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FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-006-00:on 890204;manual shutdown due to inoperable vacuum breaker;subsequent ESF actuation.

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RIDS/ADDS

NRC Form 366
(9 83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Susquehanna Steam Electric Station - Unit 1	0 5 0 0 0 3 8 7	1 OF 0 3

TITLE (4)

Manual Shutdown Due to Inoperable Vacuum Breaker; Subsequent ESF Actuation

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 5 0 0 0
0 2	0 4	8 9	8 9	- 0 0 6	- 0 0	0 3	0 6	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	20.402(b)	20.405(c)	X	50.73(a)(2)(iv)	73.71(b)	
		20.405(a)(1)(i)	50.36(c)(1)		50.73(a)(2)(v)	73.71(c)	
		20.405(a)(1)(ii)	50.36(c)(2)		50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)	
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		
		20.405(a)(1)(iv)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
		20.405(a)(1)(v)	50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
R.R. Wehry - Power Production Engineer	AREA CODE 7 1 7 5 4 2 - 3 6 6 4

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	B F	0 P S V	C 3 3 9	Y					

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)

On February 4, 1989 the Unit 1 reactor was manually shutdown by inserting all control rods and placing the mode switch in SHUTDOWN at 0740 hours. Prior to the shutdown, the unit had been operating at 100% power when suppression chamber - drywell vacuum breaker PSV-15704B2 failed to open on February 2, 1989 at 1050 hours during its monthly surveillance (a 72 hour LCO was entered). In order to comply with the Tech Spec Action requirements, a shutdown was initiated at 1900 hours on February 3, 1989. Following the shutdown, an unplanned automatic actuation of the RPS occurred at 0741 hours on February 4, 1989 when the shutdown SCRAM was reset without first bypassing the SCRAM Discharge Volume high level trip. As a result, when the SCRAM Discharge Volume level reached the high level trip setpoint, an automatic RPS actuation occurred. The operator's failure to place the SCRAM Discharge Volume high level trip bypass control switch to BYPASS prior to resetting the SCRAM was influenced by lack of clear SCRAM reset instructions in the operating procedure being used to shut down the reactor (via manual insertion of all control rods). The subject procedure was revised to provide explicit directions for placing the SCRAM Discharge Volume high level trip bypass control switch in BYPASS prior to resetting the SCRAM. The cause of the vacuum breaker's failed surveillance was attributed to a mechanically bound solenoid valve in its testing circuit. The investigation determined that the vacuum breaker itself would have opened in order to perform its design function under accident conditions. The solenoid valve was replaced and the vacuum breaker was satisfactorily retested and returned to service.

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Unit 1 Susquehanna Steam Electric Station	0 5 0 0 0 3 8 7	8 9	— 0 0 6	— 0 0	0 2 OF 0 3

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

DESCRIPTION OF EVENT

On February 4, 1989 the Unit 1 reactor was manually shut down by inserting all control rods and placing the reactor mode switch in SHUTDOWN at 0740 hours. Prior to the shutdown, the unit had been operating at 100% power when suppression chamber - drywell vacuum breaker PSV-15704B2 (EIIS Code: BF) failed to open on February 2, 1989 at 1050 hours during its monthly surveillance. A 72 hour LCO was entered in accordance with Tech Spec 3.6.4.a. When the vacuum breaker could not be restored to an OPERABLE condition, a shutdown from 100% power was initiated at 1900 hours on February 3, 1989. Following the shutdown, an unplanned automatic actuation of the Reactor Protection System (RPS; EIIS CODE:JC) occurred at 0741 hours on February 4, 1989 when the shutdown SCRAM was reset without first bypassing the SCRAM Discharge Volume high level trip (EIIS Code: AA). As a result, when the SCRAM Discharge Volume level reached the high level trip setpoint, the automatic RPS actuation occurred.

CAUSE OF EVENT

The cause of the suppression chamber - drywell vacuum breaker's failure during surveillance testing was determined to be a mechanically bound solenoid valve in the vacuum breaker's testing circuit. The unplanned RPS actuation occurred because the shutdown SCRAM was reset before the SCRAM Discharge Volume (SDV) piping had fully drained to the SCRAM Discharge Instrument Volume and the SDV high level trip bypass control switch had inadvertently not been placed in the BYPASS position by the operator (utility - licensed). The operator was able to reset the SCRAM without bypassing the SDV high level trip signal because the SDV level was not high, due to performing a manual shutdown. The operator's failure to place the SDV high level trip bypass control switch in BYPASS prior to resetting the SCRAM was influenced by the lack of clear SCRAM reset instructions in the operating procedure (GO-100-005, Plant Shutdown From Minimum Power). The method of fully inserting all control rods prior to placing the reactor mode switch in the SHUTDOWN position, per GO-100-005, has not been the standard method for performing manual shutdowns at Susquehanna. In the past, most manual shutdowns were performed by decreasing reactor power to approximately 15% and then manually scramming the reactor and performing the actions of EO-100-101, Scram Bases. The emergency operating procedure, EO-100-101, contains an explicit direction to place the SDV high level trip bypass control switch to the BYPASS position prior to resetting the SCRAM. Procedure GO-100-005 did not contain this direction.

REPORTABILITY/ANALYSIS

The shutdown of Unit 1 was determined reportable per 10CFR50.73(a)(2)(i)(A) in that the unit was manually shut down due to an inoperable suppression chamber - drywell vacuum breaker, as required by Technical Specification Action 3.6.4.a. The plant was safely shut down and there were no safety consequences or compromise to public health or safety. The investigation concluded that the vacuum breaker would have performed its design function under accident conditions. Following the shutdown, the unplanned automatic actuation of the

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

RPS occurred and was determined reportable per 10CFR50.73(a)(2)(iv) in that the unplanned actuation of the RPS is an automatic actuation of an Engineered Safety Feature (ESF). No control rod movements occurred, and none were required, since all control rods had previously been manually fully inserted into the core. There were no safety consequences or compromise to public health or safety during this incident, nor would there have been if the occurrence took place during any other plant condition since the RPS actuated per design and operated properly.

CORRECTIVE ACTIONS

The mechanically bound solenoid valve was replaced and the vacuum breaker was satisfactorily retested and returned to service. The remaining nine vacuum breaker solenoid valves were also inspected. Problems with two additional solenoid valves were identified. The decision was made to replace all nine solenoid valves as well. An analysis to attempt to determine the failure mechanism of the solenoid valves are planned. The subject operating procedure, GO-100-005, Plant Shutdown From Minimum Power, was revised to provide explicit direction to place the SDV high level trip bypass control switch to the BYPASS position prior to resetting the SCRAM. GO-100-004, Plant Shutdown To Minimum Power, as well as the corresponding procedures for Unit 2, were similarly revised.

ADDITIONAL INFORMATION

The following Licensee Event Reports describe previous similar incidents resulting in plant shutdowns due to vacuum breaker problems:

87-023-00
84-009-00 (Unit 2)

The following Licensee Event Reports describe previous unplanned ESF actuations due to procedural inadequacies:

85-001-02
86-013-00
89-001-00

Failed component identifier: Solenoid Valve, Manufacturer - Circle Seal.

Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215/770-5151

March 6, 1989

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

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 89-006-00
FILE R41-2
PLAS - 354

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

Attached is Licensee Event Report 89-006-00. This event was determined reportable per 10CFR50.73(a)(2)(i)(A) and 10CFR50.73(a)(2)(iv) in that Unit 1 was manually shutdown due to an inoperable suppression chamber drywell vacuum breaker and an unplanned automatic ESF actuation occurred following the shutdown when the Reactor Protection System actuated.

R.G.Byram
Superintendent of Plant - Susquehanna

RRW/mjm

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