

PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 149450

Date: May 2, 1979

Title: Loss of Feedwater Transient at Oyster Creek

The failure sequence was:

1. A spurious high RCS pressure signal caused by surveillance testing caused a reactor scram and an ATWS recirculation pump trip.
2. The turbine/generator tripped due to low load. This caused all three reactor feed pumps to trip.
3. An automatic transfer was made to the "SA" startup transformer and buses "1A" and "1C" loaded. "SB" startup transformer was out of service for maintenance thus a transfer did not take place. Diesel generator #2 started and loaded bus "1D", however power was lost to non-essential bus "1B".
4. An unsuccessful attempt to start the "A" feed pump was made. "B" and "C" feed pumps are feed from the "1B" bus which was de-energized.
(see attached page)

Corrective action:

1. The "A" feedwater pump and the "A" recirculation pump were placed into service and the water level returned to the proper level.
2. The reactor was placed in cold shutdown.

Design purpose of failed system or component:

The isolation condenser system prevents overheating of the reactor fuel in the event feedwater is lost and heat removal systems which require a.c. power for operation are unavailable.

Unavailability of system per WASH 1400:* not considered in WASH 1400

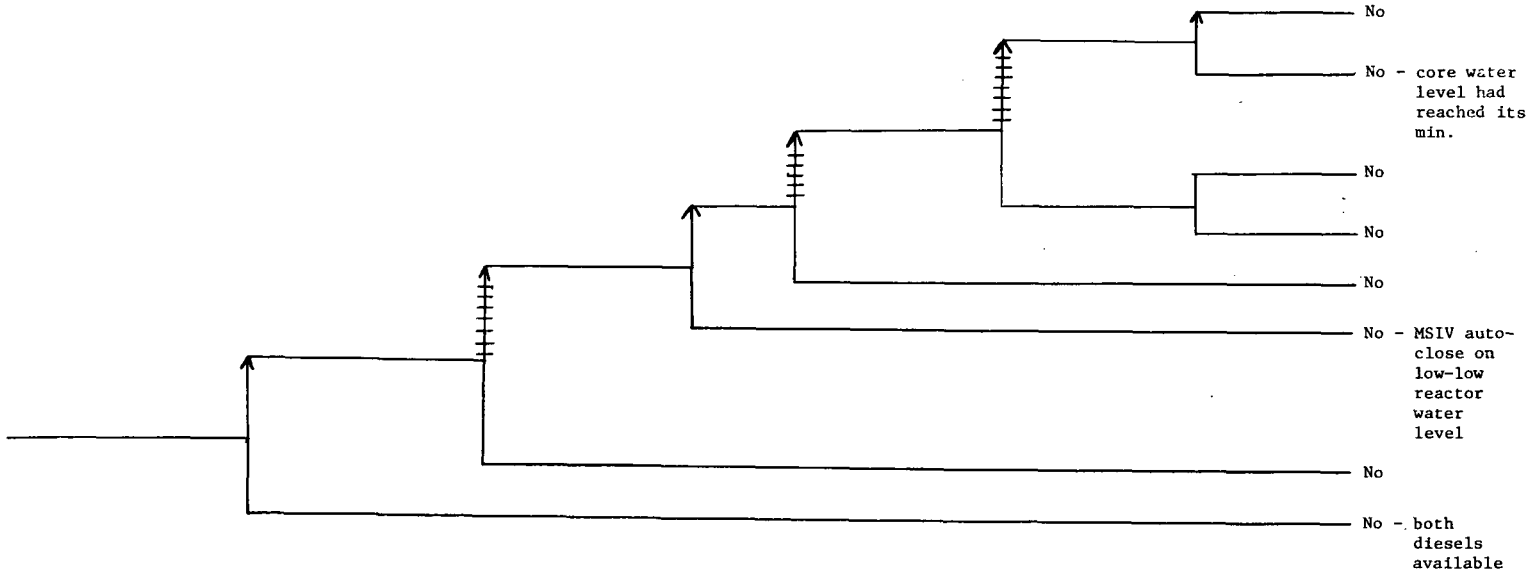
Unavailability of component per WASH 1400:* $3 \times 10^{-3}/D$, operator error

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

The failure sequence was: (continued)

5. The operator manually closed the MSIVs.
6. The "B" isolation condenser was manually initiated by the operator. This required closing discharge valves in the "A" and "E" recirculation loop. It is believed the operator also closed loops "B" and "C" discharge valves. The "D" loop had been isolated prior to the event for maintenance. This left all 5 recirculation loop discharge valves closed, thus isolating the core from returning condensate from the isolation condensers. All 5 by-pass valves around the discharge valves were opened and once the "LD" bus was loaded both CRD pumps were operational, thus the core region received a continuous supply of water. Water from the isolation condenser backed up into the downcomer since flow to the core was very restricted.
7. The isolation condensers were operated periodically or to control the reactor cool down rate.
8. The operator initiated the "C" recirculation pump, however, it was quickly shut down due to a rapid water level drop in the downcomer annulus.
9. The "A" feedwater pump was finally initiated (after several unsuccessful attempts) thus providing high capacity, high pressure coolant injection. Shortly afterwards the "A" recirculation pump was started and water level in the reactor and annulus region achieved equilibrium.

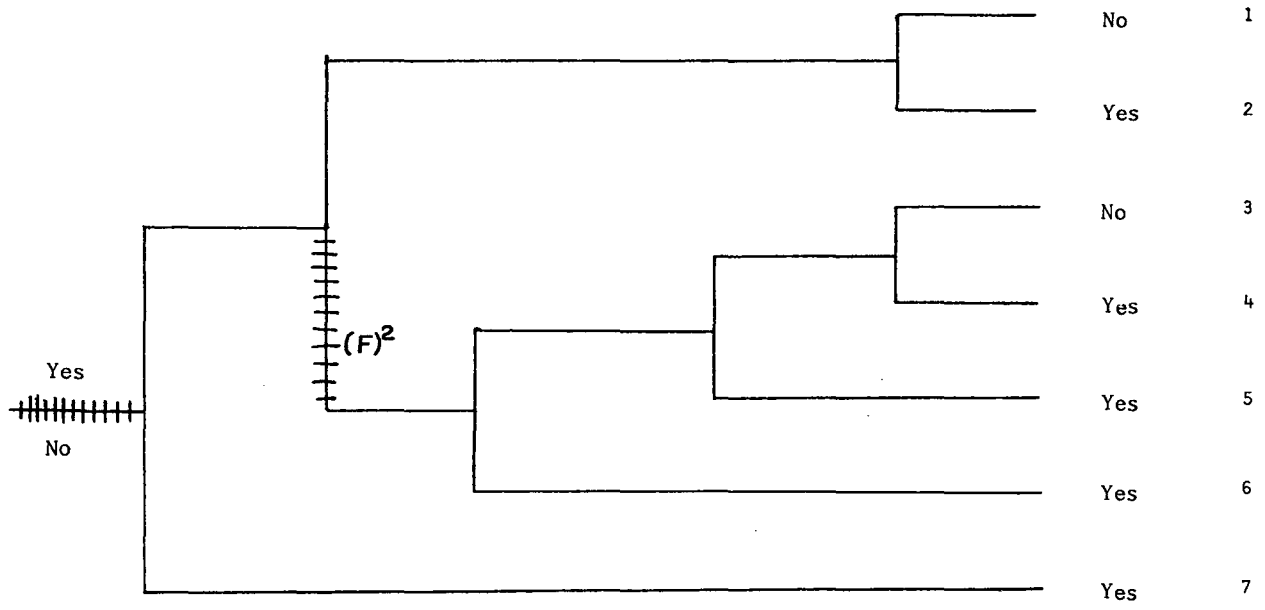
A reactor/recirculation pump trip results in a turbine/generator trip which results in a loss of feedwater	An autotransfer to transformer "5A" loaded buses "1A" & "1C". "5B" was down for maintenance thus essential bus "1D" was loaded from the diesel	An attempt to start feed pump 1A failed (pumps B & C were fed from the unavailable 1B bus	Operator manually closes the MSIV	The operator initiates the isolation condenser and closes all recirc. discharge valves instead of just "A" & "E"	Operator initiates the "C" recirculate pump but shut it off due to rapid water drop in annulus	Feed pump "A" successfully started followed by recirculation pump "A"	Potential Severe Core Damage
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NSIC 149450 - Actual Occurrence of a Loss of Feedwater Flow at Oyster Creek

Loss of Feedwater Flow	Reactor Subcritical	RCIC/HPCI ¹ Response Adequate	Automatic Depressurization System Operates	LPCI or CS Response Adequate	Long Term Core Cooling
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Potential Severe Core Damage
Sequence No.



NSIC 149450 – Sequence of Interest for a Loss of Feedwater Flow at Oyster Creek

¹ Oyster Creek utilizes Isolation condensers rather than RCIC
² Success requires proper operation of either FWCT or IC.

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 149450

DATE OF LER: May 12, 1979

DATE OF EVENT: May 2, 1979

SYSTEM INVOLVED: isolation condensers

COMPONENT INVOLVED: recirculation loop discharge valves

CAUSE: operator/procedural deficiencies, human error

SEQUENCE OF INTEREST: loss of feedwater flow

ACTUAL OCCURRENCE: loss of feedwater flow at Oyster Creek

REACTOR NAME: Oyster Creek

DOCKET NUMBER: 50-219

REACTOR TYPE: BWR

DESIGN ELECTRICAL RATING: 650 MWe

REACTOR AGE: 10.4 yr

VENDOR: GE

ARCHITECT-ENGINEERS: Burns and Roe

OPERATORS: Jersey Central Power and Light

LOCATION: Nine miles S of Toms River, NJ

DURATION: N/A

PLANT OPERATING CONDITION: 98% power followed by scram

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

DISCOVERY METHOD: operation

COMMENT: Four previous LERs are attributed to problems with the I.C. system and its line rupture instrumentation. In fact, the administrative controls which require tripping the "A" and "C" recirculation pumps was developed to circumvent the line rupture problem. Perhaps if the problem with the instrumentation had been rectified instead of just the system this event could have been avoided.