

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8911220081      DOC. DATE: 89/11/13      NOTARIZED: NO      DOCKET #  
 FACIL: 50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylv      05000388  
 AUTH. NAME      AUTHOR AFFILIATION  
 CRIST, M.L.      Pennsylvania Power & Light Co.  
 BYRAM, R.G.      Pennsylvania Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 89-012-00: on 891015, RPS actuation received during restoration of Div I + 24 VDC battery sys.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 4  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: LPDR 1 cy Transcripts.

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	AEOD/DSP/TPAB	1 1	AEOD/ROAB/DSP	2 2
	DEDRO	1 1	NRR/DEST/ESB 8D	1 1
	NRR/DEST/ICSB 7	1 1	NRR/DEST/MEB 9H	1 1
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	NRR/DEST/RSB 8E	1 1	NRR/DEST/SGB 8D	1 1
	NRR/DLPQ/HFB 10	1 1	NRR/DLPQ/PEB 10	1 1
	NRR/DOEA/EAB 11	1 1	NRR/DREP/RPB 10	2 2
	NUDOCS-ABSTRACT	1 1	<u>REG FILE</u> 02	1 1
	RES/DSIR/EIB	1 1	RGNI FILE 01	1 1
EXTERNAL:	EG&G WILLIAMS, S	4 4	L ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
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NOTES:		2 2		

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Pennsylvania Power & Light Company

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November 13, 1989

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

SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 89-012-00  
FILE R41-2  
PLAS -392

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

Attached is Licensee Event Report 89-012-00. This event was determined to be reportable per 10CFR50.73(a)(2)(iv) in that an Engineered Safety Feature actuation occurred when a RPS actuation was received during restoration of Division I ± 24 VDC Battery System.

R.G. Byram  
Superintendent of Plant - Susquehanna

MLC/mjm

cc: Mr. W.T. Russell  
Regional Administrator, Region I  
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475 Allendale Road  
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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) **Susquehanna Steam Electric Station - Unit 2** DOCKET NUMBER (2) **0 5 | 0 0 | 0 3 | 8 | 8 1** PAGE (3) **1 OF 0 | 3**

TITLE (4) **RPS Actuation Received During Restoration of Div. I ± 24 VDC Battery System**

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)												
1	0	1	5	8	9	8	9	0	1	2	0	0	1	1	1	3	8	9	0	5	0	0	0

OPERATING MODE (9) **5** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	<input type="checkbox"/>	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	<input type="checkbox"/>	73.71(b)	<input type="checkbox"/>
20.405(a)(1)(i)	<input type="checkbox"/>	50.38(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	<input type="checkbox"/>	73.71(c)	<input type="checkbox"/>
20.405(a)(1)(ii)	<input type="checkbox"/>	50.38(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vi)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 368A)	<input type="checkbox"/>
20.405(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)	<input type="checkbox"/>		
20.405(a)(1)(iv)	<input type="checkbox"/>	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)	<input type="checkbox"/>		
20.405(a)(1)(v)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)	<input type="checkbox"/>		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<b>Michael L. Crist - Compliance Evaluator</b>	<b>7   1   7 5   4   2   -   3   2   8   9</b>

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On October 15, 1989 at 0534 hours with Unit 2 in Condition 5, Refueling, an unplanned Engineered Safety Feature actuation occurred when a full Reactor Protection System (RPS) actuation was received during restoration of the Division I ± 24 VDC Battery System following system maintenance. When the positive battery charger was placed in the equalize mode the overvoltage relay tripped, sending a trip signal to the battery charger's output breaker. The output breaker opened and since the battery was not connected, the 24 VDC positive bus deenergized. This in turn caused a Division I Intermediate Range Monitor upscale/inop trip signal which actuated a Nuclear Monitoring System trip of the RPS. With the shorting links removed, this single channel trip results in a full RPS actuation.

The cause of the event is attributed to the type of relays used in the ± 24 VDC overvoltage trip circuit. The relays used are GE NGV relays set at the upper end of their range. With this type of relay there is an overlap between the relay operating range and the battery charger equalizing voltage. This type of relay still provides equipment operability protection in the event of an actual overvoltage condition, however nuisance battery charger trips, when in the equalize mode, are possible. As a interim measure, a modification to the Division I overvoltage trip circuits has been performed. Long term actions consist of replacement of the overvoltage relays in both unit's ± 24 VDC battery system. There were no safety consequences or compromise to public health or safety during this incident since the RPS actuated per design and operated properly.

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-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 2	DOCKET NUMBER (2)  0   5   0   0   0   3   8   8   8   9   -   0   1   2   -   0   1   0   0   2   OF   0   3	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			

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

EVENT DESCRIPTION

On October 15, 1989 at 0534 hours with Unit 2 in Condition 5, Refueling, an unplanned Engineered Safety Feature (ESF) actuation occurred when a full Reactor Protection System (RPS, EIIS Code: JC) actuation was received during restoration of the Division I ± 24 VDC Battery System (EIIS Code: EJ) following system maintenance. The event occurred as maintenance electricians (utility, non-licensed) were in the process of restoring battery 2D670. When the battery charger was placed in the equalize mode, the overvoltage protection relay tripped due to an apparent overvoltage condition. As expected, a trip signal was generated to the charger's output circuit breaker, 2D672-01. Since battery 2D670 was not yet connected to the bus tripping breaker 2D672-01 de-energized the 24 VDC positive bus. This in turn caused a Division I Intermediate Range Monitor upscale/inop trip signal which actuated a Nuclear Monitoring System (NMS, EIIS Code: I) trip of the RPS, with the shorting links removed. All control rods were fully inserted prior to the actuation, thus no rod motion occurred. Charger 2D673 was placed in the float mode and 2D672-01 was reset. Control Room personnel (utility, licensed) reset the actuation at 0536 hours. ENS notification was completed in accordance with 10CFR50.72(b) (2) (ii) at 0645 hours.

CAUSE OF EVENT

The cause of the event is attributed to the type of relays used in the ± 24 VDC bus overvoltage trip circuit. The overvoltage relays used in the system are GE NGV relays, typically used in undervoltage applications. These relays are designed to de-energize between 19 and 27 VDC and energize at 105% or less of the dropout voltage. The overvoltage trip circuit utilizes the relay in a normally deenergized state, with an actuation setpoint of 29 ±0.5 VDC. When the charger is in the equalize mode output voltage is 28.5 VDC. This mode is primarily used for recharging the battery. The overlap of the relay operating range with battery charger equalizing voltage caused the charger's output circuit breaker to trip due to an apparent overvoltage condition, as sensed by the relay. Following the event the setpoint for the overvoltage relay was found to be 28.6 VDC.

The RPS actuation occurred when only one NMS channel tripped due to Source Range Monitor "shorting links" being removed. When the shorting links are removed the NMS trip logics are no longer "one out of two taken twice", but are one out of eighteen once. In this configuration any single NMS trip will result in a RPS actuation.

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) Susquehanna Steam Electric Station - Unit 2	DOCKET NUMBER (2)  0   5   0   0   0   3   8   8	LER NUMBER (6)			PAGE (3)		
		YEAR 8   9	SEQUENTIAL NUMBER -   0   1   2	REVISION NUMBER -   0   0	OF	0   3	

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

REPORTABILITY/ANALYSIS

This event was determined reportable per 10CFR50.73(a) (2) (iv) in that an Engineered Safety Feature (ESF) actuation resulted when an unplanned RPS actuation occurred. All control rods were fully inserted prior to the actuation, thus no rod movement occurred. There were no safety consequences or comprise to public health or safety during this event, nor would there have been if the occurrence took place during any other plant condition since the the RPS actuated per design and operated properly. Additionally, the shorting links are always in place for startup and operation, restoring the "one out of two twice" logic.

CORRECTIVE ACTIONS

Immediate corrective actions consisted of placing the battery charger in the float mode, output voltage 27 VDC, and restoring the system to its normal configuration. The use of GE NGV relays in this application provides equipment operability protection in the event of an actual overvoltage condition, however nuisance battery charger trips, when in the equalize mode, are possible. As an interim measure, a modification has been performed to the Division I overvoltage trip circuits. The modification installed a 300 ohm, 5 watt resistor in series with each overvoltage relay's operating coil. This allows the overvoltage relay to monitor system voltage within its operating range, reducing the likelihood of nuisance overvoltage trips. Long term actions will consist of replacement of the overvoltage relays, in the Unit 1 and Unit 2 ± 24 VDC battery systems, with a relay better suited to this application.

ADDITIONAL INFORMATION

Failed Components: None

Previous Similar Events: None