PRECURSOR DESCRIPTION AND ANALYSIS

LER No.: 373/85-017
Event Description: LOFW and RCIC Trip
Date of Event: February 8, 1985
Plant: LaSalle 1

EVENT DESCRIPTION

Sequence

At 1018 h with Unit 1 at 75% power, the reactor scrammed on low reactor vessel level.

An operator error during maintenance on an instrument valve caused a low feedwater pump suction pressure signal that tripped the 1A and 1B turbine-driven reactor feedwater (TDRFP) pumps. An unsuccessful attempt was made to restart the 1A TDRFP. The motor-driven feed pump was out of service for maintenance. When vessel level reached ~12.5 in., the reactor scrammed (10:18:45), and the recirculation pumps shifted to low speed. When the vessel level reached about -50 in. (10:18:48), the HPCs system initiated, the recirculation pumps tripped as required, and the No. 3 DG started. The RCIC system also initiated but tripped because of overspeed.

The MSIVs closed, and other isolations occurred. ADS valve E opened twice to relieve vessel pressure at 1125 psig. Its nominal set point was 1175 psig. Vessel level dropped to approximately -60 in. before it was restored to normal. RCIC was reset and restarted at 10:21:29.

Corrective Action

The primary cause of the unit scram was placing a jumper in the feedwater pump NPSH trip circuit that did not serve its intended function. The jumper was installed utilizing a revision of the print that did not reflect the present system configuration. The circuit had been modified (Mod No. 1-1-82-293), during the September 1984 outage, and the drawing change request had not yet been processed.

Plant/Event Data

Systems Involved:
MFW, recirculation pumps, RCIC, MSIVs and ADS, HPCS

Components and Failure Modes Involved:
MFW — instrument maintenance error caused trips of MFW pumps
ADS valve — opened twice at incorrect pressure
RCIC — failed on demand

Event Identifier: 373/85-017

Component Unavailability Duration: NA
Plant Operating Mode: 1 (75% power)
Discovery Method: Operational event
Reactor Age: 3.2 years
Plant Type: BWR

Comments

None

MODELING CONSIDERATIONS AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Transient	1.0	Nonrecoverable

Branches Impacted and Branch Nonrecovery Estimate

PCS	1.0	No recovery of PCS under given circumstances
RCIC	0.12	Manual recovery from control room
Feedwater	0.34	Possible but difficult MFW recovery locally at pumps

Plant Models Utilized

BWR plant Class C

Event Identifier: 373/85-017

CONDITIONAL CORE DAMAGE CALCULATIONS

LER Number: 373/85-017
Event Description: LOFW and RCIC Trip
Event Date: 2/8/85
Plant: LaSalle 1

INITIATING EVENT

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

TRANS	1.000E+00

SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CV	
TRANS	1.305E-07
Total	1.305E-07
CD	
TRANS	5.325E-05
Total	5.325E-05
ATWS	
TRANS	2.034E-05
Total	2.034E-05

DOMINANT SEQUENCES

End State: CV Conditional Probability: 6.510E-08

134 TRANS SCRAM -SLC.OR.RODS PCS/TRANS -SRV.CLOSE FW/PCS.TRANS HPCI RCIC/TRANS.OR.LOOP -SRV.ADS -COND/FW.PCS -RHR(SDC)

End State: CD Conditional Probability: 3.098E-05

101 TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM -SRV.CLOSE -FW/PCS.TRANS RHR(SDC) RHR(SPCOOL)/-LPCI.RHR(SDC) C.I.AND.V/RHR(SDC).RHR(SPCOOL)

End State: ATWS Conditional Probability: 2.034E-05

Event Identifier: 373/85-017

173 TRANS SCRAM SLC.OR.RODS

SEQUENCE CONDITIONAL PROBABILITIES

	Sequence	End State	Seq. Prob	Non-Recov**
101	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM -SRV.CLOSE -FW /PCS.TRANS RHR(SDC) RHR(SPCOOL)/-LPCI.RHR(SDC) C.I.AND. V/RHR(SDC).RHR(SPCOOL)	CD	3.098E-05 *	7.630E-02
102	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM -SRV.CLOSE FW /PCS.TRANS -HPCI RHR(SDC) RHR(SPCOOL)/-LPCI.RHR(SDC) C. I.AND.V/RHR(SDC).RHR(SPCOOL)	CD	1.585E-05	3.913E-02
111	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM SRV.CLOSE -FW /PCS.LOCA RHR(SDC) RHR(SPCOOL)/-LPCI.RHR(SDC) C.I.AND.V /RHR(SDC).RHR(SPCOOL)	CD	1.167E-06	7.630E-02
119	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM SRV.CLOSE FW /PCS.LOCA HPCI RCIC/LOCA SRV.ADS	CD	3.895E-06	1.936E-02
134	TRANS SCRAM -SLC.OR.RODS PCS/TRANS -SRV.CLOSE FW/PCS.TRANS HPCI RCIC/TRANS.OR.LOOP -SRV.ADS -COND/FW.PCS -RHR(SDC)	CV	6.510E-08 *	8.398E-03
138	TRANS SCRAM -SLC.OR.RODS PCS/TRANS -SRV.CLOSE FW/PCS.TRANS HPCI RCIC/TRANS.OR.LOOP -SRV.ADS COND/FW.PCS -LPCS -RHR(SDC)	CV	3.331E-08	4.306E-03
155	TRANS SCRAM -SLC.OR.RODS PCS/TRANS SRV.CLOSE FW/PCS.LOCA HPCI RCIC/LOCA -SRV.ADS -COND/FW.PCS -RHR(SDC)	CV	2.043E-08	6.998E-02
159	TRANS SCRAM -SLC.OR.RODS PCS/TRANS SRV.CLOSE FW/PCS.LOCA HPCI RCIC/LOCA -SRV.ADS COND/FW.PCS -LPCS -RHR(SDC)	CV	1.046E-08	3.589E-02
173	TRANS SCRAM SLC.OR.RODS	ATWS	2.034E-05 *	2.181E-01

* dominant sequence for end state
** non-recovery credit for edited case

Note:

Conditional probability values are differential values which reflect the added risk due to observed failures. Parenthetical values indicate a reduction in risk compared to a similar period without the existing failures.

MODEL: b:bwrctree.cmp
DATA: b:laslprob.cmp

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
TRANS	1.142E-03	1.000E+00	
LOOP	1.305E-05	3.400E-01	
LOCA	3.250E-06	3.400E-01	
SCRAM	4.100E-04	1.000E+00	

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SLC.OR.RODS	1.000E-02	1.000E+00	4.000E-02
PCS/TRANS	1.700E-01 > 1.000E+00	1.000E+00	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	1.700E-01 > Failed		
PCS/LOCA	1.000E+00	1.000E+00	
SRV.CHALL/TRANS.-SCRAM	1.000E+00	1.000E+00	
SRV.CHALL/TRANS.SCRAM	1.000E+00	1.000E+00	
SRV.CHALL/LOOP.-SCRAM	1.000E+00	1.000E+00	
SRV.CHALL/LOOP.SCRAM	1.000E+00	1.000E+00	
SRV.CLOSE	3.630E-02	1.000E+00	
EMERG.POWER	2.850E-03	5.100E-01	
FW/PCS.TRANS	4.600E-01 > 1.000E+00	3.400E-01	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	4.600E-01 > Failed		
FW/PCS.LOCA	1.000E+00	3.400E-01	
HPCI	2.000E-02	3.400E-01	
RCIC/TRANS.OR.LOOP	6.700E-02 > 1.000E+00	5.700E-01 > 1.200E-01	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	6.700E-02 > Failed		
RCIC/LOCA	1.000E+00	1.000E+00	
CRD	1.000E-02	1.000E+00	4.000E-02
SRV.ADS	6.700E-03	1.000E+00	4.000E-02
COND/FW.PCS	1.000E+00	3.400E-01	
LPCS	2.000E-02	3.400E-01	
LPCI(RHR)/LPCS	6.000E-04	3.400E-01	
RHRSW/LPCS.LPCI.TRANS	1.000E+00	1.000E+00	
RHRSW/LPCS.LPCI.LOOP	1.000E+00	1.000E+00	
RHRSW/LPCS.LPCI.LOCA	1.000E+00	1.000E+00	
RHR(SDC)	2.108E-02	3.400E-01	
RHR(SDC)/-LPCI	2.000E-02	3.400E-01	
RHR(SDC)/LPCI	1.000E+00	1.000E+00	
RHR(SPCOOL)/-LPCI.RHR(SDC)	2.000E-02	1.000E+00	
RHR(SPCOOL)/LPCI.RHR(SDC)	5.200E-01	1.000E+00	
C.I.AND.V/RHR(SDC).RHR(SPCOOL)	1.000E+00	3.400E-01	

*** forced

Austin
08-13-1986
06:34:54

Event Identifier: 373/85-017