NRC FORM 366 (6-89) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED OMB NO. 3150-0104 EXPIRES: 4/30/92

LICENSEE EVENT REPORT (LER)

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.

FACILITY NAME (1)	DOCKET NUMBER(2)	PAGE (3)
Susquehanna Steam Electric Station - Unit 2	0 5 0 0 0 3 8 8	1 OF 0 4

TITLE (4)
Reactor Scram Following Turbine Trip on Load Reject

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 4	1 5	9 5	9 5	0 0 5	0 0	0 5	1 5	9 5		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	1 0 0

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

	20.402(b)		20.405(c)	X	50.73(a)(2)(iv)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)
	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(1)(2)(viii)(B)
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)

	73.71(b)
	73.71(c)
	OTHER (Specify in Abstract below and in Text, NRC Form 366A)

(LICENSEE CONTACT FOR THIS LER (12))

NAME	TELEPHONE NUMBER
Robert D. Kichline - Project Licensing Specialist	AREA CODE 7 1 7 5 4 2 - 3 2 8 9

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	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)

At 0907 hours on April 15, 1995, with Unit 2 operating at 100% power, while isolating the unit output from the South Bus in the Susquehanna 500 kV Switchyard for scheduled maintenance, a reactor scram occurred, per design, when a generator load reject was received. All major equipment operated per design during the transient, Emergency Core Cooling Systems (ECCS) were not challenged and no abnormal operator actions were required to place the unit in a stable condition. The reactor scram was caused by a turbine control valve fast closure that resulted from a generator load rejection. The generator load rejection was caused by an incorrectly configured auxiliary cam switch in a 500 kV Switchyard motor operated disconnect. The mispositioned auxiliary cam switch initiated the open breaker flashover protection scheme that cleared the North Bus at the Susquehanna 500 kV Switchyard and tripped the Unit 2 generator lockout relays. The cause of the incorrectly configured auxiliary cam switch has been attributed to insufficient control and planning of work details during maintenance. This event was determined to be reportable per 10CFR50.73(a)(2)(iv) in that an unplanned ESF actuation occurred when the RPS initiated an automatic reactor scram following turbine control valve fast closure with power greater than 24%. The plant was safely shutdown and there were no safety consequences or compromise to public health or safety during this incident, nor would there have been under different initial operating conditions. This transient is within the bounds of a generator full load rejection transient as analyzed in Chapter 15 of the FSAR. The incorrectly configured auxiliary cam switch has been properly adjusted.

DESCRIPTION OF EVENT

At 0907 hours on April 15, 1995, with Unit 2 operating at 100% power, while isolating the unit output from the South Bus in the Susquehanna 500 kV Switchyard (EIIS Code: FK) for scheduled maintenance, a Reactor Protection System (EIIS Code: JC) actuation occurred when a main generator (EIIS Code: TB) load rejection was received. Per design, the turbine control valves closed and an automatic reactor scram occurred. Both Reactor Recirculation (EIIS Code: AD) pumps tripped per design via the EOC-RPT logic circuitry. All control rods inserted fully. Four Safety Relief Valves (EIIS Code: SB) automatically lifted momentarily to control reactor pressure and properly reseated. The immediate operator actions for reactor scram and reactor pressure control were performed. Reactor water level reached + 4.5 inches before recovering. One of three Feedwater Heater (EIIS Code: SN) strings isolated. All major equipment operated per design during the transient, Emergency Core Cooling Systems (ECCS) were not challenged, and no abnormal operator actions were required to place the unit in a stable condition.

During restart of the 'B' Reactor Recirculation pump, several unexpected containment isolation valve isolations occurred when two instrument AC (EIIS Code: EF) panels de-energized due to an AC voltage dip and lack of UPS battery backup upon pump start. The isolations were per design as a result of the loss of instrument power. Power was restored to the instrument AC panels and all isolations were reset in accordance with operating procedures.

CAUSE OF EVENT

The normal Susquehanna 500 kV Switchyard alignment has the Unit 2 Main Generator connected to the power grid via both the North bus and the South bus of the 500 kV Switchyard. At 09:07 hours on April 15, 1995, the 500 kV circuit breaker connecting the Unit 2 Generator to the 500 kV South bus was opened in order to perform preplanned maintenance work. As such, the Unit 2 Generator full load was to be directed solely through the North bus 500 kV circuit breaker. Upon opening of the South bus 500 kV circuit breaker, the open breaker flashover protection scheme initiated and cleared the North Bus at the Susquehanna 500 kV Switchyard. This resulted in a main generator load rejection signal that caused the actuation of the Reactor Protection System after a main turbine trip and scrammed the unit. The cause the initiation of the open breaker flashover protection scheme was an incorrectly configured auxiliary cam switch. The incorrectly configured auxiliary cam switch has been attributed to insufficient control and planning of work details during maintenance.

The containment isolations which occurred upon restart of the "B" Reactor Recirculation pump were attributed to the momentary loss of an uninterruptible power supply (UPS;EIIS:EF) which supplied Instrument AC Panels 2Y218 and 2Y219. The UPS is designed with three sources, Preferred AC, Battery Backup and Alternate AC. Normal alignment provides preferred AC to charge the battery, power the inverter and ultimately power the Instrument AC loads. In the event of a momentary or sustained loss of preferred AC power the connected Instrument AC loads will continue to be supplied through the inverter from the battery. Finally, in the event inverter output is lost, a Solid State Static Switch will direct

the Alternate AC power to the loads. At the time of start of the "B" Reactor Recirculation pump one of the two off-site supply transformers was out of service for preplanned maintenance. In this electrical configuration both the preferred and alternate AC supplies were subjected to a momentary voltage dip associated with the "B" Reactor Recirculation pump start. Since the batteries associated with the UPS were known to be degraded and had been scheduled for replacement prior to this event, the actions of the UPS in response to this momentary loss of Preferred and Alternate AC led to the loss of the two instrument AC panels.

REPORTABILITY/ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(iv) in that an unplanned ESF actuation occurred when the RPS initiated an automatic reactor scram following turbine control valve fast closure with power greater than 24%. The plant was safely shutdown and there were no safety consequences or compromise to public health or safety during this incident, nor would there have been under different initial operating conditions. This transient is within the bounds of a generator full load reject transient as analyzed in Chapter 15 of the FSAR.

In accordance with the guidance provided in NUREG 1022 Supplement 1 item 14.1, the required submission date for this report was determined to be May 15, 1995.

CORRECTIVE ACTION

The auxiliary cam switch has been properly adjusted and functionally tested to verify that it was correctly configured for the closed position of the motor operated disconnect.

The configuration of the other auxiliary cam switches on the 500 kV motor operated disconnects was independently verified. No other incorrect configurations of the auxiliary cam switch were found.

The configuration of the auxiliary cam switches for the Unit 1 ganged operated disconnects was verified. No incorrect configurations were found.

A maintenance procedure to index motor operated disconnect cam switches is being developed.

Cam duration diagrams for all motor operated switches at Susquehanna SES related substations are being developed.

The need and purpose of the Open Breaker Flashover logic and possible alternatives to the present overcurrent fault detector are being evaluated.

The batteries in the subject UPS panel have been replaced. The replacement of these batteries will insure proper transfer of the UPS from normal source to Battery Backup, thereby precluding the unexpected containment isolations which occurred in this event.

ADDITIONAL INFORMATION

Failed Component Identification: Not Applicable

Previous Similar Events with similar results:

Docket No. 50-388 LER 85-025 - Generator load reject, reactor scram. Lightning strike on 500 kV line caused logic relay failure.

Docket No. 50-387 LER 84-034 - Generator load reject, reactor scram. Phase-to-phase fault on 230 kV line (tree contact).

Docket No. 50-387 LER 88-006 - Generator load reject, reactor scram. Worker bumped 230 kV yard span protection relay.

Docket No. 50-387 LER 88-010 - Generator load reject, reactor scram. Apparent lightning strike on 500 kV line caused misoperation of ground fault relay.

Docket No. 50-387 LER 89-027 - Generator load reject, reactor scram. Loss of electrical services to the 230 kV switchyard caused tripping of main distribution breakers resulting in the generator load reject.

Docket No. 50-388 LER 90-002 - Generator load reject, reactor scram. Actuation of protective circuitry caused tripping of the main distribution breakers resulting in the generation load rejection.