

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
Susquehanna Steam Electric Station - Unit 2

DOCKET NUMBER (2)
0 5 0 0 0 3 8 8

PAGE (3)
1 OF 03

TITLE (4)
Power Load Unbalance, Reactor Scram.

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)
09	08	84	84	018	00	10	08	84			0 5 0 0 0
<p>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)</p>											

OPERATING MODE (9) 1	20.402(b)	20.406(e)	<input checked="" type="checkbox"/>	60.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 4 6	20.406(a)(1)(iii)	60.36(a)(1)	<input type="checkbox"/>	60.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	60.36(a)(2)	<input type="checkbox"/>	60.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.406(a)(1)(iii)	60.73(a)(2)(i)	<input type="checkbox"/>	60.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	60.73(a)(2)(ii)	<input type="checkbox"/>	60.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	60.73(a)(2)(iii)	<input type="checkbox"/>	60.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME
R.W. Stanley - Compliance Engineer

TELEPHONE NUMBER
AREA CODE: 717 | 5421-3930

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
X	JJ	IPIT	G1084	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

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

Susquehanna Steam Electric Station, Unit 2, scrambled on September 8, 1984 at 0342 as a result of a Turbine Control Valve Fast Closure signal generated from a false power-load unbalance signal during performance of a weekly Power-Load Unbalance Circuit test. The unit responded as per design throughout the transient. The recirc. pumps tripped as per design on End of Cycle-Recirculation Pump Trip from a Turbine Control Valve Fast Closure signal. Unit 2 is involved in the Power Ascension Program and was at 46% power at the time of this event.

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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 (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		84	018	00	02	OF 03

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

Susquehanna Steam Electric Station, Unit 2 scrambled on September 8, 1984 at 0342 as a result of a Turbine Control Valve Fast Closure Signal generated from a False Power Load Unbalance Signal during the performance of OP-293-002 "Main Turbine Testing". Unit 2 is involved in the Power Ascension Program and was at 46% power at the time of this event.

The Turbine Control Valve Fast Closure and resultant reactor scram was caused by a "Zero Shift" of Pressure Transmitter PT-20107. The Pressure Transmitter which senses the cross-around steam pressure to the "A" moisture/separator and inputs a signal to the rate sensitive power/load unbalance (PLU) circuit has a two fold purpose: 1) to initiate control valve fast closure action under load rejection conditions that might lead to a rapid acceleration and subsequent over-speed of the unit, and 2) to prevent any valve action under stable fault conditions which are self clearing within a reasonable amount of time.

Unit 2 scrambled on 8/26/84 and 8/28/84, documented by LER 84-17, during weekly testing of the combined intermediate valves. The hydraulic shock from these scrams may have been the cause for the zero point shift of PT-20107 by approximately 90%, i.e. with a 4-20 maDC span, at an input equal to 0% of range the output was 18.98 maDC.

At this point, a discussion of the PLU test would be helpful to the remainder of this report. Refer as necessary to the schematic (attached). During the PLU test, the PLU PUSH-TO-TEST pushbutton is depressed. This action: 1) Inhibits the Fast Closure Relays (X2B03, XK19-1.2), 2) Energizes the Time Delay Relay (K702), and 3) energizes Relays (K3B10, K2B10) which ground the generator current signals to the rate sensitive power load unbalance circuit. With pushbutton depressed and the turbine load greater than 40% (a prerequisite), the two conditions to simulate a load rejection are present: 1) power (cross-around steam pressure) more than 40% greater than load (generator output current), and 2) a change in generator current output equal to 0-100% rated occurring within 39 msec, are satisfied which results in: 1) the Power (pressure)/Load (current) Relay VCL500 contacts close, and 2) the rate of Change Relay VCL505 contacts close.

Since these relays are in series the closure of the contacts results in the test pushbutton light illuminating and energizes Relay K5B03 which seals in the rate function.

To restore the circuit, the PLU Push-To-Test pushbutton is released and the following actions occur: 1) The relays grounding the current input signal are deenergized restoring the signal, and 2) the time delay relay (time delay drop out) is deenergized and a 5 second time delay begins.

The restoration of current input signal to the rate sensitive power/load unbalance circuit resets the voltage comparators. This clears the power/load function and deenergizes its relay. When the relay contacts open: 1) the indicator lamp is extinguished, and 2) relay K5B03 is deenergized removing the seal in on the rate change function. The valve fast closure relays are enabled after, the 5 second delay.

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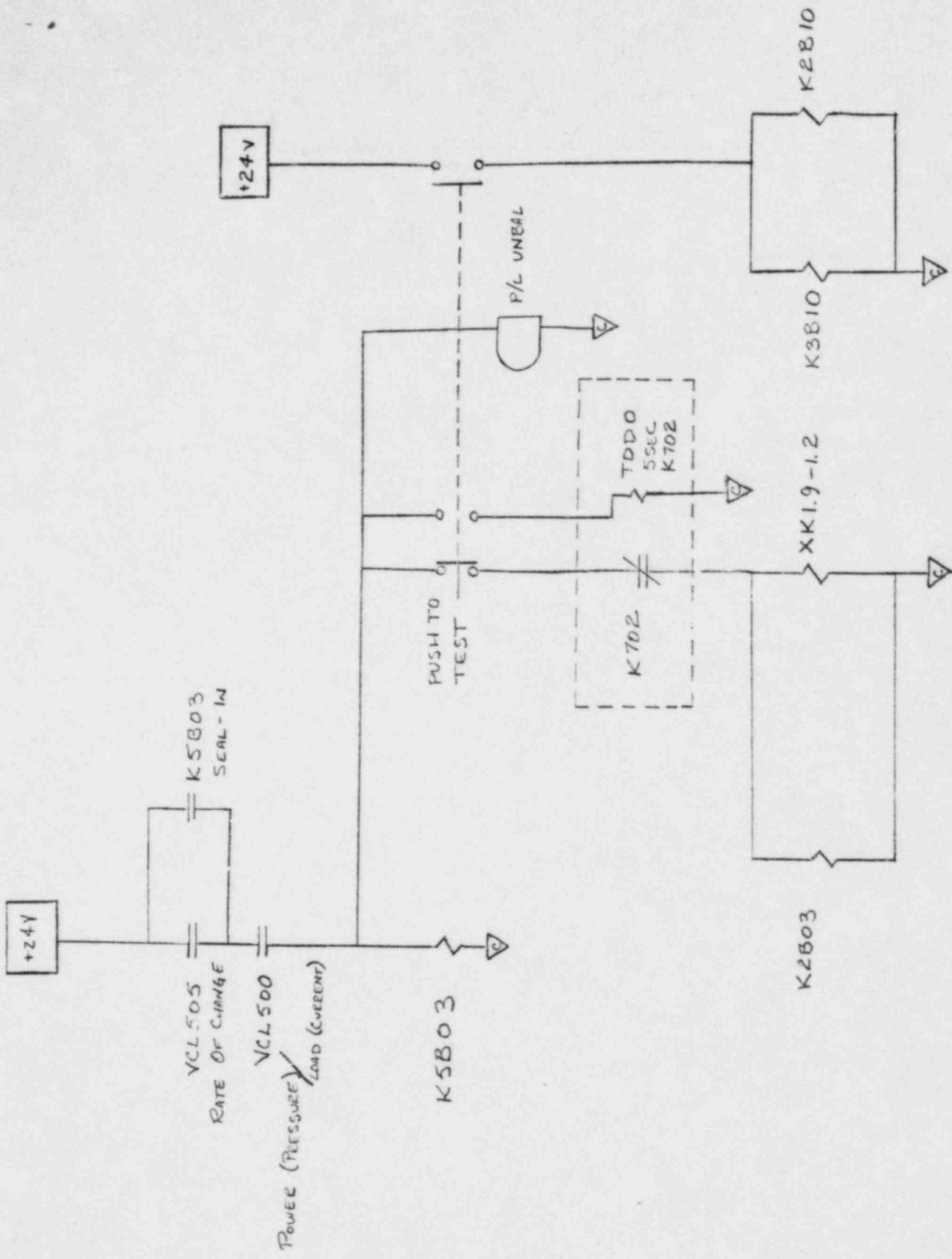
TEXT (If more space is required, use additional NRC Form 366A's) (17)

During the performance of OP-293-002 on 9/8/84, the power/load function did not clear. Therefore, when the valve fast closure relays were enabled the circuit was in the tripped condition. The test was performed at approximately 45% load. Because of the "zero shift" previously described, PT-20107 would have an output which appeared to the PLU circuit as greater than 100%. Thus, the power/load mismatch appeared to be at least 55% ($\geq 100-45$). When the pushbutton was released, the power/load function was in and the rate change function seal in was maintained. This maintained the circuit in the tripped condition, which resulted in the Turbine Control Valve Fast Closure. The unit responded per design through out the transient. The Reactor Recirculation Pumps tripped as per design on the end of cycle-recirculation pump trip.

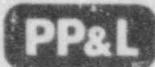
To correct the problem Pressure Transmitter PT-20107 was recalibrated as documented on WA V47786. The sensing lines for the instrument were inspected and no evidence of damage was found.

A note was added to OP-293-002 (currently under revision) to prevent recurrence.

NOTE: If the Power-Load Unbalance Push to Test button light does not de-energize within 3 seconds after the Power-Load Unbalance Push to Test pushbutton is released, depress and hold the Power-Load Unbalance Push to Test pushbutton to avoid a Turbine Trip. Maintain the pushbutton depressed until the problem is corrected.



SIMPLIFIED RATE SENSITIVE POWER LOAD UNBALANCE CIRCUIT AND RELAYS



Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

October 8, 1984

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

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 84-018-00
ER 100450 FILE 841-23
PLA-2333

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

Attached is Licensee Event Report 84-018-00. 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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