

## PRECURSOR DESCRIPTION SHEET

LER No.: 387/87-003  
 Event Description: Both diesel generators are unavailable  
 Date of Event: 1/27/87  
 Plant: Susquehanna 1

## EVENT DESCRIPTION

Sequence

Diesel generator (DG) B was removed from service for maintenance. The DG A trip alarm occurred and the local panel would not respond to an alarm test. Both DGs were out of service for 8 h.

Corrective Action

Repairs were made.

Plant/Event Data

Systems Involved:  
 Emergency power

Components and Failure Modes Involved:

Diesel generators and controls are unavailable  
 Component Unavailability Duration: 8 h  
 Plant Operating Mode: 1 (100%)  
 Discovery Method: Operational event  
 Reactor Age: 4.3 y  
 Plant Type: BWR

Comments

None.

## MODELING CONSIDERATION AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Postulated LOOP Base case nonrecovery

Branches Impacted and Branch Nonrecovery Estimate

EPS No recovery assumed possible (limited information provided in LER)

Plant Models Utilized

BWR plant Class C

Event Identifier: 387/87-003

CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

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UNAVAILABILITY, DURATION= 8

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

LOOP 4.4E-05

SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CD	
LOOP	7.5E-06
Total	7.5E-06
CV	
LOOP	( 2.5E-10 )
Total	( 2.5E-10 )
ATWS	
LOOP	1.5E-08
Total	1.5E-08

SEQUENCE CONDITIONAL PROBABILITIES (PROBABILITY ORDER)

Sequence	End State	Prob	N Rec**
274 loop EMERG.POWER -scram ep.rec	CD	7.4E-06	5.4E-02
256 loop EMERG.POWER -scram -ep.rec srv.chall/loop.-scram -srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	4.4E-10	7.8E-02
263 loop EMERG.POWER -scram -ep.rec srv.chall/loop.-scram srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	3.1E-11	7.8E-02
828 loop -EMERG.POWER scram -slc.or.rods srv.close hpci -srv.ads -lpcs -rhr(sdc)	CV	( 2.0E-11 )	1.1E-01
221 loop -EMERG.POWER -scram srv.chall/loop.-scram srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	( 3.7E-11 )	4.7E-02
202 loop -EMERG.POWER -scram srv.chall/loop.-scram -srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	( 1.1E-10 )	1.8E-02
201 loop -EMERG.POWER -scram srv.chall/loop.-scram -srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	( 5.3E-10 )	4.7E-02
841 loop EMERG.POWER scram	ATWS	1.5E-08	3.2E-01

\*\* non-recovery credit for edited case

SEQUENCE CONDITIONAL PROBABILITIES (SEQUENCE ORDER)

Sequence	End State	Prob	N Rec**
201 loop -EMERG.POWER -scram srv.chall/loop.-scram -srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	( 5.3E-10 )	4.7E-02
202 loop -EMERG.POWER -scram srv.chall/loop.-scram -srv.close -hpci	CV	( 1.1E-10 )	1.8E-02

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	rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v rhrsw(c.i.and.v )			
221	loop -EMERG.POWER -scram srv.chall/loop.-scram srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v )	CV	( 3.7E-11 )	4.7E-02
828	loop -EMERG.POWER scram -slc.or.rods srv.close hpci -srv.ads -lpcs -rhr(sdc)	CV	( 2.0E-11 )	1.1E-01
256	loop EMERG.POWER -scram -ep.rec srv.chall/loop.-scram -srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	4.4E-10	7.8E-02
263	loop EMERG.POWER -scram -ep.rec srv.chall/loop.-scram srv.close -hpci rhr(sdc) rhr(spcool)/-lpci.rhr(sdc) -c.i.and.v -rhrsw(c.i.and.v)	CV	3.1E-11	7.8E-02
274	loop EMERG.POWER -scram ep.rec	CD	7.4E-06	5.4E-02
841	loop EMERG.POWER scram	ATWS	1.5E-08	3.2E-01

\*\* non-recovery credit for edited case

Note: For unavailabilities, conditional probability values are differential values which reflect the added risk due to failures associated with an event. Parenthetical values indicate a reduction in risk compared to a similar period without the existing failures.

SEQUENCE MODEL: c:\asp\newmodel\bwr\_cnew.cmp  
 BRANCH MODEL: c:\asp\newmodel\susquhan.new  
 PROBABILITY FILE: c:\asp\newmodel\bwr\_cnew.pro

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
trans	8.6E-04	1.0E+00	
loop	1.7E-05	3.2E-01	
loca	3.3E-06	5.0E-01	
scram	3.5E-04	1.0E+00	
slc.or.rods	1.0E-02	1.0E+00	1.0E-02
pcs/trans	1.7E-01	1.0E+00	
srv.chall/trans.-scram	1.0E+00	1.0E+00	
srv.chall/loop.-scram	1.0E+00	1.0E+00	
srv.close	6.6E-02	1.0E+00	
EMERG.POWER	2.1E-03 > 1.0E+00 **	8.0E-01 > 1.0E+00	
Branch Model: 2.OF.4			
Train 1	Cond Prob:	5.0E-02 > Unavailable	
Train 2	Cond Prob:	5.7E-02 > Unavailable	
Train 3	Cond Prob:	1.9E-01	
Train 4	Cond Prob:	5.0E-02	
ep.rec	1.0E+00	1.7E-01	
fw/pcs.trans	4.6E-01	3.4E-01	
fw/pcs.loca	1.0E+00	3.4E-01	
hpci	2.9E-02	7.0E-01	
rcic	6.0E-02	7.0E-01	
crd	1.0E-02	1.0E+00	1.0E-02
srv.ads	3.7E-03	7.1E-01	1.0E-02
cond/fw.pcs	1.0E+00	3.4E-01	1.0E-03
lpcs	3.0E-03	3.4E-01	
lpci(rhr)/lpcs	1.0E-03	7.1E-01	
rhr(sdc)	2.1E-02	3.4E-01	1.0E-03
rhr(sdc)/-lpci	2.0E-02	3.4E-01	1.0E-03
rhr(sdc)/lpci	1.0E+00	1.0E+00	1.0E-03
rhr(spcool)/-lpci.rhr(sdc)	2.0E-03	1.0E+00	
rhr(spcool)/lpci.rhr(sdc)	5.2E-01	1.0E+00	
c.i.and.v	1.0E-03	1.0E+00	1.0E-02
rhrsw	2.0E-02	3.4E-01	2.0E-03
rhrsw(c.i.and.v)	5.0E-01	3.4E-01	

\* branch model file  
 \*\* forced

Minarick  
 05-16-1989

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