

NSIC Accession Number: 85370

Date: October 31, 1973

Title: Loss of Offsite Power, Excessive RCS Cooldown, Subsequent Safety Injection, and Failure of a Vital Instrument Bus at R. E. Ginna

The failure sequence was:

1. The reactor was at approximately 100% power, with one of four transmission circuits out of service due to construction and auxiliary power provided from the station switchyard and an external 34.5kv line.
2. A second of four 115kv circuits tripped due to a ground fault.
3. Power swings because of high generated power with only two transmission lines cause remaining two 115kv transmission lines to trip, which resulted in loss of the station switchyard and one of two auxiliary power sources.
4. Loss of all 115kv transmission lines overload a supply circuit for the remaining auxiliary power source, causing it to trip, resulting in a total loss of offsite power, and a turbine trip.

(See attached page)

Corrective action:

1. Operating procedures were revised to reduce the power output from Ginna when any transmission circuit is out of service.
2. The turbine-driven AFW pump control logic was being reviewed because of the rapid steam generator filling.
3. No cause for the momentary instrument bus failure was found.

Design purpose of failed system or component:

1. Offsite electrical power provides an alternate source of power to plant auxiliaries in the event the unit generator is inoperable.
2. The vital instrument bus provides battery-backed uninterruptible power for safety-related instrument loads.

Unavailability of system per WASH 1400:\*      Offsite power:  $2 \times 10^{-5}/\text{hr}$   
    Vital instrument bus:  $1.7 \times 10^{-5}/\text{hr}$

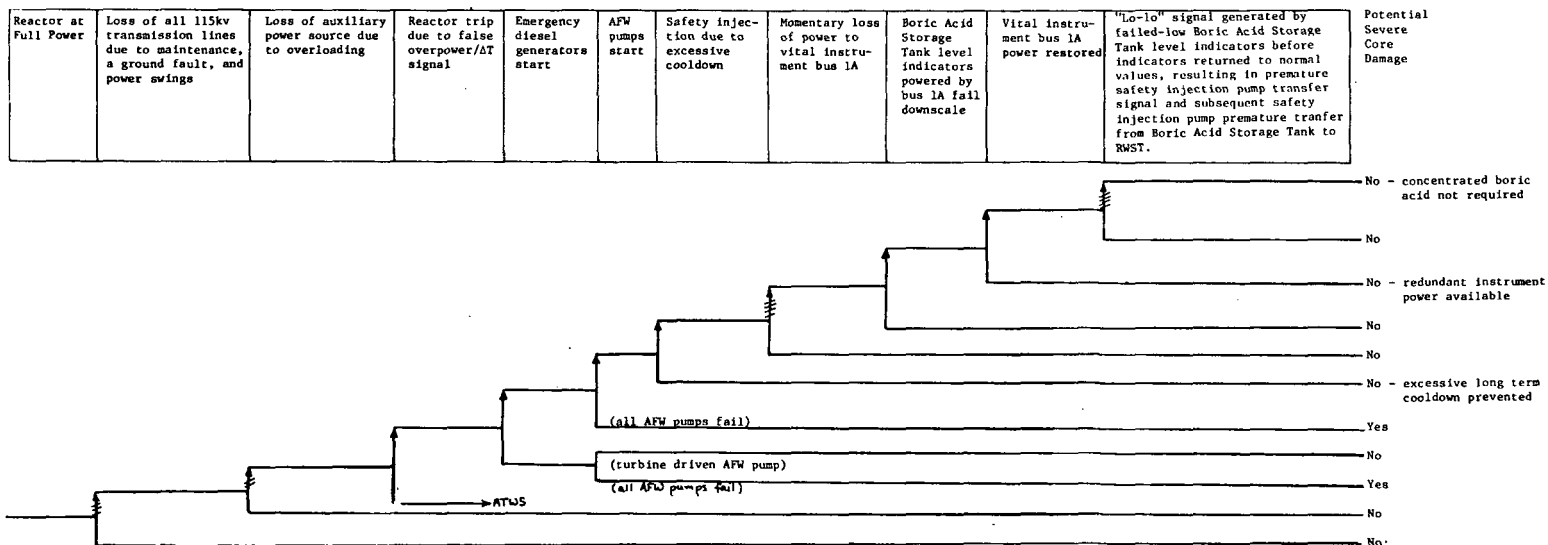
Unavailability of component per WASH 1400:\*

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

The failure sequence was: (Continued)

5. An electrical disturbance on an instrument bus causes a reactor trip on a false overpower/high  $\Delta T$  signal.
6. The emergency diesel generators started.
7. The motor-driven and turbine-driven auxiliary feed pumps started on low steam generator level and loss of offsite power.
8. The operator secured the motor-driven AFW pump from the control room and the turbine-driven AFW pump locally because of increasing steam generator water level and decreasing RCS temperature. Because of the turbine-driven pump control circuitry during a loss of offsite power, the pump could only be secured locally.
9. Safety injection was automatically initiated due to low pressurizer pressure and level resulting from the RCS cooldown.
10. Vital bus 1A momentarily failed and caused the Boric Acid Storage Tank level transmitters powered from this bus to fail downscale.
11. Vital bus 1A power was restored.
12. The failed-low Boric Acid Storage Tank level indicators generated a "lo-lo" level signal before returning to their normal position, resulting in a premature safety injection pump transfer signal.
13. The safety injection pumps prematurely transferred their suction source from to Boric Acid Storage Tank to the RWST.



NSIC 85370 - Actual Occurrence for Loss of Offsite Power, Excessive RCS Cooldown, Safety Injection, and Failure of a Vital Instrument Bus at K. E. Ginna



CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 85370

DATE OF LER: October 31, 1973

DATE OF EVENT: October 21, 1973

SYSTEM INVOLVED: offsite power, vital power

COMPONENT INVOLVED: transmission circuits, vital instrument bus

CAUSE: (see attached page)

SEQUENCE OF INTEREST: loss of offsite power

ACTUAL OCCURRENCE: loss of offsite power, excessive RCS cooldown, subsequent safety injection, and loss of a vital instrument bus

REACTOR NAME: R. E. Ginna

DOCKET NUMBER: 50-244

REACTOR TYPE: PWR

DESIGN ELECTRICAL RATING: 490 MWe

REACTOR AGE: 4.1 yr

VENDOR: Westinghouse

ARCHITECT-ENGINEERS: Gilber Associates

OPERATORS: Rochester, Gas & Electric Co.

LOCATION: 15 miles NE of Rochester, NY

DURATION: N/A

PLANT OPERATING CONDITION: approximately 100% power

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

DISCOVERY METHOD: operational event

COMMENT: -

CAUSE: The transmission circuits failed due to a ground fault and power swings caused by instability of the generator and transmission lines when two transmission lines were inoperable. The cause of the momentary power failure on the vital instrument bus was not determined.