

PRECURSOR DESCRIPTION SHEET

LER No.: 389/86-011
Event Description: Emergency power system is unavailable
Date of Event: July 9, 1986
Plant: St. Lucie 2

EVENT DESCRIPTION

Sequence

At 0854 h the 2-A emergency DG was started for a surveillance test conducted once every 7 d. The 2-A DG failed to meet the required generator voltage and frequency within 10 s after the start signal. One of the two engines in the 2-A DG set had failed to start. The 2-A DG was manually tripped by the operator at 0856 h.

At 0915 h the redundant 2-B DG was started. At 0917 h, 2-B DG was stopped because an operator observed 1 of the 12 cylinder cooling fan blades rubbing the cooling fan shroud.

The unit remained at 100% power throughout this event.

Corrective Action

2-B DG was repaired and returned to service at 1059 h. Troubleshooting of the 2-A DG revealed a problem in the mechanical portion of the Woodward governor. The problem was corrected, and 2-A DG was returned to service at 2010 h.

Plant/Event Data

Systems Involved:

Emergency power generation system

Components and Failure Modes Involved:

2A DG — failed in testing

2B DG — failed in testing

Component Unavailability Duration: 84 h assumed (half of the 7-d surveillance period)

Plant Operating Mode: 1 (100% power)

Discovery Method: Surveillance test

Reactor Age: 3.1 years

Plant Type: PWR

Event Identifier: 389/86-011

Comments

LER 389/86-011 states that the fan rub associated with DG 2-B was minor. If the fan rub was minor in the sense that even with the fan rub, the DG would have operated for its mission time, then the emergency power system unavailability should be based on the maintenance unavailability period (~1 3/4 hours). However, if the fan rub was minor in the sense that it was easily repaired, but with the rub the DG would not have operated for its mission time, then an emergency power system unavailability based on the surveillance period is warranted. Since it is not possible to distinguish between these two cases based on information provided in the LER, a more conservative estimate based on surveillance internal was assumed.

MODELING CONSIDERATIONS AND DECISIONS

Initiators Modeled and Initiator Nonrecovery Estimate

Postulated LOOP

Base case nonrecovery

Branches Impacted and Branch Nonrecovery Estimate

EPS

1.0

Given a LOOP, recovery assumed not possible in time to mitigate the transient (see comment above)

Plant Models Utilized

PWR plant Class G

Event Identifier: 389/86-011

Sequence	End State	Prob	N Rec**
211 LOOP -RT/LOOP EMERG.POWER -AFW/EMERG.POWER -PORV.OR.SRV.CHALL SS.RELEAS.TERM	CV	7.4E-07 *	1.3E-01
212 LOOP -RT/LOOP EMERG.POWER AFW/EMERG.POWER	CD	2.6E-06 *	1.3E-01

* dominant sequence for end state
** 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\pwrqtree.cmp
BRANCH MODEL: c:\asp\newmodel\lucie.txt
PROBABILITY FILE: c:\asp\newmodel\pwr_b.pro

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
TRANS	4.8E-04	1.0E+00	
LOOP	4.6E-06	3.9E-01	
LOCA	2.4E-06	4.3E-01	
RT	2.8E-04	1.2E-01	
RT/LOOP	0.0E+00	1.0E+00	
EMERG.POWER	2.9E-03 > 1.0E+00	8.0E-01 > 1.0E+00	
Branch Model: 1.0F.2			
Train 1 Cond Prob:	5.0E-02 > Unavailable		
Train 2 Cond Prob:	5.7E-02 > Unavailable		
AFW	3.8E-04	2.6E-01	
AFW/EMERG.POWER	5.0E-02	3.4E-01	
MFW	1.9E-01	3.4E-01	
PORV.OR.SRV.CHALL	2.0E-02	1.0E+00	
PORV.OR.SRV.RESEAT	1.0E-02	5.0E-02	
PORV.OR.SRV.RESEAT/EMERG.POWER	1.0E-02	1.0E+00	
SS.RELEAS.TERM	1.5E-02	3.4E-01	
SS.RELEAS.TERM/-MFW	1.5E-02	3.4E-01	
SS.DEPRESS	3.6E-02	1.0E+00	
COND/MFW	1.0E+00	3.4E-01	
HPI	3.0E-04	8.4E-01	
HPI(F/B)	3.0E-04	8.4E-01	4.0E-02
PORV.OPEN	1.0E+00	1.0E+00	
HPR/-HPI	1.5E-04	1.0E+00	
CSR	2.0E-03	3.4E-01	

* branch model file

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** forced

Austin
09-11-1987
12:47:15

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