

B.40-1

B.40 LER No. 362/83-099

Event Description: Trip with Turbine-Driven AFW Pump Inoperable

Date of Event: October 31, 1983

Plant: San Onofre 3

B.40.1 Summary

San Onofre 3 was operating at 62% power when a loss of main feedwater caused a reactor trip. An emergency feedwater actuation signal (EFAS) was generated, but the turbine-driven emergency feedwater (EFW) pump failed to start. The conditional core damage probability estimated for the event is 1.5×10^{-5} .

B.40.2 Event Description

During Mode 1 operation at 62% power, San Onofre Unit 3 experienced a loss of feedwater and tripped after the feed pumps experienced problems with their suction supply. An EFAS signal was generated when the unit tripped, but the turbine-driven EFW pump failed to start. The pump was found to be tripped, was reset, and was successfully restarted. The reason for the EFW pump trip was unknown at the time of the licensee event report (LER), but investigation was ongoing.

B.40.3 Additional Event-Related Information

None.

B.40.4 Modeling Assumptions

This event was modeled as a loss of feedwater with the turbine-driven EFW pump inoperable.

B.40.5 Analysis Results

The conditional core damage probability estimated for this event is 1.5×10^{-5} . The dominant sequence for this event, highlighted on the event tree in Figure B.40.1, involves a failure of main and emergency feedwater, and failure to supply makeup from the condensate system.

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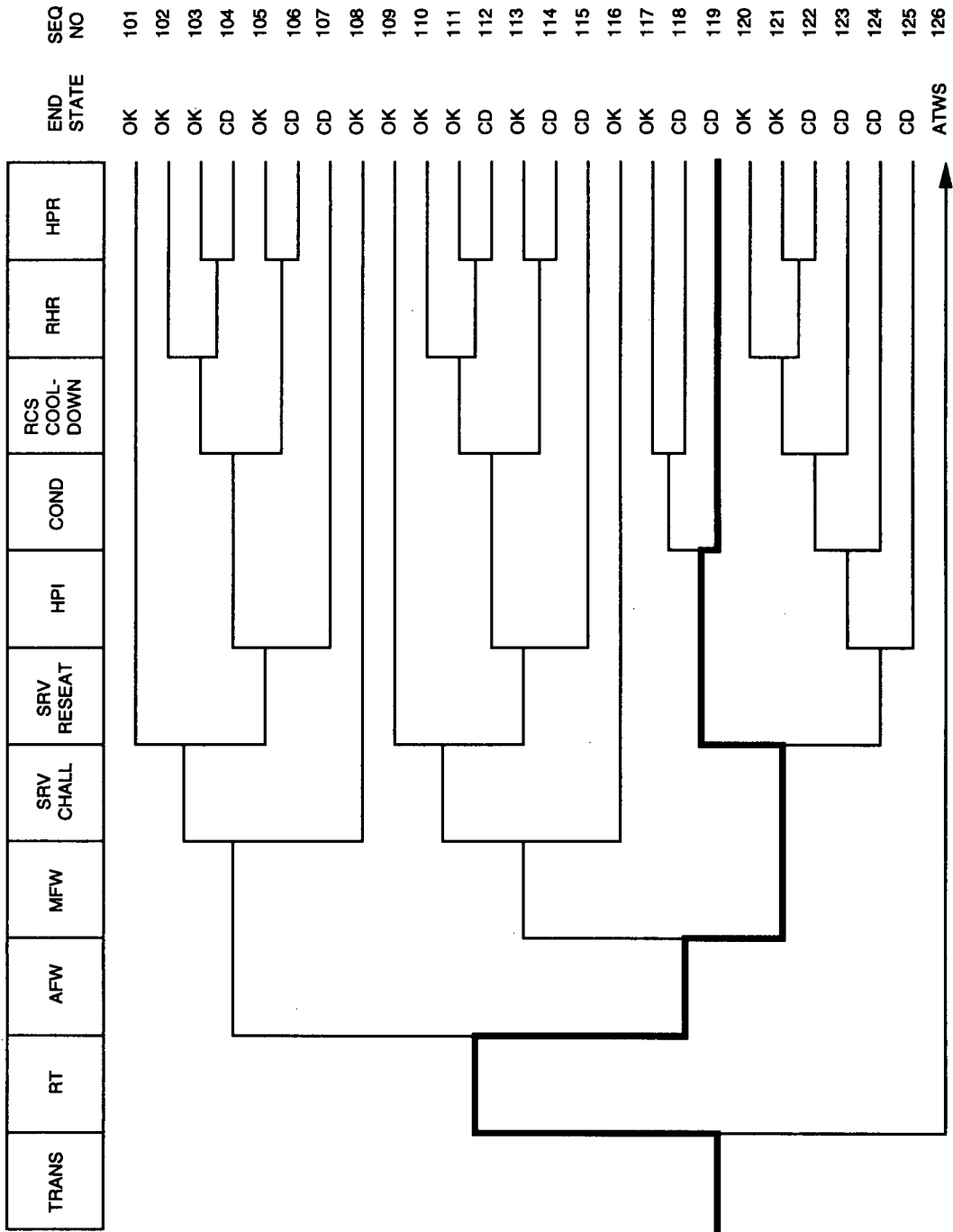


Figure B.40.1 Dominant core damage sequence for LER 362/83-099

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CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

Event Identifier: 362/83-099
Event Description: Trip with turbine-driven AFW pump inoperable
Event Date: October 31, 1983
Plant: San Onofre 2

INITIATING EVENT

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

TRANS 1.0E+00

SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CD	
TRANS	1.5E-05
Total	1.5E-05

SEQUENCE CONDITIONAL PROBABILITIES (PROBABILITY ORDER)

Sequence	End State	Prob	N Rec**
119 trans -rt AFW MFW -srv.reseat cond	CD	1.2E-05	1.5E-01
508 trans rt -prim.press.limited AFW/ATWS	CD	1.1E-06	1.0E-01
118 trans -rt AFW MFW -srv.reseat -cond rcs.cooldown	CD	6.6E-07	1.5E-01

** non-recovery credit for edited case

SEQUENCE CONDITIONAL PROBABILITIES (SEQUENCE ORDER)

Sequence	End State	Prob	N Rec**
118 trans -rt AFW MFW -srv.reseat -cond rcs.cooldown	CD	6.6E-07	1.5E-01
119 trans -rt AFW MFW -srv.reseat cond	CD	1.2E-05	1.5E-01
508 trans rt -prim.press.limited AFW/ATWS	CD	1.1E-06	1.0E-01

** non-recovery credit for edited case

SEQUENCE MODEL: c:\asp\1982-83\pwrh8283.cmp
BRANCH MODEL: c:\asp\1982-83\sanono2.82
PROBABILITY FILE: c:\asp\1982-83\pwr8283.pro

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
trans	1.7E-03	1.0E+00	
loop	2.0E-05	5.8E-01	
loca	2.4E-06	5.4E-01	

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sgtr	1.6E-06	1.0E+00
rt	2.8E-04	1.0E-01
rt(loop)	0.0E+00	1.0E+00

Event Identifier: 362/83-099

AFW	3.8E-04 > 2.3E-03	4.5E-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/ATWS	4.3E-03 > 4.0E-02	1.0E+00	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	4.3E-03 > 4.0E-02		
afw/ep	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 > Failed		
cond	2.5E-02	1.0E+00	1.0E-02
srv.chall	4.0E-02	1.0E+00	
srv.chall/afw	1.0E+00	1.0E+00	
srv.chall/loop	1.0E-01	1.0E+00	
srv.chall/sbo	1.0E+00	1.0E+00	
srv.reseat	2.0E-02	1.0E+00	
srv.reseat(atws)	1.0E-01	1.0E+00	
hpi	3.0E-04	8.9E-01	
rhr	7.1E-03	5.7E-02	1.0E-03
hpr	2.0E-03	1.0E+00	
ep	2.9E-03	8.9E-01	
seal.loca	5.5E-02	1.0E+00	
offsite.pwr.rec/seal.loca	7.6E-01	1.0E+00	
offsite.pwr.rec/-seal.loca	3.4E-01	1.0E+00	
sg.iso.and.rcs.cooldown	1.0E-02	1.0E-01	
rcs.cooldown	1.0E-03	1.0E+00	1.0E-03
rcs.cool.below.rhr	3.0E-03	1.0E+00	3.0E-03
prim.press.limited	8.8E-03	1.0E+00	
emrg.boration	0.0E+00	1.0E+00	1.0E-02

* branch model file
** forced