

## 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) Turbine Trip/Reactor Scram on Moisture Separator 'B' Drain Tank High Level.																						
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	3	0	8	5	8	5	0	3	1	0	0	1	2	7	8	5	0	5	0	0	0
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)																				
1		20.402(b)				20.406(c)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)								
POWER LEVEL (10)		20.406(a)(1)(i)				50.38(e)(1)				50.73(a)(2)(v)				73.71(c)								
0 1 6 1 4		20.406(a)(1)(ii)				50.38(e)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)								
		20.406(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(vii)(A)												
		20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(vii)(B)												
		20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(x)												
LICENSEE CONTACT FOR THIS LER (12)																						
NAME L.A. Kuczynski - Nuclear Plant Specialist, Level III										TELEPHONE NUMBER 7 1 1 7 5 4 2 1 - 1 3 1 7 1 5 1 9												
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												
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR						
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO										

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

On October 30, 1985, following a moisture separator 'B' drain tank high level, a turbine trip initiated a reactor scram from 64% power. The Unit responded to the transient per design. All control rods inserted fully. Vessel pressure and level were controlled within acceptable values. Containment integrity and Emergency Core Cooling systems were not challenged. The engineering evaluation performed theorizes that the drain tank high level was caused by a surge of two phase flow which accumulated at the lowest level of the turbine cross-around piping. A procedure change has been made which directs Operations personnel to open the turbine cross-around drain valves for 15 minutes at approximately 30% power during power ascension. This will give added assurance that all water is removed from the high pressure turbine-to-moisture separator cross-around pipes.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 2/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
Susquehanna Steam Electric Station Unit 1	0500038785	YEAR	031
		SEQUENTIAL NUMBER	002
		REVISION NUMBER	OF 03

TEXT (If more space is required, use additional NRC Form 365A's) (17)

On October 30, 1985, at 1936, the Unit experienced an unanticipated reactor protection system (RPS) (JC) actuation when, during power escalation, the reactor scrammed from 64% power. The scram occurred one second after a turbine trip which was caused by moisture separator 'B' drain tank high level. Because reactor power was greater than 24%, the end-of-cycle recirculation pump trip (EOC-RPT) logic actuated to trip both reactor recirculation pump (AD). Reactor water level, which had been controlling at the normal +35 inches before the scram, reached a minimum level of +8 inches due to the collapse of voids and a reduction in feedwater flow before recovering. Reactor pressure, which had been 945 psig prior to the scram, peaked at 992 psig with all five turbine bypass valves open. No safety relief valves lifted; none were required. The Station administrative and Technical Specification limits on reactor cooldown rate were never approached.

All control rods inserted fully. Analysis showed scram times to be within administrative and Tech Spec limits. Primary containment integrity was maintained throughout the transient, and no discernable changes were noted in drywell temperature and pressure, or in suppression pool temperature, pressure and level. In addition, there were no indications of fuel damage and no releases of radioactive material resulting from the transient as evidenced by a comparison of system-level particulate, iodine and noble gas monitor (SPING) (IL) data prior to and following the scram.

All equipment operated per design during the transient, Emergency Core Cooling systems (B) were not challenged, and no operator actions were required to place the unit in a stable condition.

The engineering evaluation performed theorizes that the moisture separator 'B' drain tank high level was caused by a surge of two phase flow which accumulated at the lowest level of the turbine cross-around piping. A procedure change has been made which directs Operations personnel to open the turbine cross-around drain valves for 15 minutes at approximately 30% power during power ascension. This will give added assurance that all water is removed from the high pressure turbine-to-moisture separator cross-around pipes. A similar change is proposed for the corresponding Unit 2 procedure.

In addition, cross-around drains temporary temperature monitoring was performed during the subsequent startup. The objective was twofold; first to determine fluid conditions during drain evolutions, i.e. steam or water; and second to verify that flow exists through all six drain lines. A thermo-couple was installed on each cross-around drain line approximately one to two feet above the drain valve. The data obtained during the following Unit startup will be evaluated to determine if any additional changes are required.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 0/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
Susquehanna Steam Electric Station Unit 1		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		05	000387	85	-	031	-

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

This is the first occurrence of a Unit 1 scram ultimately caused by a moisture separator drain tank high level. However, there were three occurrences of this condition causing turbine trips/reactor scrams on Unit 2. (Licensee Event Reports 50-388/84-017-00 and 50-388/84-021-00/01.) It should be noted that, since the implementation of the following corrective actions, no scrams have occurred due to drain tank high level on Unit 2.

- 1:1 gain pneumatic boosters were installed in the tubing between the valve positioner and the valve actuator diaphragm for the emergency dump valve on each moisture separator drain tank. This decreased the response time of the valves during transient conditions. (A similar modification was completed on Unit 1 after the event.)
- A twelve inch check valve was installed in the drain line from each drain tank. This reduces the quantity of water available to flash in the moisture separators during transient conditions. (This is a major modification presently contemplated but unscheduled for implementation on Unit 1.)
- Proportional controllers with reset capabilities were installed in place of the proportional only controllers in the moisture separators level control system. This stabilized the steady state response of the moisture separator control system and improved the level control valve response during transient conditions. (A similar modification was installed on Unit 1 prior to this scram.)



Pennsylvania Power & Light Company

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SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 85-031-00  
ER 100450 FILE 841-23  
PLAS-134

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

Attached is Licensee Event Report 85-031-00. This event was determined reportable per 10CFR50.73(a)(2)(iv), in that the Unit experienced an unanticipated Reactor Protection System actuation when the reactor scrambled following a turbine trip on moisture separator 'B' drain tank high level.

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

LAK/pjg

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