

PRECURSOR DESCRIPTION SHEET

LER No.: 409/86-023
Event Description: LOOP occurs due to lightning strike at coal-fired unit
Date of Event: July 10, 1986
Plant: LaCrosse

EVENT DESCRIPTION

Sequence

With the plant in the cold shutdown condition, at 0630 h, the following opened: the 69-kV tie line breaker, 2NB11; the reverse transformer supply breaker, 25NB4; and the 480-V main feed breakers, 452 M1A and 452 M1B. Both EDGs started and supplied the 1-A and 1-B 480-V essential buses. The containment building also isolated. The 1-A high-pressure service-water diesel pump started when service-water pressure dropped to the low-pressure set point.

A severe thunderstorm was in progress at the time. The operations center informed the plant that the adjacent coal plant's auxiliary switchyard had been hit by lightning. The operators reset the lockout relays. At 0642 h they closed breakers 2NB11 and 25NB4; at 0645 h they shut the 480-V main feed breakers and opened the EDG's output breakers. The 480-V essential bus breakers automatically closed, completing the electrical lineup restoration. At 0659 h the 1-A high-pressure service-water DG was secured and returned to automatic. At 0702 h the EDGs were secured and returned to automatic.

An unusual event was declared due to the loss of offsite power. The plant was without offsite power for 12 min. The lightning had hit a static wire in the adjacent coal plant's auxiliary switchyard. The 69-kV tie line supplies power to LaCrosse's reserve transformer and the coal unit's reserve auxiliary transformer. When the lightning struck, the 69-kV tie line breaker and both transformers' supply breakers opened. The LaCrosse 480-V main feed breakers tripped on undervoltage. Undervoltage also started the EDGs and tripped the 480-V essential bus main feed breakers, which caused the emergency DGs' output breakers to close to supply the essential buses. If this incident had occurred while the reactor was at 100% power, a loss of load transient would have resulted. This is a design-basis transient, and the plant would still have been in a safe condition.

Corrective Action

The breakers were closed.

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CONDITIONAL CORE DAMAGE PROBABILITY CALCULATIONS

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INITIATING EVENT

NON-RECOVERABLE INITIATING EVENT PROBABILITIES

LOOP 2.7E-01

SEQUENCE CONDITIONAL PROBABILITY SUMS

End State/Initiator	Probability
CD	
LOOP	2.0E-05
Total	2.0E-05
CV	
LOOP	0.0E+00
Total	0.0E+00
ATWS	
LOOP	5.3E-06
Total	5.3E-06

DOMINANT SEQUENCES

End State: CD Conditional Probability: 6.7E-06

205 LOOP -EMERG.POWER -SCRAM HPCS HPSN

End State: ATWS Conditional Probability: 4.7E-06

206 LOOP -EMERG.POWER SCRAM -HPCS SLC.OR.RODS

SEQUENCE CONDITIONAL PROBABILITIES

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	Sequence	End State	Prob	N Rec**
202	LOOP -EMERG.POWER -SCRAM HPCS -HPSW -SRV.CLOSE SHUTDOWN.COND ENSER MANUAL.DEPRESS	CD	1.6E-06	2.7E-01
204	LOOP -EMERG.POWER -SCRAM HPCS -HPSW SRV.CLOSE MANUAL.DEPRES S	CD	1.6E-06	2.7E-01
205	LOOP -EMERG.POWER -SCRAM HPCS HPSW	CD	6.7E-06 *	2.7E-01
206	LOOP -EMERG.POWER SCRAM -HPCS SLC.DR.RODS	ATWS	4.7E-06 *	2.7E-01
207	LOOP -EMERG.POWER SCRAM HPCS	ATWS	4.7E-07	2.7E-01
209	LOOP EMERG.POWER -SCRAM -HPSW -SRV.CLOSE SHUTDOWN.CONDENSER MANUAL.DEPRESS	CD	7.3E-07	2.2E-01
210	LOOP EMERG.POWER -SCRAM -HPSW SRV.CLOSE	CD	6.1E-06	2.2E-01
211	LOOP EMERG.POWER -SCRAM HPSW	CD	3.1E-06	2.2E-01
212	LOOP EMERG.POWER SCRAM	ATWS	2.2E-07	2.2E-01

* dominant sequence for end state
** non-recovery credit for edited case

SEQUENCE MODEL: c:\asp\newmodel\lactree.cap
BRANCH MODEL: c:\asp\newmodel\lacrosse.txt
PROBABILITY FILE: c:\asp\newmodel\bwr_c.pro

No Recovery Limit

BRANCH FREQUENCIES/PROBABILITIES

Branch	System	Non-Recov	Opr Fail
TRANS	8.6E-04	1.0E+00	
LOOP	2.0E-05 > 2.0E-05	3.6E-01 > 2.7E-01	
Branch Model: INITOR			
Initiator Freq: 2.0E-05			
LOCA	3.3E-06	5.0E-01	
SCRAM	3.5E-04	1.0E+00	
SLC.DR.RODS	1.0E-02	1.0E+00	4.0E-02
EMERG.POWER	2.9E-03	8.0E-01	
FW	1.0E-01	3.4E-01	
HPSW	5.0E-03	1.0E+00	
SHUTDOWN.CONDENSER	1.0E-02	1.0E+00	
HPCS	5.0E-03	1.0E+00	
LPCS	1.0E-03	1.0E+00	
SRV.CLOSE	1.0E-02	1.0E+00	
DH	1.0E-02	1.0E+00	
MANUAL.DEPRESS	1.2E-01	1.0E+00	

* branch model file
** forced

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