

PRECURSOR DESCRIPTION SHEET

LER No.: 250/86-038
Event Description: System is unavailable AFW
Date of Event: December 4, 1986
Plant: Turkey Points 3 and 4

EVENT DESCRIPTION

Sequence

During routine testing, AFW pump B of AFW train 2 unexpectedly tripped off on an overspeed trip (the set point had drifted). Because the station AFW consists of three turbine-driven pumps (pumps B and C on train 2 and pump A on train 1), pump C was placed in service. Personnel then discovered pump C's steam supply valve (MOV-3-1403) failed to open. Train A was available but could not service both Units 3 and 4.

After trains B and C were restored to service, unit 4 AFW motor valves were inspected. The alignment of the valves rendered one train inoperable.

Corrective Action

The AFW pump B trip set point was adjusted. The valve MOV-3-1403 motor was replaced.

Plant/Event Data

Systems Involved:
AFW

Components and Failure Modes Involved:
Train B — failed in testing
Train A — failed in testing

Component Unavailability Duration: 360 h
Plant Operating Mode: 1 (100% power)
Discovery Method: Testing
Reactor Age: 14.2 (Unit 3) and 13.5 years (Unit 4), respectively
Plant Type: PWR

Comments

Both units were affected by this event; however, this unavailability is a problem only if both MFW systems fail simultaneously, as in a station LOOP event. In a LOOP only one unit could be provided with sufficient AFW.

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MODELING CONSIDERATIONS AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Postulated LOOP

Base case nonrecovery

Branches Impacted and Branch Nonrecovery Estimate

AFW

1.0

Recovery impossible without repair and
local troubleshooting

Plant Models Utilized

PWR plant Class E

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CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

Event Identifier: 250/86-038
 Event Description: Unavailability of Auxiliary Feedwater
 Event Date: 12/4/86
 Plant: Turkey Point 3

UNAVAILABILITY, DURATION= 360

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

LOOP	6.5E-04
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SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CV	
LOOP	(7.9E-09)
Total	(7.9E-09)
CD	
LOOP	5.8E-05
Total	5.8E-05
ATWS	
LOOP	0.0E+00
Total	0.0E+00

DOMINANT SEQUENCES

End State: CD	Conditional Probability: 2.6E-05
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214 LOOP -RT/LOOP -EMERG.POWER AFW HPI(F/B)

SEQUENCE CONDITIONAL PROBABILITIES

Sequence	End State	Prob	N Rec**
212 LOOP -RT/LOOP -EMERG.POWER AFW -HPI(F/B) -HPR/-HPI PORV.OPEN	CD	5.9E-06	3.9E-01
213 LOOP -RT/LOOP -EMERG.POWER AFW -HPI(F/B) HPR/-HPI	CD	2.5E-05	3.9E-01

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214	LOOP -RT/LOOP -EMERG.POWER	AFW HPI(F/B)	CD	2.6E-05 *	3.3E-01
218	LOOP -RT/LOOP	EMERG.POWER AFW/EMERG.POWER	CD	1.5E-06	3.1E-01

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

Note: For unavailabilities, conditional probability values are differential values which reflect the added risk due to failures associated with an event. Parenthetical values indicate a reduction in risk compared to a similar period without the existing failures.

SEQUENCE MODEL: c:\asp\newmodel\pwrmtree.cmp
 BRANCH MODEL: c:\asp\newmodel\turkey.txt
 PROBABILITY FILE: c:\asp\newmodel\pwr_b.pro

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
TRANS	4.8E-04	1.0E+00	
LOOP	4.6E-06	3.9E-01	
LOCA	2.4E-06	4.3E-01	
RT	2.8E-04	1.2E-01	
RT/LOOP	0.0E+00	1.0E+00	
EMERG.POWER	2.9E-03	8.0E-01	
AFW	1.5E-03 > 1.0E+00	2.7E-01 > 1.0E+00	
Branch Model: 1.0F.3			
Train 1 Cond Prob:	5.0E-02 > Unavailable		
Train 2 Cond Prob:	1.0E-01 > Unavailable		
Train 3 Cond Prob:	3.0E-01 > Unavailable		
AFW/EMERG.POWER	1.5E-03 > 1.0E+00	2.7E-01 > 1.0E+00	
Branch Model: 1.0F.3			
Train 1 Cond Prob:	5.0E-02 > Unavailable		
Train 2 Cond Prob:	1.0E-01 > Unavailable		
Train 3 Cond Prob:	3.0E-01 > Unavailable		
MFW	1.9E-01	3.4E-01	
PORV.OR.SRV.CHALL	4.0E-02	1.0E+00	
PORV.OR.SRV.RESEAT	2.0E-02	5.0E-02	
PORV.OR.SRV.RESEAT/EMERG.POWER	2.0E-02	1.0E+00	
SS.RELEAS.TERM	1.5E-02	3.4E-01	
SS.RELEAS.TERM/-MFW	1.5E-02	3.4E-01	
HPI	3.0E-04	8.4E-01	
HPI(F/B)	3.0E-04	8.4E-01	4.0E-02
HPR/-HPI	1.5E-04	1.0E+00	4.0E-02
PORV.OPEN	1.0E-02	1.0E+00	
SS.DEPRESS	3.6E-02	1.0E+00	
COND/MFW	1.0E+00	3.4E-01	
LPI/HPI	1.5E-04	3.4E-01	

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LPR/-HPI.HPR
LPR/HPI

6.7E-01
1.5E-04

1.0E+00
1.0E+00

* branch model file
** forced

Austin
09-11-1987
11:14:36

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