

PRECURSOR DESCRIPTION SHEET

LER No.: 373/84-054, -056, -060, -062
Event Description: Scram, RCIC Failures, and RHR Unavailability Within
+15 d
Date of Event: September 21, 29, and 30, 1984
Plant: LaSalle 1

EVENT DESCRIPTION

Sequence

While the reactor was at 23% power on September 21, 1984, operator error caused a reactor scram and MSIV closure. This caused a Group I isolation during the performance of an MSIV isolation calibration and functional test. Later, on the same day, RCIC was found failed during a test; again on September 29, RCIC isolated on high steam flow when an attempt was made to open the RCIC outboard isolation valve. On September 30, with the unit in hot shutdown, the RHR inboard suction isolation valve failed to open on demand, rendering RHR unavailable for almost 9 h. Due to the nature of the events, RCIC and RHR may have been unavailable simultaneously with the scram.

Corrective Action

Following the September 21 trip, a warning sign was posted to prevent bumping of the instrument rack that caused the trip. The first RCIC failure was corrected by flushing the RCIC oil system and replacing clogged oil filters. The second RCIC failure only required resetting of the outboard isolation valve. The RHR suction valve inoperability was investigated, and a training procedure for declutching motor operators was issued.

Plant/Event Data

Systems Involved:

RCIC, RHR

Components and Failure Modes Involved:

RCIC pump — isolated during test

RCIC pump — tripped during test

RHR suction valve — failed on demand

Event Identifier: 373/84-054

Component Unavailability Duration: NA
Plant Operating Mode: 24%, 1%, 23%, and 0%
Discovery Method: See sequence description
Reactor Age: 2.2 years
Plant Type: BWR

Comments

None

MODELING CONSIDERATIONS AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Transient	1.0	Nonrecoverable
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Branches Impacted and Branch Nonrecovery Estimate

RCIC	1.0	Nonrecoverable in required time; pump-governor oil system required flushing
RHR (SDC)	0.34	Recovered within 9 h, SDC is not required in the short term
PCS	1.0	Unavailable due to MSIV closure
MFW	1.0	Unavailable due to MSIV closure; considered nonrecoverable

Plant Models Utilized

BWR plant Class C

Event Identifier: 373/84-054

CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

Event Identifier: 373/84-054

Event Description: Scram with RCIC Failure and RHR Unavailability (+/-15 days)

Event Date: 9/21/84

Plant: LaSalle 1

INITIATING EVENT

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

TRANS	1.0E+00
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SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CV	
TRANS	2.4E-06
Total	2.4E-06
CD	
TRANS	2.3E-03
Total	2.3E-03
ATWS	
TRANS	2.0E-05
Total	2.0E-05

DOMINANT SEQUENCES

End State: CV	Conditional Probability: 1.0E-06
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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: 2.2E-03
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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)

Event Identifier: 373/84-054

End State: ATWS

Conditional Probability: 2.0E-05

173 TRANS SCRAM SLC.OR.RODS

SEQUENCE CONDITIONAL PROBABILITIES

	Sequence	End State	Prob	N Rec**
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	2.2E-03 *	1.2E-01
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	9.2E-05	7.6E-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	1.0E-06 *	1.5E-01
135	TRANS SCRAM -SLC.OR.RODS PCS/TRANS -SRV.CLOSE FW/PCS.TRANS HPCI RCIC/TRANS.OR.LOOP -SRV.ADS -COND/FW.PCS RHR(SDC) - RHR(SPCOOL)/-LPCI.RHR(SDC)	CV	5.2E-07	7.6E-02
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	5.3E-07	7.6E-02
139	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) -RHR(SPCOOL)/-LPCI.RHR(SDC)	CV	2.7E-07	3.9E-02
173	TRANS SCRAM SLC.OR.RODS	ATWS	2.0E-05 *	1.0E+00

* dominant sequence for end state

** non-recovery credit for edited case

MODEL: b:\bwrctree.cmp

DATA: b:\laslprob.cmp

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
TRANS	1.1E-03	1.0E+00	
LOOP	1.3E-05	3.4E-01	
LOCA	3.3E-06	3.4E-01	
SCRAM	4.1E-04	1.0E+00	
SLC.OR.RODS	1.0E-02	1.0E+00	4.0E-02
PCS/TRANS	1.7E-01 > 1.0E+00	1.0E+00	
Branch Model: 1.0F.1			
Train 1 Cond Prob: 1.7E-01 > Failed			
PCS/LOCA	1.0E+00	1.0E+00	
SRV.CHALL/TRANS.-SCRAM	1.0E+00	1.0E+00	

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SRV.CHALL/TRANS.SCRAM	1.0E+00	1.0E+00	
SRV.CHALL/LOOP.-SCRAM	1.0E+00	1.0E+00	
SRV.CHALL/LOOP.SCRAM	1.0E+00	1.0E+00	
SRV.CLOSE	6.0E-02	1.0E+00	
EMERG.POWER	2.9E-03	5.1E-01	
FW/PCS.TRANS	4.6E-01 > 1.0E+00	3.4E-01 > 1.0E+00	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	4.6E-01 > Failed		
FW/PCS.LOCA	1.0E+00	3.4E-01	
HPCI	2.0E-02	3.4E-01	
RCIC/TRANS.OR.LOOP	6.7E-02 > 1.0E+00	5.7E-01 > 1.0E+00	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	6.7E-02 > Failed		
RCIC/LOCA	1.0E+00	1.0E+00	
CRD	1.0E-02	1.0E+00	4.0E-02
SRV.ADS	6.7E-03	1.0E+00	4.0E-02
COND/FW.PCS	1.0E+00	3.4E-01	
LPCS	2.0E-02	3.4E-01	
LPCI(RHR)/LPCS	6.0E-04	3.4E-01	
RHRSW/LPCS.LPCI.TRANS	1.0E+00	1.0E+00	
RHRSW/LPCS.LPCI.LOOP	1.0E+00	1.0E+00	
RHRSW/LPCS.LPCI.LOCA	1.0E+00	1.0E+00	
RHR(SDC)	2.1E-02 > 1.0E+00	3.4E-01	
Branch Model: 1.OF.2+ser			
Train 1 Cond Prob:	1.1E-02 > Failed		
Train 2 Cond Prob:	1.0E-01 > Failed		
Serial Component Prob:	2.0E-02		
RHR(SDC)/-LPCI	2.0E-02	3.4E-01	
RHR(SDC)/LPCI	1.0E+00	1.0E+00	
RHR(SPCOOL)/-LPCI.RHR(SDC)	2.0E-02	1.0E+00	
RHR(SPCOOL)/LPCI.RHR(SDC)	5.2E-01	1.0E+00	
C.I.AND.V/RHR(SDC).RHR(SPCOOL)	1.0E+00	3.4E-01	

*** forced

Minarick
04-12-1987
11:14:55

Event Identifier: 373/84-054