

PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 158279

Date: July 14, 1980

Title: Degraded Emergency Feedwater System During a Loss of Offsite Power at Arkansas Unit 2

The failure sequence was:

1. With the reactor at full power with atmospheric dump valves isolated due to vibration and failure to close problems, tornado activity resulted in the sequential loss of four of five offsite power lines. Protective relaying disconnected the remaining offsite power line from the bus tie autotransformer. (Offsite power was available through manual connection from the 161 kV transmission system.)
2. Both diesel generators started and powered safety-related loads.
3. Natural circulation was established with both emergency feedwater (EFW) pumps using a common suction from the condensate storage tanks and the startup and blowdown demineralizer effluent.
4. Approximately 15 min after the LOOP, emergency feedwater flow became erratic with flow rate oscillating between 80% and 100% of rated flow due to cavitation. This was caused by flashing of the startup and blowdown demineralizer effluent.
5. The startup and blowdown demineralizer effluent was isolated from the EFW pump suction and both EFW pumps were alternately stopped, vented, and restarted.
6. The process computer was unavailable during the event. This is believed to have been caused by protective trips from low voltage.

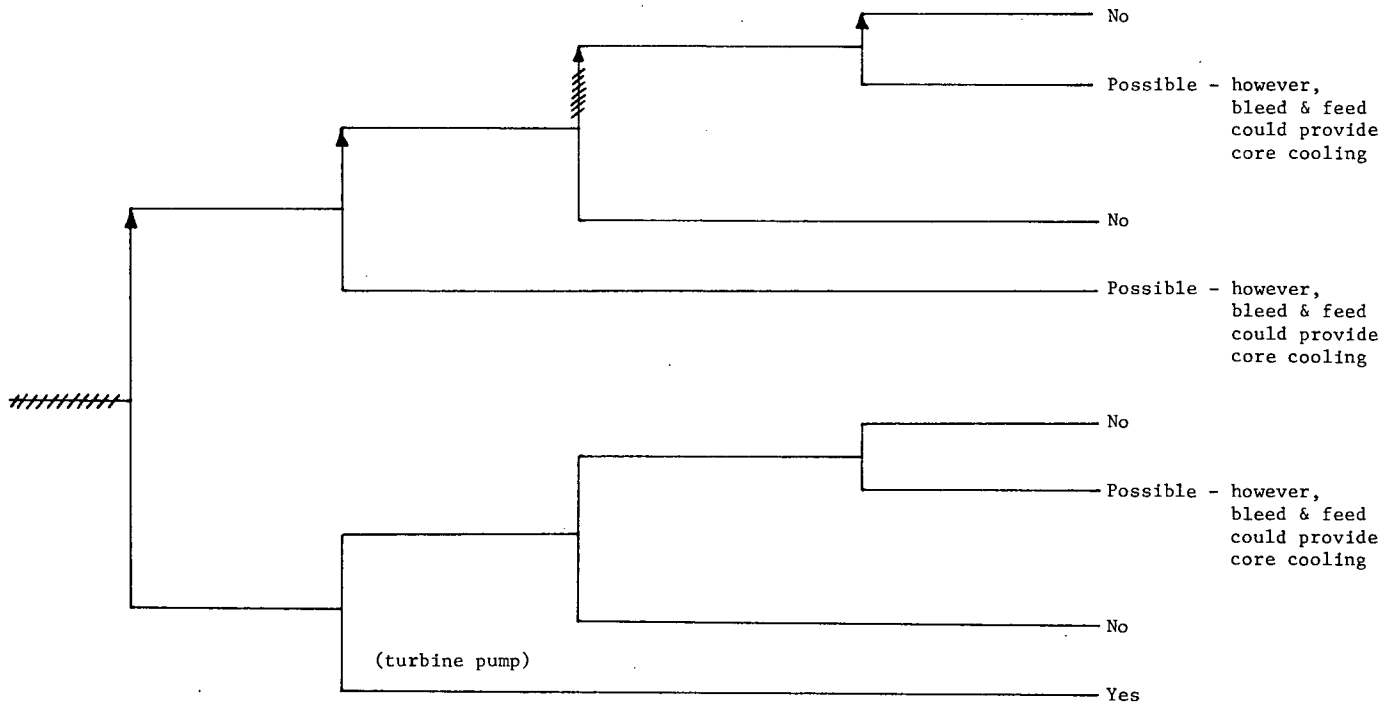
Corrective action:

Offsite power was restored via startup transformers ST-2 and ST-3. The EFW system operating procedures were revised to require isolation of the startup and blowdown effluent prior to exceeding 5% power.

Design purpose of failed system or component:

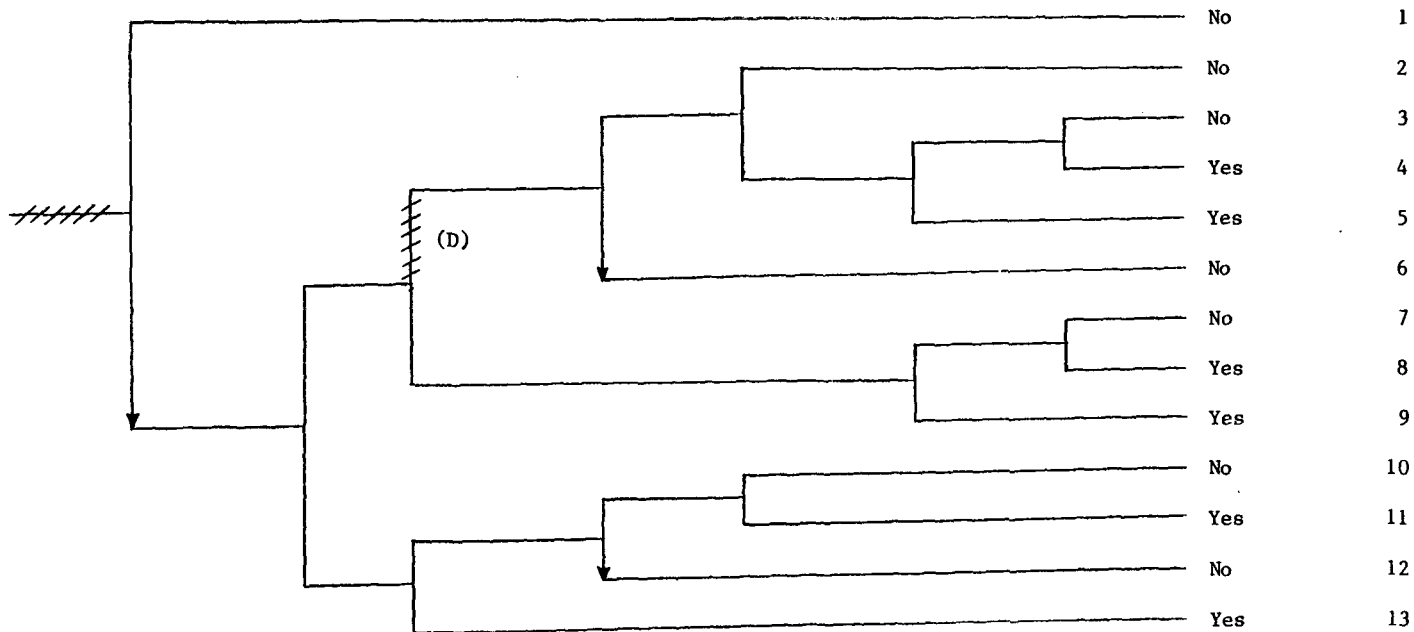
Offsite power provides the preferred source of power to safety-related loads when the unit generator is not available. The EFW system provides water to the steam generators for RCS when the main feedwater system is unavailable.

Loss of offsite power	Diesel generators supply power to safety-related loads	Emergency feedwater provided to steam generators	Emergency feedwater pumps cavitate due to mixing of hot startup and blow-down demineralizer effluent with CST flow	Demineralizer effluent isolated and EFW pumps vented	Potential Severe Core Damage
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NSIC 158279 - Actual Occurrence for Degraded Emergency Feedwater System During a Loss of Offsite Power at Arkansas Unit 2

Loss of Offsite Power	Turbine Generator Runs Back and Assumes House Loads	Emergency Power	Auxiliary Feedwater and Secondary Heat Removal	PORV Demanded	PORV or PORV Isolation Valve Closure	High Pressure Injection	Long Term Core Cooling	Potential Severe Core Damage	Sequence No.
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NSIC 158279 - Sequence of Interest for Degraded Emergency Feedwater System During a Loss of Offsite Power at Arkansas Unit 2

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 158279

LER NO.: 80-018

DATE OF LER: July 14, 1980

DATE OF EVENT: April 7, 1980

SYSTEM INVOLVED: Offsite power, emergency feedwater system

COMPONENT INVOLVED: Transmission lines, both EFW pumps

CAUSE: Tornado damage and failure of operating procedures to require isolation of the startup and blowdown effluent thereby allowing flashing to occur in EFW pump suction lines.

SEQUENCE OF INTEREST: LOOP

ACTUAL OCCURRENCE: LOOP and FW pump cavitation from hot demineralizer effluent causing flashing.

REACTOR NAME: Arkansas Nuclear Unit 2

DOCKET NUMBER: 50-368

REACTOR TYPE: PWR

DESIGN ELECTRICAL RATING: 912 MWe

REACTOR AGE: 1.3 years

VENDOR: Combustion Engineering

ARCHITECT-ENGINEERS: Bechtel

OPERATORS: Arkansas Power and Light

LOCATION: 6 miles NW of Russelville, Arkansas

DURATION: N/A

PLANT OPERATING CONDITION: 100% rate power

TYPE OF FAILURE: Inadequate performance;
made inoperable

DISCOVERY METHOD: Operational event

COMMENT: