

## PRECURSOR DESCRIPTION SHEET

LER No.: 296/84-015  
Event Description: Trip and One Condensate Pump and Two CRD Pumps Fail  
Date of Event: December 9, 1984  
Plant: Browns Ferry 3

### EVENT DESCRIPTION

#### Sequence

During normal operation, Unit 3 was operating at 36% power. The feeder breaker for condensate pump motor 3A failed to trip when the motor shorted to ground. A burned-up trip coil prevented the breaker from operating. The effect was that the normal feeder breaker for the unit board tripped when one of its overcurrent relays operated. This also locked out the alternate feeder breaker and deenergized the loads connected to the unit board.

The safety loads supplied by the unit board then automatically transferred to their alternate sources as designed. DGs 3A and 3B started but were not required. The unit was manually scrammed following loss of CRD pump 3B, which tripped due to loss of board voltage. CRD pump 3A was out of service for maintenance. In anticipation of a low-water-level scram and to determine as quickly as possible that all rods were fully inserted, the licensed unit operator scrammed the reactor.

#### Corrective Action

The condensate breaker and motor were repaired. There was no other apparent damage. The safety-related equipment operated as designed during this event.

#### Plant/Event Data

Systems Involved:  
Condensate and CRD

Event Identifier: 296/84-015

Components and Failure Modes Involved:  
Condensate pump — failed in operation

CRD pumps — rendered unavailable

Component Unavailability Duration: N/A  
Plant Operating Mode: 1 (36% power)  
Discovery Method: Operational event  
Reactor Age: 8.3 years  
Plant Type: BWR

Comments

It has been assumed that because the unit was operating at 36% power, only the failed condensate pump was operating. Because of this assumption, an LOFW has been assumed to have occurred.

MODELING CONSIDERATIONS AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Transient	1.0	No recovery
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Branches Impacted and Branch Nonrecovery Estimate

CRD	1.0	Unavailable due to maintenance on 3A pump (two pumps are required for cooling using CRD pumps)
MFW	0.34	Assumed failed
PCS	1.0	Failed because of MFW unavailability

Plant Models Utilized

PWR plant Class C

Event Identifier: 296/84-015

# CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

Event Identifier: 296/84-015  
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 Event Date: 12/9/84  
 Plant: Browns Ferry 3

## 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	5.3E-07
Total	5.3E-07
CD	
TRANS	1.1E-04
Total	1.1E-04
ATWS	
TRANS	2.0E-05
Total	2.0E-05

### DOMINANT SEQUENCES

End State: CV	Conditional Probability: 1.7E-07
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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: 3.3E-05
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110 TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM -SRV.CLOSE FW/PCS.TRANS HPCI RCIC/TRANS.OR.LOOP  
 CRD SRV.ADS

Event Identifier: 296/84-015

End State: ATWS

Conditional Probability: 2.0E-05

173 TRANS SCRAM SLC.OR.RODS

# SEQUENCE CONDITIONAL PROBABILITIES

	Sequence	End State	Prob	N Rec**
101	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM -SRV.CLOSE -FW /PCS.TRANS RHR(SDC) RHR(SPCOOL)/-LPCI.RHR(SDC) C.I.AND. V/RHR(SDC).RHR(SPCOOL)	CD	3.0E-05	7.6E-02
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	1.5E-05	3.8E-02
110	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM -SRV.CLOSE FW /PCS.TRANS HPCI RCIC/TRANS.OR.LOOP CRD SRV.ADS	CD	3.3E-05 *	1.1E-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	1.1E-06	7.6E-02
119	TRANS -SCRAM PCS/TRANS SRV.CHALL/TRANS.-SCRAM SRV.CLOSE FW /PCS.LOCA HPCI RCIC/LOCA SRV.ADS	CD	3.3E-05	1.9E-01
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	1.7E-07 *	7.3E-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	8.9E-08	3.7E-02
155	TRANS SCRAM -SLC.OR.RODS PCS/TRANS SRV.CLOSE FW/PCS.LOCA HPCI RCIC/LOCA -SRV.ADS -COND/FW.PCS -RHR(SDC)	CV	1.7E-07	1.3E-01
159	TRANS SCRAM -SLC.OR.RODS PCS/TRANS SRV.CLOSE FW/PCS.LOCA HPCI RCIC/LOCA -SRV.ADS COND/FW.PCS -LPCS -RHR(SDC)	CV	8.8E-08	6.6E-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:\bfprob.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

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PCS/TRANS	1.7E-01 > 1.0E+00	1.0E+00	
Branch Model: 1.OF.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	
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	3.6E-02	1.0E+00	
EMERG.POWER	5.4E-04	5.1E-01	
FW/PCS.TRANS	4.6E-01 > 1.0E+00	3.4E-01	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	4.6E-01 > Failed		
FW/PCS.LOCA	1.0E+00	3.4E-01	
HPCI	1.0E-01	5.7E-01	
RCIC/TRANS.OR.LOOP	6.7E-02	5.7E-01	
RCIC/LOCA	1.0E+00	1.0E+00	
CRD	1.0E-02 > 1.0E+00	1.0E+00	4.0E-02
Branch Model: 1.OF.1+opr			
Train 1 Cond Prob:	1.0E-02 > Unavailable		
SRV.ADS	6.7E-03	1.0E+00	4.0E-02
COND/FW.PCS	1.0E+00	3.4E-01	
LPCS	3.0E-03	3.4E-01	
LPCI(RHR)/LPCS	4.0E-04	3.4E-01	
RHRSW/LPCS.LPCI.TRANS	5.0E-01	1.0E+00	4.0E-02
RHRSW/LPCS.LPCI.LOOP	5.0E-01	1.0E+00	4.0E-02
RHRSW/LPCS.LPCI.LOCA	5.0E-01	1.0E+00	4.0E-02
RHR(SDC)	2.0E-02	3.4E-01	
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  
04-11-1987  
14:48:08

Event Identifier: 296/84-015