

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Susquehanna Steam Electric Station - Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 1 8 1 8	PAGE(S) 1 OF 0 1 3
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TITLE (4)  
Reactor Manual Scram Due to Main Transformer Over Heating.

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		
0 1	1 5	8 6	8 6	0 0 4	0 0 0	0 3	1 4	8 6			
									DOCKET NUMBER(S) 0 5 0 0 0		
									0 5 0 0 0		

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

OPERATING MODE (9) 1	20.402(b)	20.406(c)	<input checked="" type="checkbox"/>	80.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1710	20.406(a)(1)(i)	80.36(e)(1)	<input type="checkbox"/>	80.73(a)(2)(v)	73.71(e)
	20.406(a)(1)(ii)	80.36(e)(2)	<input type="checkbox"/>	80.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 306-1)
	20.406(a)(1)(iii)	80.73(a)(2)(i)	<input type="checkbox"/>	80.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	80.73(a)(2)(ii)	<input type="checkbox"/>	80.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	80.73(a)(2)(iii)	<input type="checkbox"/>	80.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Duane D. Sadvary	TELEPHONE NUMBER
	AREA CODE: 7 1 1 7    5 1 4 1 2 1 - 1 3 1 8 1 5 1 6

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	
X	E	L	F	A	N	M	1	7	15	N

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 January 15, 1986 at 1437, Unit Two reactor was manually scrambled from approximately 70 percent power due to overheating of the "B" Phase Main Transformer (2X101B).

Prior to the event, the unit was operating at 100 percent power. An alarm on Unit Two Main Transformers annunciated. Upon investigation by an operator, the transformer was found with a pressure relief device relieving oil from the transformer top.

As a result of the event, the Shift Supervisor implemented a controlled shutdown of the reactor per procedure EO-200-101, "Scram." Reactor recirculation was runback per the procedure, then the reactor was manually scrambled.

The problem was found to be improper alignment of the knife switches to the transformer cooling loops. Subsequently, a ground fault on one of the cooling fans caused a trip of the feeder breaker and loss of all cooling to the transformer.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Susquehanna Steam Electric Station Unit 2	DOCKET NUMBER (2) 05000388	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		86	004	00	02	OF	03

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

On the morning of January 15, 1986 with Unit Two operating at 100 percent power, the "B" Phase Main Transformer (2X101B) (EIIS System Code - EL; IEEE Component Code - XFMR) and Auxiliary Transformer (2X105) were to have maintenance performed to change out their nitrogen bottles.

Electric Maintenance had contacted Operations and received permission to change out the bottles at approximately 0730. The change out was completed on the "B" Phase Main Transformer at about 0830 without activating any alarms. When the work was done on the auxiliary transformer, at about 0900, an alarm was received in the Main Control Room. Operations acknowledged the alarm and telephoned Electrical Maintenance to verify that the bottle change out was the cause of the alarm. Maintenance verified they were the cause of the alarm, but informed Operations their work would be done shortly.

This communication was the object of a misunderstanding. The intent of the communication from Electrical Maintenance was that all work would be completed shortly for both the "B" Phase Main Transformer and the Auxiliary Transformer. Operations believed the communication to mean that work on the auxiliary transformer only would be completed shortly, since that was the alarm just received. Operations was not aware that the bottles on the "B" Phase Main Transformer had been changed without an alarm.

At approximately 1230, the "B" Phase Main Transformer Trouble Alarm annunciated in the Control Room. The alarm was acknowledged, however it was not investigated immediately for several reasons. All Nuclear Plant Operators were in the plant performing their assigned tasks. In light of the morning alarm on the auxiliary transformer caused by Electrical Maintenance and the misunderstanding mentioned above, it was determined that the alarm must be due to the nitrogen bottle change out. No call was made to Electrical Maintenance to determine if the nitrogen bottle change out was the cause of the alarm.

At approximately 1400, one of the Nuclear Plant Operators returned to the Control Room from his previous work assignment. He was immediately sent to check the "B" Phase Main Transformer.

At the transformer he found oil spraying from a pressure relief device. A check of the control cabinet revealed five alarms actuated: Loss of Control Power, Loss of Coolers Group 1, Loss of Coolers Group 2, Top Oil High Temperature, and Pressure Relief Device Trip. A second operator was immediately sent to the Control Power Feeder Breaker. The breaker was found tripped and attempts to reset it were unsuccessful. The operator at the transformer was instructed to swap the control power from the normal to the alternate source by use of the knife switches in the control panel. Due to a lack of labeling of the knife switches causing confusion and fear that an arc from the knife switch transfer might cause a fire with the spraying oil, the attempt to swap to the alternate source was abandoned.

Emergency procedure EO-200-101, "Scram," was implemented. The procedure called for a runback of reactor recirculation which took reactor power to about 70 percent before the reactor was manually scrammed.

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

Due to the reduced power level no safety relief valves lifted. Vessel water level was controlled with feedwater so no HPCI or RCIC injections were needed.

The investigation of the incident found that both loops of cooling for the transformer were being supplied by one power source. Consequently, when a cooling fan (IEEE Component Code - FAN) caused a ground fault on one loop of cooling, it tripped the breaker which then caused a loss of both loops of cooling. It is believed this occurred at approximately 1230 when the alarm in the Control Room sounded.

Two power sources are supplied to the transformer control cabinets. Per the vendor drawings, the control circuitry and cooling loops are to be supplied from two separate sources. Each source is to power one loop of cooling with the opposite source as the alternate source of power. The major problem for this incident was that both loops of cooling were supplied from the same source. If the cooling loops were properly aligned, only one loop would have been lost. The other loop may have sustained the transformer. It is important to note that if the cooling loops were properly aligned, and the knife switches were properly labeled, only one loop of cooling would have tripped when the fan faulted. There was no indication for the operator to determine that the cause of all the trouble was a faulted cooling fan. Had he seen one loop of cooling tripped, he would have tried to swap to the alternate power source which would have then tripped the second source causing a total loss of cooling.

A review of all main and auxiliary transformers on both units was performed. Several transformers were found with both cooling loops aligned to the same power source. All knife switches were corrected to have each loop supplied from a separate source.

The Unit Two knife switches have been temporarily labeled. Permanent labels will be installed by Operations under the Plant Labeling Program.

All operators will review the incident during training. Emphasis will be placed on responding to and verifying the cause of alarms.



Pennsylvania Power & Light Company

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March 14, 1986

Dr. Thomas E. Murley  
Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
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SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 86-004-00  
ER 100450 FILE 841-23  
PLAS- 152

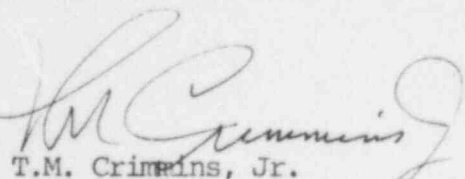
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Docket No. 50-388  
License No. NPF-22

Dear Dr. Murley:

Attached is Licensee Event Report 86-004-00. The event was initially determined to not be reportable in that the manual actuation of the Reactor Protection System (RPS) was performed as part of a planned evolution.

Subsequent review has determined that the event should have been reported per NRC guidance to 10CFR50.73(a)(2)(iv). The manual initiation of the RPS was performed to "mitigate the consequences of the event."



T.M. Crimmins, Jr.  
Superintendent of Plant, Susquehanna

DDS/pjg

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