

PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 61434

Date: March 4, 1971

Title: Loss of Offsite Power and Failure of an Emergency Condenser Valve to Open at Humboldt Bay (Semi-Annual Report July-December 1970)

The failure sequence was:

1. With the reactor at power, a switching error at the Humboldt Substation caused protective relaying which resulted in a generator and turbine trip, loss of the 60 KV bus, and consequent loss of offsite power.
2. Loss of normal power resulted in reactor scram, loss of feedwater flow, loss of drywell cooling, and loss of control room indication of reactor vessel pressure and level.
3. The emergency propane generator started and assumed safety-related loads. (A back-up feed was available from the adjacent fossil unit.) A CRD hydraulic pump was started to provide reactor makeup.
4. The emergency condenser return valve failed closed due to an incorrectly adjusted torque switch.

cont.

Corrective action:

1. Normal power was restored to the plant 2.4 KV bus from an adjacent fossil unit.
2. The emergency condenser isolation valve was repaired and returned to service.

Design purpose of failed system or component:

1. Offsite power provides power for safety-related systems when the unit generator is unavailable.
2. The emergency condenser provides a means of removing reactor decay heat when the condenser is not available for steam dump.

Unavailability of system per WASH 1400:*

LOOP: 2×10^{-5} /hr.

Unavailability of component per WASH 1400:*

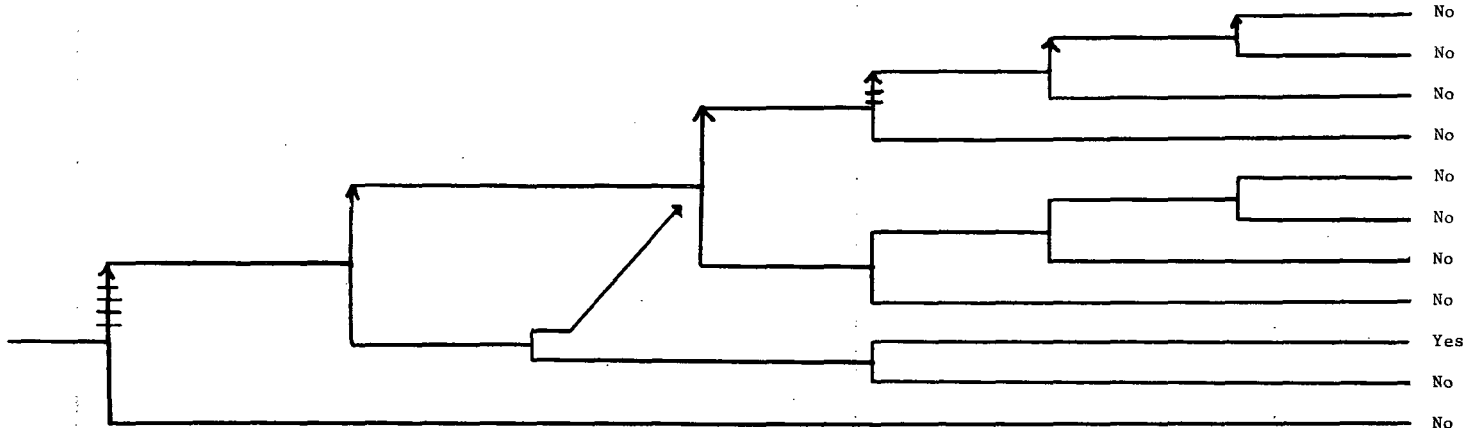
valve, motor operated, failure to open: 1×10^{-3} /D

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

failure sequence continued

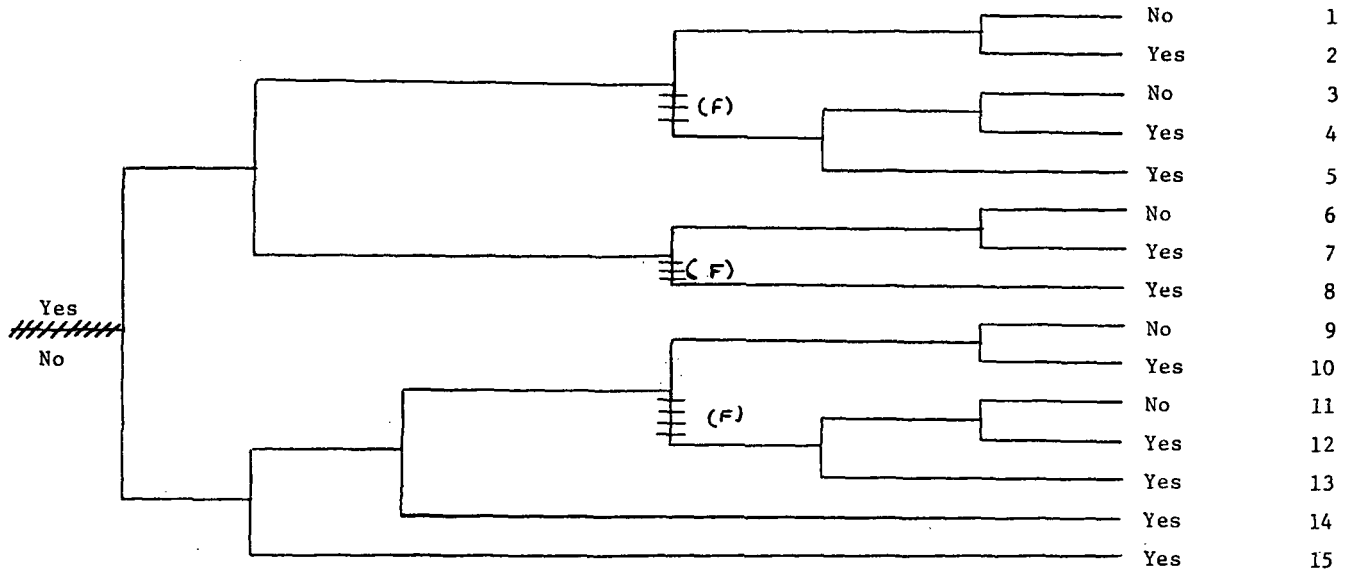
5. Reactor vessel level shrink to the low water level setpoint due to the opening of a safety valve (a result of the failed emergency condenser) combined with the loss of feedwater and an increase in drywell pressure (due to loss of drywell cooling plus a failed relief valve expansion joint) resulted in the actuation of the reactor vent system. This system was manually secured four minutes later.
6. The low pressure core flood and core spray systems subsequently automatically initiated and were used for core cooling until normal power was restored.

Reactor at power	Switching error at Humboldt substation results in generator/turbine trip, scram, and loss of offsite power	Emergency propane generator starts and assumes safety-related loads	Adjacent fossil unit provides power to safety-related loads	CRD hydraulic pump started to provide reactor makeup	Emergency condenser return valve fails closed due to improperly set torque switch (valve disc jammed)	Reactor vent system actuates and depressurizes reactor (subsequently secured)	Low pressure core flood and core spray systems provide core cooling	Potential Severe Core Damage
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NSIC 61434 - Actual Occurrence for Loss of Offsite Power and Failure of an Emergency Condenser Valve to Open at Humboldt Bay

Loss of Offsite Power	Reactor Scram	Diesel Start and Load	Reactor Made Sub-critical by the SBLCS Or Rods Are Manually Driven In	RCIC/HPCI ¹ Initiates	ADS/LPCI CS Initiates	Long Term Core Cooling	Potential Severe Core Damage	Sequence No.
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NSIC 61434 - Sequence of Interest for Loss of Offsite Power and Failure of an Emergency Condenser Valve to Open at Humboldt Bay

¹Humboldt Bay utilized an emergency condenser and CRD hydraulic pumps/safety valves for decay heat removal

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 61434

DATE OF LER: March 4, 1971

DATE OF EVENT: July 17, 1970

SYSTEM INVOLVED: offsite power, emergency condenser

COMPONENT INVOLVED: 60 KV bus, motor-operated valve

CAUSE: power was lost to the bus due to a switching error, the valve failed to operate due to an improperly set torque switch, operator error.

SEQUENCE OF INTEREST: loss of offsite power

ACTUAL OCCURRENCE: Loss of offsite power

REACTOR NAME: Humboldt Bay

DOCKET NUMBER: 50-133

REACTOR TYPE: BWR

DESIGN ELECTRICAL RATING: 65 MWe

REACTOR AGE: 7.4 yr

VENDOR: GE

ARCHITECT-ENGINEERS: Bechtel

OPERATORS: Pacific Gas and Electric Co.

LOCATION: 4 miles S of Eureka

DURATION: N/A

PLANT OPERATING CONDITION: at power

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

DISCOVERY METHOD: operational event

COMMENT: —