NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U7.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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 5

TITLE (4)
Loss Of 4 KV Bus

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 8	0 2	9 6	9 6	0 0 7	0 0	0 9	0 3	9 6		0 5 0 0 0

OPERATING MODE (9): 3
POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR Y: (Check one or more of the following) (11)

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)	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
Cornelius T. Coddington - Sr. Project Engineer, Licensing	AREA CODE 6 1 0 7 7 4 - 7 5 3 1

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

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 August 2, 1996, at 1105, with Unit 1 in Condition 3 (Hot Shutdown) at 0% power, a bus lockout occurred during the replacement of an overcurrent relay in the alternate feeder breaker to a 4 KV Engineered Safeguard System (ESS) bus. Power was lost to Division I Reactor Protection System (RPS) which actuated the Division I primary containment isolation. Per design, the 'A' Emergency Diesel Generator started and did not load to the bus. The Control Room Emergency Outside Air Supply System started per design. The emergency operating procedures were entered due to the loss of ventilation. Off Normal procedures were entered due the loss of the 4 KV ESS bus and the actuation of primary containment isolation. The event was determined to be reportable under 10CFR50.73(a)(2)(iv) in that unplanned Engineered Safety Feature (ESF) actuations occurred when the lockout occurred on the 4 KV ESS bus. Also, Technical Specification 3.0.3 was entered due to the isolation of both loops of Containment Radiation Monitors when power was lost to RPS. Technical Specification 3.0.3 was again entered at 1605 during the transfer from the alternate power supply to the normal power supply on RPS Division I. The entry into Technical Specification 3.0.3 was determined to be reportable under 10CFR50.73(a)(2)(i)(B) in that the isolation of both loops of the Containment Radiation Monitors at the same time is a condition prohibited by Technical Specifications. The alternate feeder breaker to the 4 KV ESS bus was removed from service and the bus was successfully re-energized after it was determined that there was no actual fault present. The relay for the alternate feeder breaker was replaced with a calibrated spare and successfully tested. The specific cause of the bus lockout has not been determined. The most likely cause is a short circuit between the relay 125 VDC control power and the current transformer circuit monitored by the overcurrent relay. The suspect relay will be sent to an independent testing facility for a complete inspection. Additional testing of the relay case and associated wiring and relays will be conducted. While the cause appears to be equipment related, human performance can not be totally ruled out. The corrective actions include evaluating the periodic training of Relay Test Group personnel, evaluating expansion of Quality Control coverage to 4 KV relay work, enhancing relay calibration procedure and evaluating Relay Test Group management, supervisory and physical work practices. During the bus lockout all equipment performed as expected. There were no safety consequences or compromises to public health and safety as result of this event. With respect to the entry into Technical Specification 3.0.3, Technical Specification 3.4.3.1 will be revised to address the isolation of both loops of containment radiation monitors at the same time in order to eliminate the entry into Technical Specification 3.0.3.

EVENT DESCRIPTION

On August 2, 1996, at 1105, with Unit 1 in Condition 3 (Hot Shutdown) at 0% power, a bus lockout occurred during the replacement of an overcurrent relay in the alternate feeder breaker to a 4 KV Engineered Safeguard System (ESS) bus (EIIS Code: EK). The lockout occurred when the technician from the Relay Test Group (utility; non-licensed) returned the 125 VDC (EIIS Code: EJ) control power to the relay. The DC System ground alarm was received in the Control Room at the moment the 4 KV ESS bus lockout occurred. The ground alarm appears to have cleared four (4) seconds later when the Relay Test technician removed the control power from the relay. As a result of the lockout, power was lost to Division I Reactor Protection System (RPS; EIIS Code: JC) which actuated the Division I primary containment isolation (EIIS Code: JM). The 'A' Emergency Diesel Generator (EDG: EIIS Code: EK) started and did not load to the bus per design, given a bus lockout condition. The Control Room Emergency Outside Air Supply System (EIIS Code: VI) started per design. The emergency operating procedures were entered due to the loss of ventilation. Off Normal procedures were entered due the loss of the 4 KV ESS bus and the actuation of primary containment isolation. Also, Technical Specification 3.0.3 was entered due to the isolation of both loops of Containment Radiation Monitors when power was lost to RPS. Technical Specification 3.0.3 was again entered, for the same reason, at 1605 during the transfer from the alternate power supply to the normal power supply on RPS Division I.

CAUSE OF EVENT

The cause of the 4 KV ESS bus lockout could not be conclusively determined. The most likely cause of the bus lockout was a short circuit between the relay 125 VDC control power and the current transformer circuit monitored by the overcurrent relay. This short circuit caused the protective relay to actuate. In addition, while the most likely cause appears to be equipment related, human performance can not be ruled out. Two additional causes that could have possibly resulted in the bus lockout were 1) the lever arm for the Seal-in circuit relay may have been bumped closed, and 2) the protective flag may have been accidentally lowered after the relay was in the trip circuit.

The cause of the entry into Technical Specification 3.0.3 is that Technical Specification 3.4.3.1 does not adequately address the isolation of both loops of Containment Radiation Monitors from the primary containment. Entry into Technical Specification 3.0.3 was therefore necessary since both loops of Containment Radiation Monitors are isolated on a loss of power to the RPS system, per RPS design.

REPORTABILITY/ANALYSIS

The event was determined to be reportable under 10CFR50.73(a)(2)(iv) in that unplanned Engineered Safety Feature (ESF) actuations occurred when the lockout occurred on the 4 KV ESS bus. This event is not safety significant since the systems responded per design. Also, the loss of one 4 KV ESS bus has been analyzed as part of the design of the plant. There was no safety consequence or compromise to the public health or safety as a result of these unplanned ESF actuations.

The event of isolating of both loops of Containment Radiation Monitors from the primary containment was determined to be reportable per 10CFR50.73(a)(2)(i)(B), in that entry into LCO 3.0.3 constitutes a condition prohibited by the Technical Specifications when both loops of the Containment Radiation Monitors were isolated from the drywell at the same time. Technical Specification 3.4.3.1 requires that one loop of Containment Radiation Monitors (one gaseous channel and one particulate channel) be operable and aligned to the drywell during Operating Conditions 1, 2 and 3.

The isolation of both loops of Containment Radiation Monitors does not affect the ability of the plant to shutdown safely, and the health and safety of the public were never challenged. Other leak detection systems were operable when both Containment Radiation Monitors loops were isolated; therefore, a leak into the drywell would have been detected. The plant response to a postulated transient was not changed as a result of this event.

In accordance with the guidance provided in NUREG 1022 Supplement 1 item 14.1 and 10 CFR 50.4(d), the required submission date for this report was determined to be September 3, 1996.

CORRECTIVE ACTIONS

The following corrective actions were identified and completed:

- The overcurrent relay was replaced with a new relay which was successfully tested.
- The 4 KV ESS bus alternate supply breaker was successfully tested for operability.
- All protective relay calibrations were stopped until the results of the investigation of this event were available.

The following corrective actions for the most likely cause of the bus lockout were identified:

- Functionally test the suspect relay.
- Further testing of the subject relay case, bus wiring and relays will be conducted.
- Institute appropriate administrative controls to limit work activities on the subject relay, relay case, and wiring until the additional testing is completed.
- Identify those critical relays that can trip a 4 KV or 13.8 KV bus and potentially result in the loss of an operating Unit.
- Evaluate testing the critical relays with the Unit off-line or with the protected equipment out of service.

The following corrective action have been identified for the less likely causes of the bus lockout:

- Evaluate expanding Quality Control coverage to 4 KV relay work.
- Enhance the maintenance procedure on relay calibration to minimize the possibility of bumping the Seal-in circuit contacts.
- Counsel Relay Test Group technician regarding checking all relay contacts.
- Evaluate Relay Test Group management, supervisory and physical work practices with respect to establishing Plant Maintenance standards.
- Periodically evaluate worker task proficiency in accordance with Nuclear Training Procedures.

ADDITIONAL INFORMATION

Past Similar Events: For the 4 KV ESS bus lockout event:

Docket No. 50-388 LER 92-001-00
Docket No. 50-387 LER 93-011-00

For the entry into Technical Specification 3.0.3 event:

Docket No. 50-387 LER 95-010-00
LER 95-012-00
LER 96-003-00
LER 96-005-00

Failed Component: None