

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8908040197 DOC. DATE: 89/07/30 NOTARIZED: NO DOCKET #
 FACIL: 50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylv 05000387
 AUTH. NAME AUTHOR AFFILIATION
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 BYRAM, R.G. Pennsylvania Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-020-00: on 890702, unplanned ESF actuations as result
 of circuit breaker termination/mounting hardware failures.
W/8 ltr.

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

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Pennsylvania Power & Light Company

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July 30, 1989

U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 89-020-00
FILE R41-2
PLAS -377

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

Attached is Licensee Event Report 89-020-00. This event was determined to be reportable per 10CFR50.73(a)(2)(iv) in that unplanned actuations of Engineered Safety Feature systems occurred.


R.G. Byram
Superintendent of Plant - Susquehanna

PPR/mjm

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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
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TITLE (4) **Unplanned ESF Actuations as a Result of Circuit Breaker Termination/ Mounting Hardware Failures in RPS Distribution Panel**

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 2	8 9	8 9	0 2	0 0	0 7	3 0	8 9			0 5 0 0 0

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)				
POWER LEVEL (10) 1 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(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"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)		
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)		
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(iii)	<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)			

LICENSEE CONTACT FOR THIS LER (12)

NAME P.P. Rusanowsky - Power Production Engineer	TELEPHONE NUMBER
	AREA CODE: 7 1 7 NUMBER: 5 4 2 - 1 3 7 1 5 9

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	JIC	51-21-1	G101-810	Y					

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 7/2/89 and 7/5/89, with the unit at 100% power, termination/mounting problems with Reactor Protection System (RPS) circuit breaker CB8B caused numerous power interruptions in the "B" RPS distribution system, each of which resulted, per design, in actuations of several Engineered Safety Feature (ESF) systems and components (initiations of the Standby Gas Treatment System and the Control Room Emergency Outside Air Supply System and isolations of HVAC Zones I and III, Reactor Water Cleanup System and Reactor Recirc Pump cooling water). These ESF actuations were unplanned and hence reportable under 10CFR50.73(a)(2)(iv). The ESF actuation trip signals on 7/2/89, which occurred at 0804, 0827 and 0933 and were caused by circuit breaker CB8B trips, were reset at 1115 on 7/2/89 after CB8B was replaced. All systems were subsequently restored to normal. The ESF actuation trip signals on 7/5/89, which occurred at 1005 and were caused by the "B" RPS bus Electrical Protection Assembly (EPA) supply breakers tripping, were reset at 1205 after termination/mounting failures with circuit breaker CB8B were reworked. All systems were subsequently restored to normal. Although, due to the fact that during the initial investigation on 7/2/89 it was revealed that one of the trips of circuit breaker CB8B, which is rated for 100 amps, occurred at 65 amps, CB8B was replaced, it has since been determined that the replaced breaker was in proper working order. Investigations on 7/5/89 of circuit breaker CB8B termination/mounting configuration revealed a loose input connection, which is suspected to have caused the breaker CB8B trips on 7/2/89, and a cracked ground insulator which caused the EPA breaker trips on 7/5/89. Since all ESF components and systems involved actuated per design and functioned properly, there was no compromise to the health and safety of the public.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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					0 2	OF 0 3	

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

DESCRIPTION OF EVENT

At 0804 on 7/2/89, with the unit at 100% power, circuit breaker CB8B in Reactor Protection System (RPS) (EIIS Code: JC) distribution panel 1Y201B tripped. This resulted, per design, in a "B" RPS half scram signal, initiations of the Standby Gas Treatment System (EIIS Code: BH) and the Control Room Emergency Outside Air Supply System (EIIS Code: BH) and isolations of HVAC Zones I and III (EIIS Code: VA), Reactor Water Cleanup System (EIIS Code: CE) and Reactor Recirc Pump cooling water (EIIS Code: KM). Two additional trips of circuit breaker CB8B occurred at 0827 and 0933 while restoration efforts were in progress. Each of these additional trips resulted in the same Engineered Safety Feature (ESF) actuation signals described above. All ESF components were confirmed to have functioned properly during the event. Investigations revealed that one of the trips of circuit breaker CB8B, which is rated for 100 amps, occurred at 65 amps and it was replaced. All trip signals were reset at 1115 and all systems were subsequently restored to normal.

Three days later, at 1005 on 7/5/89, with the unit at 100% power, the electrical supply to the "B" RPS bus distribution panel 1Y201B was lost when the normal supply Electrical Protection Assembly (EPA) breakers tripped. This resulted, per design, in the same ESF actuations described for the occurrence on 7/2/89. Again, all ESF components functioned properly. When power to the "B" RPS bus was shifted to its alternate supply, the alternate EPA breakers tripped. Several attempts to restore normal or alternate power sources to the "B" RPS bus were unsuccessful. Due to the uncertainty regarding when power would be restored to the "B" RPS bus and since Reactor Recirc Pump (EIIS Code: AD) motor winding temperatures started to trend upward (as anticipated due to the isolation of cooling water), the decision was made to conduct a deliberate power reduction before any operational limits were approached. The power reduction was commenced at 1028. Recirc Pump winding temperatures were stabilized at time 1100 with reactor power at 66%. Reactor power was maintained at 66% for the duration of the event.

CAUSE OF EVENT

The EPA breaker trips on 7/5/89 occurred when the conducting/mounting stud on the "B" RPS bus side of breaker CB8B came in contact with the breaker mounting plate which is at ground potential. Further investigation revealed a small piece of the stud to mounting plate insulator tube cracked off at the point where the stud goes through the mounting plate. The ground fault was determined to have occurred at this point. The cause of stud insulator tube failure could not be determined. The investigation also revealed that the wire from the "B" RPS bus which is terminated on the end of the same conducting/mounting stud described above, was found to have been heat damaged as a result of a loose set screw which secures the wire to a lug which is in turn bolted to the end of the stud. Although this overheating condition is not believed to have contributed to the insulator tube failure (no evidence of

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

insulator tube heat damage anywhere but at the end farthest from the loose connection), it is suspected to have caused the circuit breaker CB8B trips on 7/2/89 which, as it turned out, were not caused by a faulty circuit breaker as originally suspected. It has since been determined that the circuit breaker replaced on 7/2/89 was in proper working order. It can be reasonably concluded that heat, transferred from the loose connection through the stud and into the breaker, caused the breaker to trip prematurely due to the effect of the additional heat on the circuit breaker's thermal overload trip element.

CORRECTIVE ACTIONS

The stud insulator tube and damaged wire were reworked, power to the "B" RPS bus was restored, all trip signals were reset at 1204 on 7/5/89, and all systems were subsequently restored to normal. Restoration of reactor power to 100% was commenced at 1241.

This type of event will continue to be tracked under specific, site, trend codes and appropriate corrective action(s) will be implemented as necessary. No further actions are deemed necessary at this time.

REPORTABILITY/ANALYSIS

The event was determined to be reportable under 10CFR50.72(b)(2)(ii) and 10CFR50.73(a)(2)(iv) in that unplanned ESF actuations occurred. Emergency Notification System calls were made at 1020 on 7/2/89 and 1208 on 7/5/89. Since all ESF components and systems involved actuated per design and functioned properly, there was no compromise to the health and safety of the public. (Note: Circuit breaker CB8B and distribution panel 1Y201B are not safety related components).

ADDITIONAL INFORMATION

A review of past LERs for the station revealed the following similar events.

Unit 1: None

Unit 2: (Docket No. 50-388; License No. NPF-22)
85-010
85-018

A similar situation on Unit 2 was documented on 2/9/87 (Significant Operating Occurrence Report No. 2-87-020) but was not reportable under the Licensee Event Reporting System since it involved a portion of the RPS distribution system which, per design, did not result in any ESF actuations.