts focused on EPA breaker hardware.

Spurious actuation of EPA breakers has been identified as a problem affecting BWR reliability. This issue has been under review by the BWR Owners Group for several years. In January, 1991 GE-Nuclear Energy issued Electrical Protection Assembly (EPA) Study (Report No. EDE-18-0789) in response to the BWR Owners Group's request to address the EPA operational and design issues which may explain the occurrence of reported spurious trips. The report is also under PP&L review to assess any operational or design changes that may be warranted. LER 90-007 (Docket No. 50-388/License No. NPF-22) which describes a previous similar event will be updated to provide the results of PP&L's efforts to enhance RPS reliability.

REPORTABILITY/ANALYSIS

This event was determined to be reportable under 10CFR50.73(a)(2)(iv) in that unplanned actuations of Engineered Safety Features (ESF) occurred when an RPS EPA breaker tripped.

The safety function of the EPA breaker is to interrupt power to the RPS buses in the event of overvoltage, undervoltage, or under-frequency conditions. RPS is designed such that a loss of power to the RPS buses results in plant systems aligning to conservative positions.

Since all ESF systems and components functioned properly and per design, there were no safety consequences or compromises to the health or safety of the public.

Had this event occurred with the unit in cold shutdown or refueling, the safety consequences could have been slightly greater due to the fact that shutdown cooling could have been temporarily lost due to the automatic isolation of the RHR Shutdown Cooling suction line.

ADDITIONAL INFORMATION

A review of past Licensee Event Reports (LERs) for the station identified eight previous events where spurious EPA breaker trips resulted in ESF actuations. Several other events in which the EPA breaker trips were caused by the starting of large motors are not reported here since this problem was corrected in 1985 by replacing the RPS Alternate Power Supply transformers with constant voltage transformers in both Units 1 and 2.

UNIT 1 (Docket No. 50-387/License No. NPF-14)

LER 91-004
LER 90-005
LER 87-024
LER 86-029
LER 86-023
LER 83-172

UNIT 2 (Docket No. 50-388/License No. NPF-22)

LER 90-007
LER 88-005