

PRECURSOR DESCRIPTION SHEET

LER No.: 455/87-007
 Event Description: Trip with feedwater isolation and one AFW train
 unavailable
 Date of Event: 5/4/87
 Plant: Byron 2

EVENT DESCRIPTION

Sequence

Due to component failure, loss of an inverter deenergized instrument bus 211. Because of RPS testing in progress, a high flux bistable had been tripped already, thus satisfying the two of four coincident trip logic. As part of the normal posttrip sequence, the MFW was isolated as designed. AFW responded, but the 2A motor pump failed to start because it drew control power from bus 211, which was deenergized.

Corrective Action

The inverter was repaired.

Plant/Event DataSystems Involved:

Auxiliary feedwater
 Electrical

Components and Failure Modes Involved:

Inverter and bus fail in operation
 AFW pump fails on demand

Component Unavailability Duration: N/A

Plant Operating Mode: 1 (88%)

Discovery Method: Operational event

Reactor Age: 0.3 y

Plant Type: PWR

Comments

None.

MODELING CONSIDERATION AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Transient	1.0	No recovery
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Branches Impacted and Branch Nonrecovery Estimate

AFW	Base case	One of three trains unavailable
MFW	Base case	

Plant Models Utilized

PWR plant Class B

Event Identifier: 455/87-007

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	3.7E-05
Total	3.7E-05
CV	
TRANS	6.6E-05
Total	6.6E-05
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	1.6E-05	2.5E-02
120 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress cond/mfw	CD	1.5E-05	3.0E-02
127 trans -rt AFW MFW hpi(f/b) ss.depress	CD	1.8E-06	7.4E-02
121 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open ss.depress	CD	1.7E-06	8.8E-02
123 trans -rt AFW MFW -hpi(f/b) hpr/-hpi -ss.depress cond/mfw	CD	1.7E-06	3.0E-02
125 trans -rt AFW MFW hpi(f/b) -ss.depress -cond/mfw	CV	3.0E-05	4.9E-02
119 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress -cond/mfw	CV	2.9E-05	5.8E-02
109 trans -rt -AFW -porv.or.srv.chall ss.releas.term hpi	CV	4.1E-06	2.8E-01
122 trans -rt AFW MFW -hpi(f/b) hpr/-hpi -ss.depress -cond/mfw	CV	3.2E-06	5.8E-02
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	4.1E-06	2.8E-01
119 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress -cond/mfw	CV	2.9E-05	5.8E-02
120 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open -ss.depress cond/mfw	CD	1.5E-05	3.0E-02
121 trans -rt AFW MFW -hpi(f/b) -hpr/-hpi porv.open ss.depress	CD	1.7E-06	8.8E-02
122 trans -rt AFW MFW -hpi(f/b) hpr/-hpi -ss.depress -cond/mfw	CV	3.2E-06	5.8E-02
123 trans -rt AFW MFW -hpi(f/b) hpr/-hpi -ss.depress cond/mfw	CD	1.7E-06	3.0E-02
125 trans -rt AFW MFW hpi(f/b) -ss.depress -cond/mfw	CV	3.0E-05	4.9E-02
126 trans -rt AFW MFW hpi(f/b) -ss.depress cond/mfw	CD	1.6E-05	2.5E-02
127 trans -rt AFW MFW hpi(f/b) ss.depress	CD	1.8E-06	7.4E-02

Event Identifier: 455/87-007

128 trans rt ATWS 3.4E-05 1.2E-01

** non-recovery credit for edited case

SEQUENCE MODEL: c:\asp\newmodel\pwr_bnew.cmp
 BRANCH MODEL: c:\asp\newmodel\byron.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	1.3E-03 > 5.0E-02	2.6E-01	
Branch Model: 1.OF.2+ser			
Train 1 Cond Prob:	2.0E-02 > Unavailable		
Train 2 Cond Prob:	5.0E-02		
Serial Component Prob:	2.8E-04		
afw/emerg.power	5.0E-02	3.4E-01	
MFW	2.0E-01 > 1.0E+00	3.4E-01	
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	2.0E-02	1.1E-02	
porv.or.srv.reseat/emerg.power	2.0E-02	1.0E+00	
ss.releas.term	1.5E-02	3.4E-01	
hpi	1.0E-03	8.4E-01	
hpi(f/b)	1.0E-03	8.4E-01	1.0E-02
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	3.4E-01	
lpr/-hpi.hpr	6.7E-01	1.0E+00	
lpr/hpi	1.5E-04	1.0E+00	

* branch model file
 ** forced

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