PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 83833

Date: September 8, 1973

Title: Total Loss of AC Power at Oyster Creek

The failure sequence was:

1. A plant shutdown was in progress and had progressed to the point where the electrical output was 90 MWe. When attempting to switch the load from the auxiliary transformer to the startup transformer a loss of power occurred on the 1A 4160 V a.c. bus. This was caused by an improper setting on the C phase differential relay after maintenance. The 1C 4160 V bus which is feed from the 1A 4160 bus or the emergency diesel also deenergized. The loss of these buses caused several pumps to trip, including the condensate pumps.

2. Diesel generator number 1 initiated in the "fast start" mode, re-energizing the IC 4160 bus.

3. An attempt was made to restart the stopped B and C condensate pumps while the unit was still generating electricity but the reactor scrammed on low water level,

Corrective action: (see attached sheet)

1. Improper setting of the current transformer ratio matching taps for the C phase differential relays on both S1A and S1B was responsible for the loss of offsite power. The taps were properly set and the transformer returned to service.

2. The problem associated with the diesels was traced to the design of the diesel logic circuit. General Motors was contacted about this problem. (see attached sheet)

Design purpose of failed system or component:

1. Offsite power supplies power to the loads when the unit generator isn't available.

2. The diesel generators supply power to safety related loads when both the unit generator and the offsite power source are unavailable.

Unavailability of system per WASH 1400:* offsite power: 2×10^{-5}/hr.

Unavailability of component per WASH 1400:* --

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

The failure sequence was: (continued)

which caused the 1B 4160 V bus to de-energize.

4. Following the scram:
   a. the 1B 4160 V a.c. was energized from the SB transformer
   b. the lockout relay, 86SA was manually reset
   c. the S1A breaker was closed
   d. diesel generator 1 was synchronized with the system
   e. the 1C breaker was closed
5. Diesel number 1 was secured at which time a trouble light was initiated in the control room.
6. Breaker 51A tripped when the operator attempted to start the A condensate pump. Diesel generator 1 didn't start due to the previous actuation of the engine lock out relay.
7. The operator next attempted to start either B or C condensate pump. This resulted in tripping startup transformer S1B. Diesel generator 2 was initiated in the fast start mode.
8. Both the S1A and the S1B breakers and the diesel engine lockout relays were manually reset and closed and diesel generator 1 was started.
9. Diesel generator #2 was synchronized with the line, the 1D breaker was closed and the diesel was secured.
10. The operator again tried to start the B or C condensate pumps after closing the 1D breaker and securing the diesel. This resulted in a trip of breaker 1D. Diesel 2 failed to start due to lockout relay.
11. By this time the water level had dropped to 9' above the core (1'10" above the core spray initiation level). The operator opened the CRD hydraulic control station by pass valve to allow water from the CRD pumps to be pumped into the reactor to counter what was being lost due to decay heat. He finally isolated the reactor by closing the MSIVS and initiated the isolation condensers to remove decay heat.

Corrective action: (continued)

3. If the operator had initially relied upon the diesels (as he finally ended up doing) instead of trying to tie to the offsite power source, the event would have proceeded only to step 4.

   The following long range steps were taken to prevent a recurrence of this type of event:

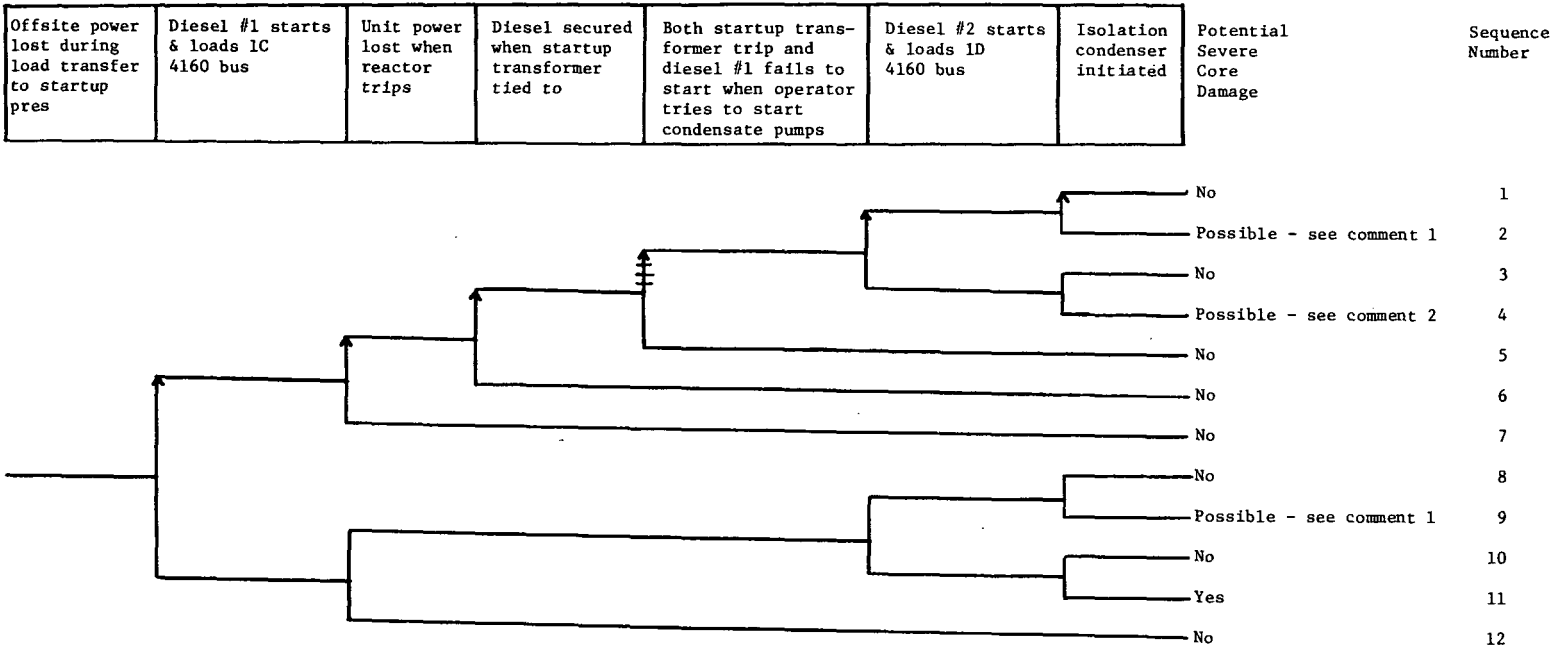
   1. Prepare procedures, in conjunction with the Relay Department, for all Relay Department work in the Oyster Creek plant. All work in the future will be coordinated with the shift foreman.

(see attached sheet)

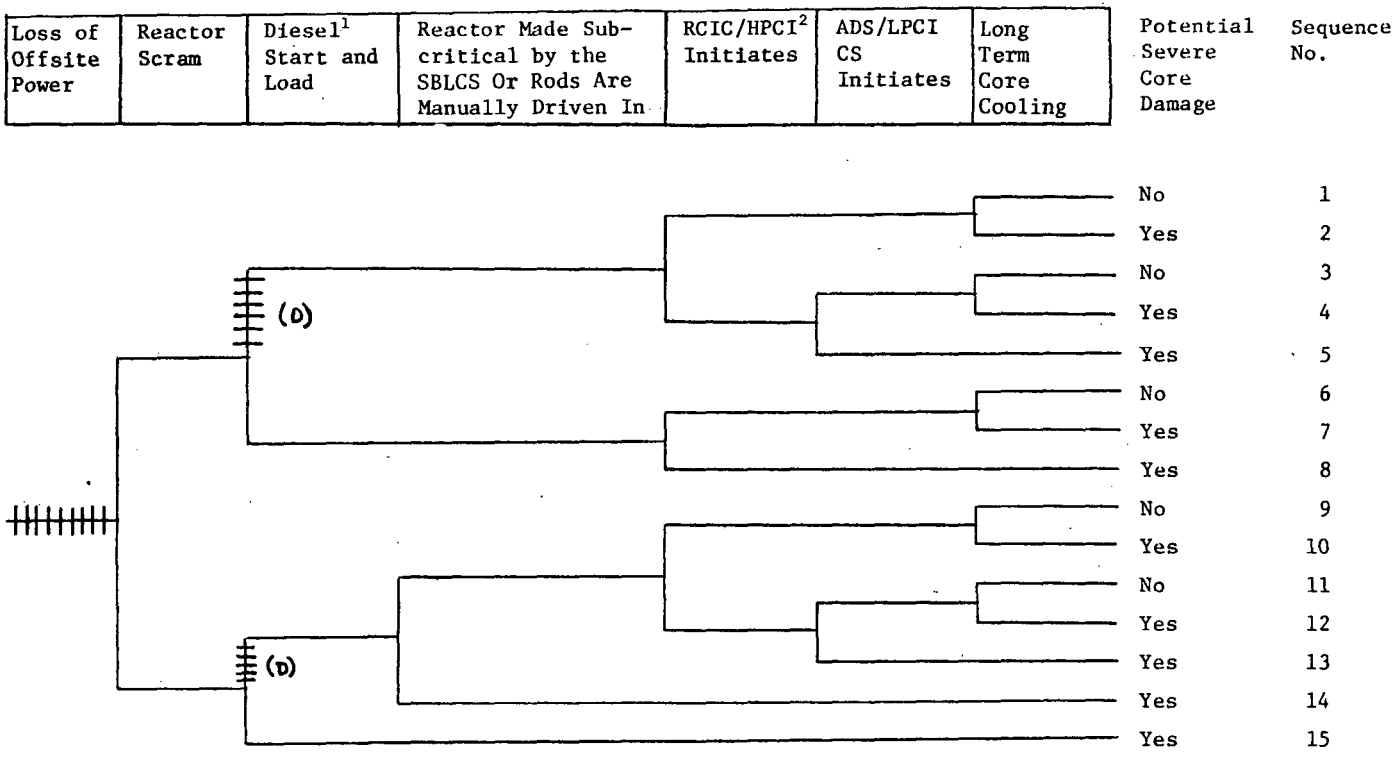
Corrective action: (continued)

2. Prepare a design change to the diesel generator logic circuits to prevent lockout following shutdown of the diesel. General Motors was to be contacted for recommendations.

3. Review and revise Procedure No. 511 "Loss of Feedwater System" as required.



NSIC 83833 — Actual Occurrence for a Total Loss of A.C. Power at Oyster Creek



NSIC 83833 — Sequence of Interest for a Total Loss of A.C. Power at Oyster Creek

[1]Diesel had initiated earlier in the transient but was locked out after being secured. The total loss of a.c. power lost approximately 15 sec.

[2]Oyster Creek utilizes isolation condenser rather than RCIC.

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 83833

DATE OF LER: September 18, 1973

DATE OF EVENT: September 8, 1973

SYSTEM INVOLVED: electric power

COMPONENT INVOLVED: transformer relays, diesel generator relays

CAUSE: maintenance fault, error in diesel start logic, human error

SEQUENCE OF INTEREST: loss of offsite power

ACTUAL OCCURRENCE: loss of offsite power

REACTOR NAME: Oyster Creek

DOCKET NUMBER: 50-219

REACTOR TYPE: BWR

DESIGN ELECTRICAL RATING: 650 MWe

REACTOR AGE: 4.29 yr

VENDOR: General Electric

ARCHITECT-ENGINEERS: Burns and Roe

OPERATORS: Jersey Central Power and Light

LOCATION: 9 miles from Toms River, New Jersey

DURATION: N/A

PLANT OPERATING CONDITION: 90 MWe and proceeding to shutdown

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

DISCOVERY METHOD: operations

COMMENT: "The designed redundancy for the station vital power supplies (i.e., offsite power and diesel generators) was not present and in fact, had not been present since July 30, 1973..." This is about a 5 week period.

This statement was taken from the LER.