

## PRECURSOR DESCRIPTION SHEET

LER No.: 259/84-027  
Event Description: Inadvertent Relief Valve Opening with Subsequent Trip  
Date of Event: June 27, 1984  
Plant: Browns Ferry 1

### EVENT DESCRIPTION

#### Sequence

During normal unit startup following a short unit outage, while approaching 1% power with ~400-psig reactor pressure, a main steam RV began to unseat. It continued to leak, causing the torus temperature to approach Technical Specifications' limits, and the unit was manually scrammed at 350 psig. The RV subsequently reseated at 100 psig.

#### Corrective Action

The valve was replaced and the unit restarted. The RV was tested at Wyle Laboratories, and it performed normally. It was then disassembled, and all internal parts were found to be normal. No reason, either electrical or mechanical, could be found to explain the premature valve actuation.

#### Plant/Event Data

Systems Involved:  
Main steam

Components and Failure Modes Involved:  
RV inadvertently opened

Component Unavailability Duration: NA  
Plant Operating Mode: 2 (1% power)  
Discovery Method: Operational event  
Reactor Age: 10.9 years  
Plant Type: BWR

#### Comments

It has been assumed that the RV's spurious opening could have occurred while the plant was at power.

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## MODELING CONSIDERATIONS AND DECISIONS

### Initiators Modeled and Initiator Nonrecovery Estimate

Small-break LOCA	0.1	To account for likelihood of occurring at power and likelihood that relief would have been sufficient to require LOCA mitigation
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### Branches Impacted and Branch Nonrecovery Estimate

None

### Plant Models Utilized

BWR plant Class C

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# CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

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## INITIATING EVENT

### NON-RECOVERABLE INITIATING EVENT PROBABILITIES

LOCA	1.0E-01
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### SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CV	
LOCA	7.2E-07
Total	7.2E-07
CD	
LOCA	9.5E-05
Total	9.5E-05
ATWS	
LOCA	2.0E-06
Total	2.0E-06

### DOMINANT SEQUENCES

End State: CV	Conditional Probability: 4.7E-07
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314 LOCA SCRAM -SLC.OR.RODS PCS/LOCA FW/PCS.LOCA HPCI -SRV.ADS -COND/FW.PCS -RHR(SDC)

End State: CD	Conditional Probability: 9.0E-05
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310 LOCA -SCRAM PCS/LOCA FW/PCS.LOCA HPCI RCIC/LOCA SRV.ADS

End State: ATWS	Conditional Probability: 2.0E-06
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332 LOCA SCRAM SLC.OR.RODS

# SEQUENCE CONDITIONAL PROBABILITIES

	Sequence	End State	Prob	N Rec**
302	LOCA -SCRAM PCS/LOCA -FW/PCS.LOCA RHR(SDC) RHR(SPCOOL)/-LPC I.RHR(SDC) C.I.AND.V/RHR(SDC).RHR(SPCOOL)	CD	3.1E-06	7.6E-03
310	LOCA -SCRAM PCS/LOCA FW/PCS.LOCA HPCI RCIC/LOCA SRV.ADS	CD	9.0E-05 *	1.9E-02
314	LOCA SCRAM -SLC.OR.RODS PCS/LOCA FW/PCS.LOCA HPCI -SRV.ADS -COND/FW.PCS -RHR(SDC)	CV	4.7E-07 *	1.3E-02
318	LOCA SCRAM -SLC.OR.RODS PCS/LOCA FW/PCS.LOCA HPCI -SRV.ADS COND/FW.PCS -LPCS -RHR(SDC)	CV	2.4E-07	6.6E-03
332	LOCA SCRAM SLC.OR.RODS	ATWS	2.0E-06 *	1.0E-01

\* 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 > 3.3E-06	3.4E-01 > 1.0E-01	
Branch Model: INITOR			
Initiator Freq:	3.3E-06		
SCRAM	4.1E-04	1.0E+00	
SLC.OR.RODS	1.0E-02	1.0E+00	4.0E-02
PCS/TRANS	1.7E-01	1.0E+00	
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	3.4E-01	
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	4.0E-02
SRV.ADS	6.7E-03	1.0E+00	4.0E-02

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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	
RHR SW/LPCS.LPCI.TRANS	5.0E-01	1.0E+00	4.0E-02
RHR SW/LPCS.LPCI.LOOP	5.0E-01	1.0E+00	4.0E-02
RHR SW/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  
13:51:40

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