

## PRECURSOR DESCRIPTION SHEET

LER No.: 400/87-008  
 Event Description: LOFW and a RWST isolation valve fails closed  
 Date of Event: 2/27/87  
 Plant: Harris 1

## EVENT DESCRIPTION

Sequence

While at 49% power during surveillance testing of the main turbine control valves, governor valve No. 3 was found failed. While the valve was being examined, a generator load swing from 358 to 315 MW(e) over a 2-s period occurred followed by an increase to 400 MW(e) over a 12-s period. All MFW system pumps except the 1B condensate pump had tripped off. The test engineer had inadvertently shorted two terminals causing the valve to close and then open, thus creating the load swing. The MFW pumps tripped off as a consequence of the valve closure.

All systems responded as designed. Due to the RCS cooldown and inventory volume shrinkage, the charging pump switched suction from the volume control tank to the RWST on low VCT level. One RWST suction valve (two in parallel) failed to open. The valve motor failed on demand. An attempt to restart MFW was unsuccessful.

Corrective Action

Repairs were made.

Plant/Event Data

Systems Involved:  
 Main feedwater  
 RWST

Components and Failure Modes Involved:

MFWPs fail in operation  
 RWST suction valve fails on demand

Component Unavailability Duration: N/A

Plant Operating Mode: 1 (49%)

Discovery Method: Operational event

Reactor Age: 0.1 y

Plant Type: PWR

Comments

None.

## MODELING CONSIDERATION AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Transient No recovery

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Branches Impacted and Branch Nonrecovery Estimate

MFW	1.0	No recovery
HPI	Base case	One of two isolation valves failed to open
HPI (B&F)	Base case	One of two isolation valves failed to open
LPI	Base case	One of two isolation valves failed to open

Plant Models Utilized

PWR plant Class B

CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

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INITIATING EVENT

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

TRANS 1.0E+00

SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CD	
TRANS	1.7E-06
Total	1.7E-06
CV	
TRANS	1.4E-04
Total	1.4E-04
ATWS	
TRANS	3.4E-05
Total	3.4E-05

SEQUENCE CONDITIONAL PROBABILITIES (PROBABILITY ORDER)

Sequence	End State	Prob	N Rec**
126 trans -rt afw MFW HPI(F/B) -ss.depress cond/mfw	CD	1.2E-06	7.4E-02
120 trans -rt afw MFW -HPI(F/B) -hpr/-hpi porv.open -ss.depress cond/mfw	CD	3.3E-07	8.8E-02
127 trans -rt afw MFW HPI(F/B) ss.depress	CD	1.3E-07	2.2E-01
121 trans -rt afw MFW -HPI(F/B) -hpr/-hpi porv.open ss.depress	CD	3.7E-08	2.6E-01
123 trans -rt afw MFW -HPI(F/B) hpr/-hpi -ss.depress cond/mfw	CD	3.7E-08	8.8E-02
109 trans -rt -afw -porv.or.srv.chall ss.releas.term HPI	CV	1.3E-04	2.9E-01
101 trans -rt -afw porv.or.srv.chall -porv.or.srv.reseat ss.releas .term HPI	CV	5.3E-06	2.9E-01
128 trans rt	ATWS	3.4E-05	1.2E-01

\*\* non-recovery credit for edited case

SEQUENCE CONDITIONAL PROBABILITIES (SEQUENCE ORDER)

Sequence	End State	Prob	N Rec**
101 trans -rt -afw porv.or.srv.chall -porv.or.srv.reseat ss.releas .term HPI	CV	5.3E-06	2.9E-01
109 trans -rt -afw -porv.or.srv.chall ss.releas.term HPI	CV	1.3E-04	2.9E-01
120 trans -rt afw MFW -HPI(F/B) -hpr/-hpi porv.open -ss.depress cond/mfw	CD	3.3E-07	8.8E-02
121 trans -rt afw MFW -HPI(F/B) -hpr/-hpi porv.open ss.depress	CD	3.7E-08	2.6E-01
123 trans -rt afw MFW -HPI(F/B) hpr/-hpi -ss.depress cond/mfw	CD	3.7E-08	8.8E-02
126 trans -rt afw MFW HPI(F/B) -ss.depress cond/mfw	CD	1.2E-06	7.4E-02
127 trans -rt afw MFW HPI(F/B) ss.depress	CD	1.3E-07	2.2E-01
128 trans rt	ATWS	3.4E-05	1.2E-01

\*\* non-recovery credit for edited case

Event Identifier: 400/87-008

SEQUENCE MODEL: c:\asp\newmodel\pwr\_bnew.cmp  
 BRANCH MODEL: c:\asp\newmodel\harris.new  
 PROBABILITY FILE: c:\asp\newmodel\pwr\_bnew.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	
ep.rec	1.0E+00	1.7E-01	
afw	3.8E-04	2.6E-01	
afw/emerg.power	5.0E-02	3.4E-01	
MFW	2.0E-01 > 1.0E+00	3.4E-01 > 1.0E+00	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	2.0E-01 > Unavailable		
porv.or.srv.chall	4.0E-02	1.0E+00	
porv.or.srv.reseat	3.0E-02	1.1E-02	
porv.or.srv.reseat/emerg.power	3.0E-02	1.0E+00	
ss.releas.term	1.5E-02	3.4E-01	
HPI	1.5E-03 > 3.1E-02	8.4E-01	
Branch Model: 1.OF.3+ser			
Train 1 Cond Prob:	1.0E-02 > Failed		
Train 2 Cond Prob:	1.0E-01		
Train 3 Cond Prob:	3.0E-01		
Serial Component Prob:	1.2E-03		
HPI (F/B)	1.5E-03 > 3.1E-02	8.4E-01	1.0E-02
Branch Model: 1.OF.3+ser+opr			
Train 1 Cond Prob:	1.0E-02 > Failed		
Train 2 Cond Prob:	1.0E-01		
Train 3 Cond Prob:	3.0E-01		
Serial Component Prob:	1.2E-03		
hpr/-hpi	1.5E-04	1.0E+00	1.0E-03
porv.open	1.0E-02	1.0E+00	4.0E-04
ss.depress	3.6E-02	1.0E+00	
cond/mfw	1.0E+00	3.4E-01	1.0E-02
LPI/HPI	1.5E-04 > 1.5E-02	3.4E-01	
Branch Model: 1.OF.2			
Train 1 Cond Prob:	1.0E-02 > Failed		
Train 2 Cond Prob:	1.5E-02		
lpr/-hpi.hpr	6.7E-01	1.0E+00	
lpr/hpi	1.5E-04	1.0E+00	

\* branch model file  
 \*\* forced

Minarick  
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