

## PRECURSOR DESCRIPTION SHEET

LER No.: 389/87-003  
 Event Description: LOFW, one AFW train fails, and a MSRV sticks open  
 Date of Event: 4/9/87  
 Plant: St. Lucie 2

## EVENT DESCRIPTION

Sequence

While at 100% power, I&C personnel were testing the ESFAS. The P-18 annunciator was found inoperative. They made an error when connecting a jumper to test the circuit and caused a MSIS actuation. The MSIVs and MFW isolation valves closed causing a LOFW and subsequent plant trip. One SG MSRV failed to fully close after opening to relieve steam pressure. Operators closed the valve 8 min after opening by opening an atmospheric dump valve to lower SG pressure and to let the MSRV reseal. The open MSRV valve did not noticeably cause SG depressurization. The 2C AFW pump tripped on overspeed but was restarted without problems.

Corrective Action

Repairs were made and personnel were counseled.

Plant/Event DataSystems Involved:

Main feedwater  
 Auxiliary feedwater  
 Steam relief

Components and Failure Modes Involved:

Pump fails on demand

Component Unavailability Duration: N/A

Plant Operating Mode: 1 (100%)

Discovery Method: Operational event

Reactor Age: 3.8 y

Plant Type: PWR

Comments

None.

## MODELING CONSIDERATION AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Transient	No recovery
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Event Identifier: 389/87-003

Branches Impacted and Branch Nonrecovery Estimate

MFW	1.0	No recovery
AFW	Base case	One of three trains unavailable (manual restart successful)
SSREL TERM	0.12	Valve is closed by operator action

Plant Models Utilized

PWR plant Class G

## 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	7.5E-05
Total	7.5E-05
CV	
TRANS	1.6E-04
Total	1.6E-04
ATWS	
TRANS	3.4E-05
Total	3.4E-05

## SEQUENCE CONDITIONAL PROBABILITIES (PROBABILITY ORDER)

Sequence	End State	Prob	N Rec**
120 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress cond/mfw	CD	6.6E-05	3.0E-02
121 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open ss.depress	CD	7.4E-06	8.8E-02
119 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress - cond/mfw	CV	1.3E-04	5.8E-02
109 trans -rt -AFW -porv.or.srv.chall SS.RELEAS.TERM hpi	CV	3.0E-05	1.0E-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**
109 trans -rt -AFW -porv.or.srv.chall SS.RELEAS.TERM hpi	CV	3.0E-05	1.0E-01
119 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress - cond/mfw	CV	1.3E-04	5.8E-02
120 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress cond/mfw	CD	6.6E-05	3.0E-02
121 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open ss.depress	CD	7.4E-06	8.8E-02
128 trans rt	ATWS	3.4E-05	1.2E-01

\*\* non-recovery credit for edited case

SEQUENCE MODEL: c:\asp\newmodel\pwr\_gnew.cmp  
 BRANCH MODEL: c:\asp\newmodel\lucie.new  
 PROBABILITY FILE: c:\asp\newmodel\pwr\_bnew.pro

No Recovery Limit

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## 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 > 2.3E-03	2.6E-01	
Branch Model: 1.OF.3+ser			
Train 1 Cond Prob:	2.0E-02		
Train 2 Cond Prob:	1.0E-01		
Train 3 Cond Prob:	5.0E-02 > Failed		
Serial Component Prob:	2.8E-04		
afw/emerg.power	5.0E-02	3.4E-01	
MFW	1.9E-01 > 1.0E+00	3.4E-01	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	1.9E-01 > Unavailable		
porv.or.srv.chall	2.0E-02	1.0E+00	
porv.or.srv.reseat	1.0E-02	1.1E-02	
porv.or.srv.reseat/emerg.power	1.0E-02	1.0E+00	
SS.RELEAS.TERM	1.5E-02 > 1.0E+00	3.4E-01 > 1.2E-01	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	1.5E-02 > Failed		
ss.depress	3.6E-02	1.0E+00	
cond/mfw	1.0E+00	3.4E-01	1.0E-02
hpi	3.0E-04	8.4E-01	
hpi(f/b)	3.0E-04	8.4E-01	1.0E-02
porv.open	1.0E+00	1.0E+00	0.0E+00
hpr/-hpi	1.5E-04	1.0E+00	
csr	2.0E-03	3.4E-01	

\* branch model file  
 \*\* forced

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