

PRECURSOR DESCRIPTION SHEET

LER No.: 440/87-009
 Event Description: Two diesel generators inoperable
 Date of Event: 2/27/87
 Plant: Perry 1

EVENT DESCRIPTION

Sequence

Two control air solenoid valves failed (leaked) and caused the two emergency diesel generators to be inoperable. No conclusive cause of failure was identified. Both solenoid valves had been previously identified for replacement. The high-pressure core spray diesel generator and system were operable during this time frame.

Corrective Action

The air solenoid valves were replaced.

Plant/Event Data

Systems Involved:
 Emergency power

Components and Failure Modes Involved:

Two diesel generators inoperable

Component Unavailability Duration: 360 h (assumed)

Plant Operating Mode: 1 (29% power)

Discovery Method: Surveillance test

Reactor Age: 0.72 y

Plant Type: BWR

Comments

None.

MODELING CONSIDERATION AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Postulated LOOP	Base case nonrecovery
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Branches Impacted and Branch Nonrecovery Estimate

Emergency power	1.0	Assumed nonrecoverable
EP recovery	0.04	(HPCS DG operable)

Plant Models Utilized

BWR plant Class C

CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

Event Identifier: 440/87-009
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UNAVAILABILITY, DURATION= 360

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

LOOP 2.0E-03

SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CD	
LOOP	2.3E-04
Total	2.3E-04
CV	
LOOP	(9.9E-09)
Total	(9.9E-09)
ATWS	
LOOP	6.7E-07
Total	6.7E-07

SEQUENCE CONDITIONAL PROBABILITIES (PROBABILITY ORDER)

Sequence	End State	Prob	N Rec**
274 loop EMERG.POWER -scram EP.REC	CD	2.3E-04	3.8E-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	2.3E-08	8.2E-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	1.5E-09	8.2E-02
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	(1.8E-09)	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	(5.4E-09)	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	(2.6E-08)	4.7E-02
841 loop EMERG.POWER scram	ATWS	6.8E-07	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	(2.6E-08)	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	(5.4E-09)	1.8E-02

Event Identifier: 440/87-009

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	(1.8E-09)	4.7E-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	2.3E-08	8.2E-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	1.5E-09	8.2E-02
274	loop EMERG.POWER -scram EP.REC	CD	2.3E-04	3.8E-02
841	loop EMERG.POWER scram	ATWS	6.8E-07	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\perry.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	6.3E-02	1.0E+00	
EMERG.POWER	2.9E-03 > 1.0E+00	8.0E-01 > 1.0E+00	
Branch Model: 1.OF.2			
Train 1 Cond Prob:	5.0E-02 > Failed		
Train 2 Cond Prob:	5.7E-02 > Failed		
EP.REC	1.0E+00 > 1.0E+00	1.7E-01 > 1.2E-01	
Branch Model: 1.OF.1			
Train 1 Cond Prob:	1.0E+00		
fw/pcs.trans	4.6E-01	3.4E-01	
fw/pcs.loca	1.0E+00	3.4E-01	
hpci	2.0E-02	3.4E-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	2.0E-02	3.4E-01	
lpci(rhr)/lpcs	6.0E-04	7.1E-01	
rhr(sdc)	2.3E-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
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