CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9704160383 DOC.DATE: 97/04/09 NOTARIZED: NO DOCKET #
FACIL:50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-002-01:on 970220,isolation of both loops of containment radiation monitoring occurred.Caused by aging component on RPS voltage regulator control card.Replaced cards.W/970409 ltr.

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April 9, 1997

U.S. Nuclear Regulatory Commission
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SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-388/97-002-01
PLAS - 704 FILE R41-2

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

Attached is Licensee Event Report 50-388/97-002-01, which is a supplemental report to Licensee Event Report 50-388/97-002-00. The events were determined to be reportable per 10CFR50.73(a)(2)(iv) in that Susquehanna SES experienced two unplanned Engineered Safety Feature (ESF) actuations, each following a trip of the Reactor Protection System (RPS). It is also reportable per 10CFR50.73(a)(2)(i)(B) in that both loops of containment radiation monitors isolated from the drywell requiring entries into Technical Specification Limiting Condition of Operation (LCO) 3.0.3 following each RPS trip and again during restoration from the events. Entry into LCO 3.0.3 represents a condition prohibited by the Technical Specifications.

G. J. Kuczynski
General Manager - Susquehanna SES

Attachment

cc: Mr. H. J. Miller
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IE22

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PDR ADOCK 05000388
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NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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.

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 5

TITLE (4)
Isolation of Both Loops of Containment Radiation Monitoring

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 2	2 0	9 7	9 7	— 0 0 2	— 0 1	0 4	0 9	9 7		0 5 0 0 0
										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)	0 9 4	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
Stephen J. Ellis - Project Engineer, Licensing	AREA CODE 7 1 7 5 4 2 - 3 5 3 7

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
X	J C	E C B D	G 0 8 2						

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)

This is a supplemental report to Licensee Event Report 50-388/97-002-00. At 0347 hours on February 20, 1997, with Unit 2 in Condition 1 (Power Operation) at 94% power, and at 0330 hours on March 11, 1997, with Unit 2 in Condition 1 (Power Operation) at 88% power, the control room received half scrams on Division I and Division II, respectively. The half scrams resulted from trips of the Reactor Protection System (RPS), which resulted in unplanned Engineered Safety Feature (ESF) actuations, including containment isolations. Isolation of both Containment Radiation Monitors (CRM) during each event and during restoration required entries into Technical Specification 3.0.3, constituting conditions prohibited by the Technical Specifications. The equipment response to the RPS trip was as expected. The conclusion of the investigation of both events is that the RPS trip was caused by an aging component on the RPS voltage regulator control card. The cards were replaced. Corrective actions include replacement of all subject cards on both Susquehanna units; failure analysis of the failed cards; evaluation of preventative maintenance activities and upgrades/enhancements of the RPS motor-generator sets; and an amendment to the Technical Specifications with respect to the Containment Radiation Monitors.

EVENT DESCRIPTION

At 0347 hours on February 20, 1997, with Unit 2 in Condition 1 (Power Operation) at 94%, the control room received a Division I half SCRAM. The half SCRAM resulted in Reactor Water Cleanup (RWCU) isolation, isolation of both Containment Radiation Monitors (CRMs), Reactor Building Ventilation Zone isolations on Division I, and subsequent Standby Gas Treatment and Control Room Emergency Outside Air System initiations. The half SCRAM on Division I was due to the trip of the Electronic Protective Assemble (EPA) breakers of the Reactor Protection System (RPS) (EIIS Code: JC). The RPS trip occurred as a result of a voltage fluctuation on the output of the RPS Motor-Generator (M-G) set, which is its normal power supply. Technical Specification 3.0.3 was entered when both CRMs (EIIS Code: IL) isolated. The RPS bus was manually transferred to its alternate power supply and system restoration commenced.

At 1640 hours on February 22, 1997, with Unit 2 in Condition 1 (Power Operation) at 93% power, Technical Specification 3.0.3 was again entered when both CRMs were removed from service at the same time during a planned transfer of the RPS system from its alternate power supply to its normal power supply. This action was a result of the event described above, and was required to restore the unit to its normal (preferred) alignment.

At 0330 hours on March 11, 1997, with Unit 2 in Condition 1 (Power Operation) at 88% power, the control room received indication of a half SCRAM on Division II. The half SCRAM resulted from a trip of the RPS which also caused a Division II isolation signal to be generated. The following Engineered Safety Feature (ESF) actuations occurred: Reactor Water Cleanup isolated, Reactor Building Ventilation Zones isolated, and Standby Gas Treatment and Control Room Emergency Outside Air Systems were initiated. Also, both channels of CRMs isolated, requiring entry into Technical Specification 3.0.3, which constitutes a condition prohibited by Technical Specifications. RPS was re-powered from its alternate source and the plant equipment was restored in accordance with operation procedures.

On March 14,1997, with Unit 2 in Condition 1 (Power Operation) at 87% power, Technical Specification 3.0.3 was again entered when both CRMs were removed from service in preparation for RPS transfer from the alternate to the normal power supply following repair of the RPS M-G set. The Division II M-G set was aligned only for a short time when voltage oscillations were observed, and RPS was returned to its alternate supply. (Division II remained on its alternate power supply until the start of the Unit 2 Outage on March 15, 1997. At that point, both CRMs are not required to be operable, so there is no subsequent Technical Specification 3.0.3 entry.)

The design of RPS requires a manual transfer between the normal and alternate supplies in a break-before-make sequence. The de-energization of the RPS bus causes the system to actuate. The design of the isolation feature for the CRMs is that for an actuation of either Division of RPS, both loops of the CRM will isolate. The CRMs are used for detection of leakage in the primary containment during normal operation and are not required post-accident. In the events described above, all expected isolations and initiations occurred.

CAUSE OF EVENT

The conclusion of the investigation of the events of February 20, 1997 and March 11, 1997 is that the loss of RPS was caused by an aging component on the voltage regulator control card associated with the RPS M-G set output voltage. The voltage regulator circuit boards were replaced. These are the first failures of the RPS M-G Set Voltage Regulators in the plant history, but because the age of the two components were similar and both failures appear to be age related, these are being considered as a potentially common mode failure. The suspect voltage regulators have been sent to the manufacturer (GE) to determine the failure mechanism. Operability of the Unit 1 RPS M-G set voltage regulators have been reviewed. The Unit 1 regulators are not as old as those on Unit 2, and are located in a milder temperature environment. Both of the Unit 1 regulators will be replaced before they approach the in-service time of that of the Unit 2 regulator.

Technical Specification 3.4.3.1 does not adequately address isolation of both loops of CRMs from the containment. Entry into Technical Specification 3.0.3 was therefore necessary since both loops of CRMs were isolated from the containment following the RPS trip and during the planned transfer of each RPS bus from its alternate to its normal power supply during restoration.

REPORTABILITY/ANALYSIS

This event was determined to be reportable per 10CFR50.73(a)(2)(iv) in that Susquehanna SES Unit 2 experienced the following ESF actuations as a result of the RPS trips: Isolation of RWCU, initiation of Standby Gas Treatment, and an initiation of the Control Room Emergency Outside Air System. The isolations and initiations received in each case were as expected with regard to a RPS trip.

Additionally, the event was determined to be reportable per 10CFR50.73(a)(2)(i)(B), in that Susquehanna SES Unit 2 was in a condition prohibited by the Technical Specifications when both loops of the Containment Radiation Monitors were isolated from the drywell at the same time, requiring entry into LCO 3.0.3, both following the RPS trip and during the RPS restoration back to the Normal Power Supply.

Technical Specification 3.4.3.1 requires that one loop of CRMs (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 CRMs did not affect the ability of the plant to shutdown safely, nor was the health and safety of the public challenged. Other leak detection systems were operable when both CRM loops were isolated; therefore, a leak in the drywell would have been detected. The plant response to a postulated transient was not changed as a result of these events and the plant responded as expected.

In accordance with the guidelines provided in NUREG-1022, Supplement 1, Item 14.1, the required submission date for this report was determined to be March 24, 1997, and the date for the supplement was determined to be April 9, 1997.

CORRECTIVE ACTIONS

The following corrective actions have been taken:

- RPS power was restored following the initiating events by transferring to the alternate power supply.
- The failed voltage regulator circuit cards were replaced.
- Plant systems were restored in accordance with operating procedures.
- A Technical Specification Change Request has been submitted to the NRC to address the isolation of both loops of CRMs and revise the Technical Specification Limiting Condition for Operation Action Statement to allow both CRMs to be out of service for some amount of time.

The following actions to prevent recurrence are being taken:

- All four voltage regulator cards on both Susquehanna SES units will be replaced (one voltage regulator replaced to date).
- Incorporate results of failure analysis of the failed voltage regulators into long range planning.
- Evaluate enhancement of the preventative maintenance program for the RPS M-G sets based on system performance, and implement enhancements as required.

- Evaluate/recommend the need to upgrade/enhance the RPS M-G sets using the results of the component failure analysis, SSES history, and industrial experience as a basis.

ADDITIONAL INFORMATION

Past Similar Events: Docket No. 50-387 LER 95-010-00
LER 95-012-00
LER 96-003-00
LER 96-005-00
Docket No. 50-388 LER 96-006-00

Failed Component: Voltage Regulator Circuit Card on the Output of the 'A' and 'B' RPS Motor-Generator Sets.