

LICENSEE EVENT REPORT (LER)

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 3		
TITLE (4) Transformer T-10 De-energization, Reactor Scram (7/3/84).																
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	7	0	3	8	4	8	4	0	2	8	SSES - Unit 2				0 5 0 0 0 3 8 8	
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11)																
OPERATING MODE (9)		1		20.402(b)		20.405(e)		X		80.73(a)(2)(iv)		73.71(b)				
POWER LEVEL (10)		1 1 0 0		20.405(a)(1)(i)		80.38(e)(1)				80.73(a)(2)(v)		73.71(c)				
				20.405(a)(1)(ii)		80.38(e)(2)				80.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC Form 365A)				
				20.405(a)(1)(iii)		80.73(a)(2)(i)				80.73(a)(2)(viii)(A)						
				20.405(a)(1)(iv)		80.73(a)(2)(ii)				80.73(a)(2)(viii)(B)						
				20.405(a)(1)(v)		80.73(a)(2)(iii)				80.73(a)(2)(ix)						
LICENSEE CONTACT FOR THIS LER (12)																
NAME R.W. Stanley - Compliance Engineer										TELEPHONE NUMBER						
										AREA CODE 7 1 1 7 5 4 2 - 3 1 6 6						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC						
C	F	K	*	*	N											
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)

As a result of a lightning strike on a 230KV Transmission Line, the Unit 1 Start-up Transformer T-10 isolated, one of two sources of offsite power. The loss of the T-10 Transformer caused a trip to the Unit 1 and Unit 2 "A" Reactor Protection System (RPS). Reactor Building Zone I, II, and III HVAC systems tripped and Standby Gas Treatment system initiated due to the loss of RPS. The effect on feedwater and reactor recirculation controls caused a reactor vessel level increase. Manual feedwater control was taken to decrease reactor vessel level. The "A" Reactor Feedwater Turbine tripped three (3) seconds after being reset. The "C" Reactor Feedwater Turbine flow decreased due to the steam supply isolating. The "B" Reactor Feedwater Pump did not provide sufficient flow to maintain reactor vessel level. The reactor scrambled on low level. Reactor vessel level decreased and initiated the HPCI and RCIC systems, and closed the Main Steam Isolation Valves. Reactor vessel level increased to the trip point for HPCI, RCIC, and Reactor Feedwater Turbines.

All safety systems which were required operated satisfactory. This event is reportable per 10CFR50.73(a)(2)(iv) since an unplanned Engineered Safety Features (ESF) actuation occurred and the RPS tripped.

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*Not Applicable.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Susquehanna Steam Electric Station Unit 1	05000381784	—	029	—	00	02	OF 03

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

The Montour-Mountain transmission line which supplies one of the two offsite power sources to the site was hit by lightning at 1410 on July 3, 1984. This caused the Unit 1 Startup Transformer (T-10) supply breaker to open. The resulting voltage transient tripped the Units 1 and 2 "A" RPS EPA breakers. The loss of "A" RPS caused many division I alarms to annunciate including $\frac{1}{2}$ scram, various area radiation monitors and neutron monitoring trips. Actual initiations caused by the loss of RPS were division I primary containment isolation and trips of Zone I, (Reactor Building, Unit 1) HVAC Zone II, (Reactor Building, Unit 2) HVAC, Zone III (Common Area Refueling Floor) HVAC, initiation of Stand-by Gas Treatment System (SGTS). After the lightning strike, the supply breaker to startup bus 10 opened on under-voltage. This caused the supply breakers to the ESS busses supplied by T-10 to open. ESS busses 1A, 1C, and 2A, 2C transferred to their alternate sources, ESS transformers 201 and 211.

The momentary loss of power to the 1A and 1C ESS busses during transfer caused a loss of signal to the feedwater level control circuits, the reactor recirculation runback circuitry for both pumps and a loss of control signal to the "A" Reactor Recirc. Pump. This caused all the reactor feed pumps speed to fail constant. "A" Reactor Recirc. Scoop Tube to lock, and the "B" Reactor Recirc. to runback. The "A" Reactor Recirc. runback was prevented by the scoop tube lock.

The Control Room Operators were aware from earlier experience that the above conditions of constant feedwater flow with a reactor recirc. runback results in a rapid increase in reactor level. The quick response of Control Room Operators prevented the water level in the reactor vessel from rising to the high level trip point.

This was accomplished by the Control Room Operators resetting the reactor feedwater turbines, then manually decreasing the flow demand. Three (3) seconds after the "A" Reactor Feedwater Turbine was reset the "A" Feedwater Pump tripped. The reactor vessel level slowly decreased. Approximately fifty (50) seconds into the event, the steam supply to the "C" Feedwater Turbine isolated which caused the reactor level to further decrease. The reactor was at 70% power at this time and with only one (1) remaining reactor feedwater pump, the reactor vessel level could not be maintained. The low level caused a Unit 1 reactor scram.

The reactor vessel level continued to decrease, which caused the initiation of the RCIC and HPCI Systems, and the Main Steam Isolation Valves closure. Reactor vessel increased due to the above injections. The HPCI, RCIC and the feedwater turbines tripped on reactor vessel high level.

Reactor power level of Unit 1 was 100%. The reactor power level of Unit 2 was 10%, at the time of the lightning strike.

The plant operated per design except for the trip of the "A" Reactor Feedwater Turbine, and the closure of the steam supply valves to the "C" Reactor Feedwater Turbine. The cause for the loss of the "A" and "C" Reactor Feedwater Turbines is unknown. Extensive post scram testing of the feedwater system proved the system operates properly in every case.

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

This event did not effect the safe operation of the nuclear power plant since the ESF operated per design. A modification has been completed which prevents the "B" Reactor Recirc. from receiving a false runback signal on loss of Transformer T-10. This was accomplished by wiring the feedwater system runback card which feeds the "B" Reactor Flow Control on a Uninterruptable Power Supply (UPS). The "B" Reactor Recirc. will remain unlocked and in auto control, it was necessary to put the recirc. master flow controller also on a Uninterruptable Power Supply (UPS) so that it would continue sending a valid control signal to the "B" Recirc. Flow Controller.

To minimize the "bump" which occurs when the feedwater turbines are reset from a Loss of Feedwater Control Power, guidelines were provided. First place the master control in automatic to provide a system demand signal to each of the three manual stations. By "nulling" the master, the output tends not to change during the next few seconds. The operator then chooses a pump at a time to be placed in automatic control. It is suggested that if reactor water level is high, the highest flow pump be selected; likewise if level is low, choose the lowest flow pump. The selected pump is placed in auto by first nulling the difference between the Manual Station's (R601A,B, or C) input and output, then placing in Auto mode. The last step is to reset the Loss of Signal Interlock which puts the throttle back in contact with the control system. This action will probably cause a bump and reactor water level may require some time to stabilize. At this point, the operator may elect to proceed with putting the other two pumps in Auto; however, once auto operation has been achieved with just one pump, he may bring the water level back toward normal levels using the Master Control if he elects to do so.



Pennsylvania Power & Light Company

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August 2, 1984

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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 84-029-00
ER 100450 FILE 841-23
PLA-2267

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

Attached is Licensee Event Report 84-029. This event was determined reportable per 10CFR50.73(a)(2)(iv), in that an Unplanned Engineered Safety Feature (ESF) actuation occurred.

H.W. Keiser
Superintendent of Plant-Susquehanna

RWS/pjg

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