

# PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 152951

Date: October 15, 1979

Title: Offsite Power Lost at Davis-Besse 1

The failure sequence was:

1. A capacitor in an ICS pulser failed due to system voltage spikes above the capacitor working voltage, resulting in the further opening of the turbine control valves.
2. Because of the reduced steam pressure caused by the opened turbine control valves, the ICS attempted to increase reactor power and feedwater flow.
3. The reactor tripped due to high flux at a reduced high flux trip setpoint of ~69% power.
4. A fault in a generator output breaker caused by a shorted, failed muffler caused a trip of the 345kv "J" bus and a loss of offsite power.
5. Diesel generators No. 1 & 2 started and loaded their safety-related buses.  
(See attached page)

Corrective action:

1. The failed ICS capacitor was replaced with one of a higher voltage rating.
2. The damaged generator breaker muffler was replaced and a reinforcing band installed to strengthen all breaker mufflers.
3. The diesel generator output breaker linkage rod cell switch was replaced.  
(See attached page)

Design purpose of failed system or component:

Offsite power provides the preferred source of power to safety-related loads when the unit generator is inoperable.

Unavailability of system per WASH 1400:\* Offsite power:  $2 \times 10^{-5}/\text{hr}$ .

Unavailability of component per WASH 1400:\* ICS: not considered in WASH-1400  
Circuit Breakers, failure to  
transfer:  $1 \times 10^{-3}/\text{D}$ .

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\* Unavailabilities are in units of per demand  $\text{D}^{-1}$ . Failure rates are in units of per hour  $\text{HR}^{-1}$ .

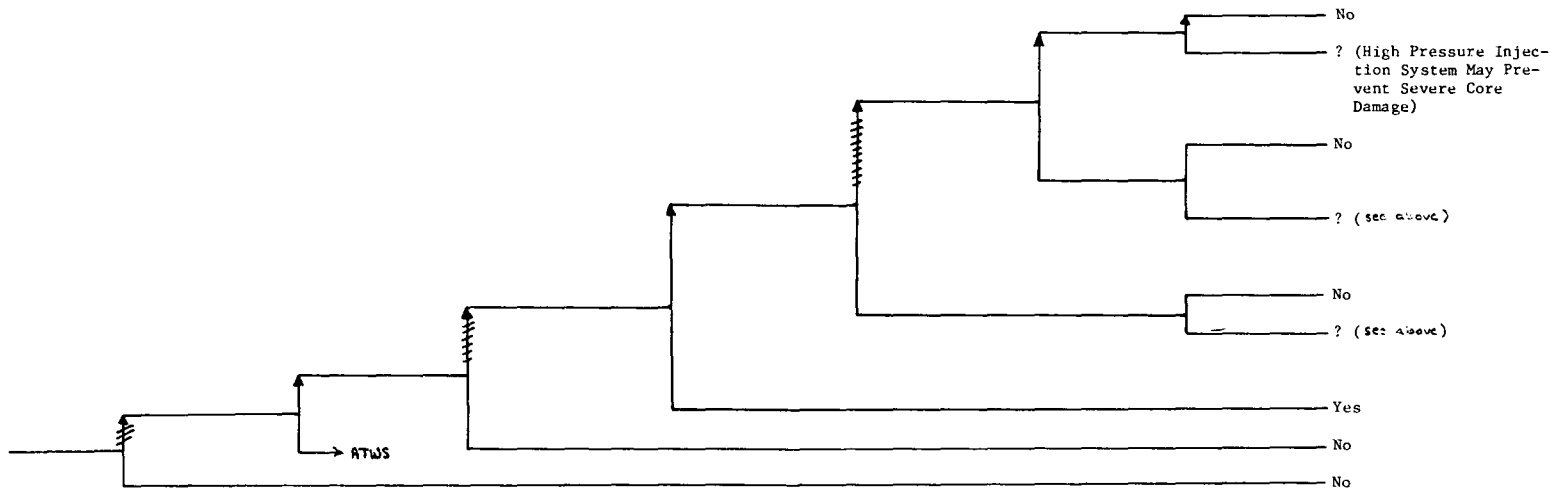
The failure sequence was: (Continued)

6. Due to a linkage-rod failure in the No. 2 diesel generator output breaker, the No. 2 train component cooling water pump and service water pump for diesel cooling did not start. These pumps were manually started.
7. The two steam-driven auxiliary feedwater pumps started and provided steam generator/RCS cooling.
8. During restoration of normal power, sticking motor-cut off switches in the 13.8 kv air circuit breakers for startup transformer No. 2 prevented powering the safety-related buses from offsite power.
9. Operator action successfully closed the startup transformer No. 2 13.8 kv circuit breakers.
10. Defective relays in the Reactor Coolant Pump Component Cooling Water Interlocks prevented restart of Reactor Coolant Pumps 2-2, 1-1, and 2-1.

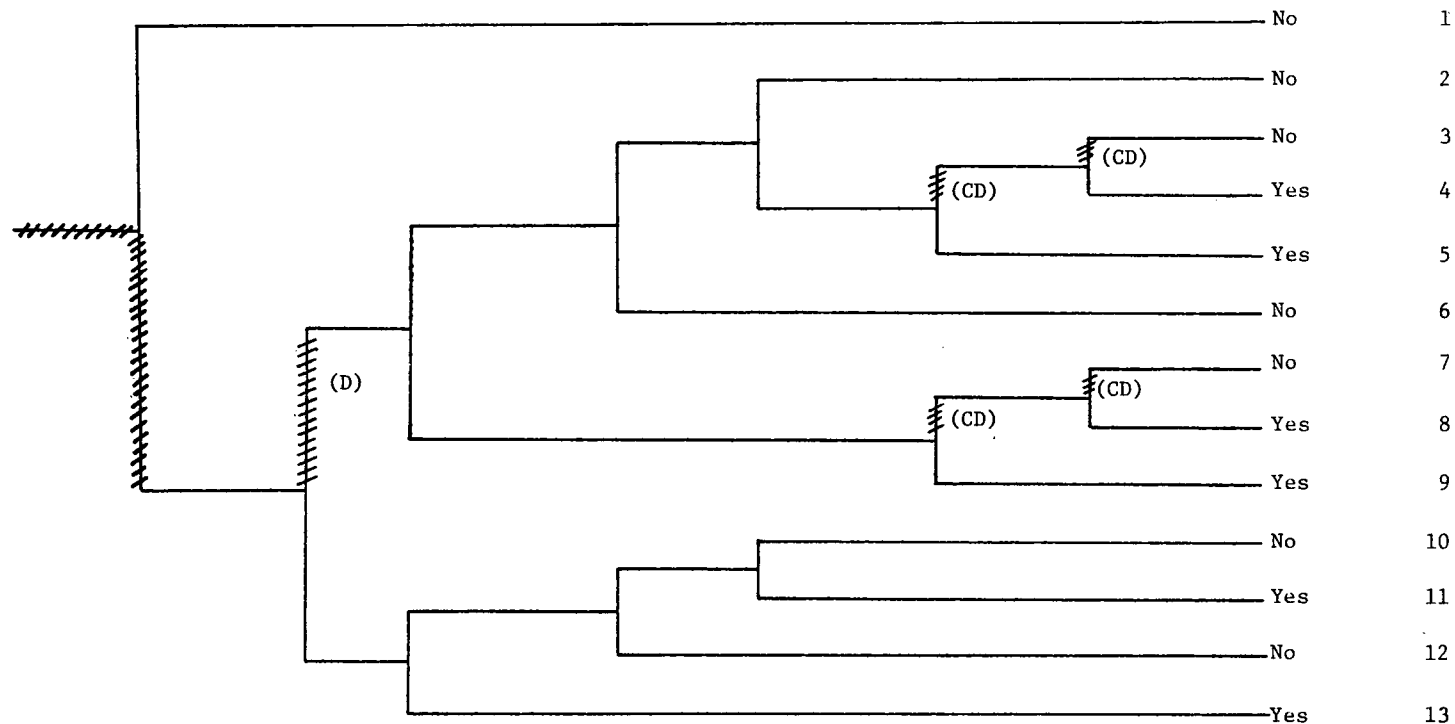
Corrective action: (Continued)

4. The sticking "A" and "B" bus motor cutoff switch operating linkages were replaced.
5. Blown fuses and relays in all reactor coolant pump component cooling water interlocks were replaced.

Reactor at ~69% Power	ICS Capacitor Failure Opens Turbine Control Valves, Resulting in Increased Reactor Power and Increased Feed-water Flow	Reactor Trip at Reduced High Flux Set Point of ~69% Power	Fault in Generator Output Breaker 35460 Due to Failed Muffler Results in Trip of 345 kv "J" Bus and Loss of Offsite Power	Diesel Generators No. 1 & 2 Start and Load Their Safety-Related Buses	Linkage Rod Assembly Failure in Diesel Generator No. 2 Output Breaker Results in Failure of Train No. 2 Component Cooling Water and Service Water Pumps to Start	Operator Manually Starts Train No. 2 Component Cooling Water and Service Water Pumps	Steam Driven AFW Pumps Provide SG/RCS Cooling	Potential Severe Core Damage
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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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CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 152951

DATE OF LER: October 25, 1979

DATE OF EVENT: October 15, 1979

SYSTEM INVOLVED: Integrated Control System (ICS), Offsite Power, Onsite Power

COMPONENT INVOLVED: Capacitor (ICS), Generator Circuit Breaker (Offsite Power),  
Diesel Output Breaker (Onsite Power)

CAUSE: Capacitor had too low a working voltage, the generator circuit breaker muffler  
failed and resulted in a ground fault, the Diesel Generator Output breaker

SEQUENCE OF INTEREST: Reactor trip with loss of offsite power linkage rod failed.

ACTUAL OCCURRENCE: Reactor trip with loss of offsite power

REACTOR NAME: Davis-Besse 1

DOCKET NUMBER: 50-346

REACTOR TYPE: PWR

DESIGN ELECTRICAL RATING: 906 MWe

REACTOR AGE: 2.2 yr

VENDOR: B&W

ARCHITECT-ENGINEERS: Bechtel

OPERATORS: Toledo Edison Co.

LOCATION: 21 miles east of Toledo, Ohio

DURATION: N/A

PLANT OPERATING CONDITION: at ~69% power

SAFETY FEATURE TYPE OF FAILURE: (a) inadequate performance; (b) failed to start;  
(c) made inoperable; (d) \_\_\_\_\_

DISCOVERY METHOD: During operating

COMMENT: -