

PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 152563

Date: October 2, 1979

Title: Tube Break Occurs in Steam Generator at Prairie Island 1

The failure sequence was:

1. With the reactor at 100% power, a tube break occurred in the "A" steam generator.
2. The air ejector radiation monitor alarmed and a turbine runback occurred due to decreasing RCS pressure.
3. The operator commenced load reduction.
4. The operator started the second and third charging pumps on low pressurizer level.
5. Reactor Trip and Safety Injection occurred due to low pressurizer pressure.
6. The operator tripped both main coolant pumps.

(Continued on next page)

Corrective action:

1. The RCS was placed in cold shutdown and drained.
2. The steam generator was inspected. The tube with the break and adjacent tubes exhibiting wall thinning were plugged. Two springs and part of a hose clamp were found in the steam generator. These were sent to Westinghouse for inspection.

Design purpose of failed system or component:

The steam generators provide the mechanism for removing heat from the RCS.

Unavailability of system per WASH 1400:* —

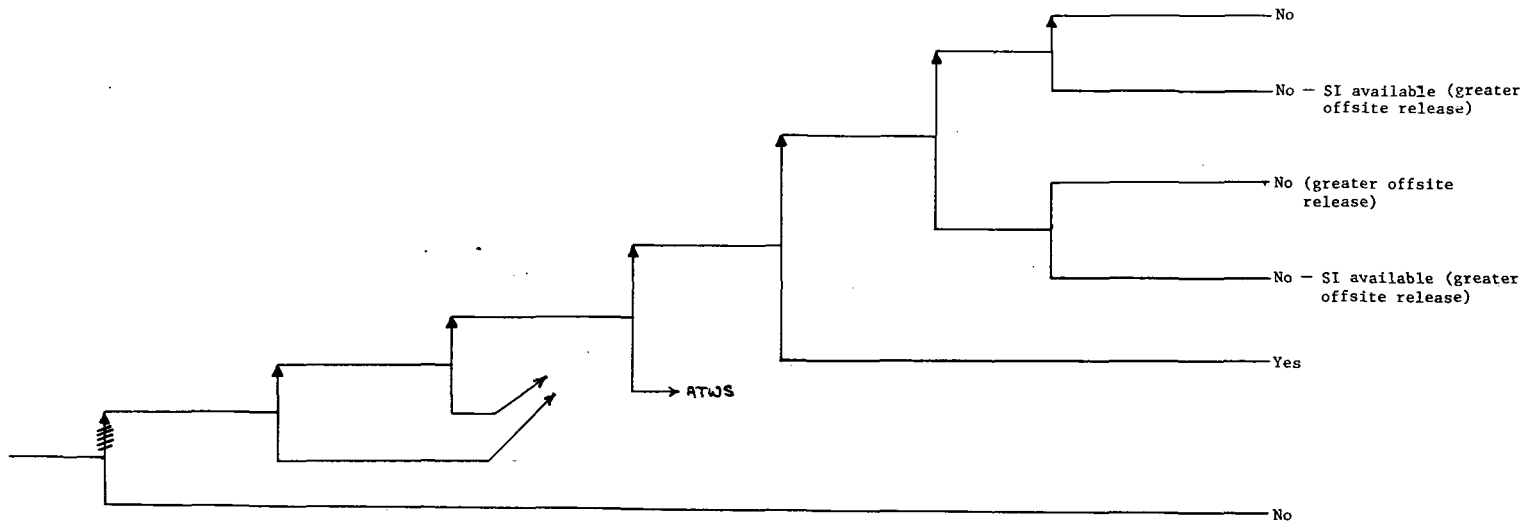
Unavailability of component per WASH 1400:* not considered

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

The failure sequence was: (Continued)

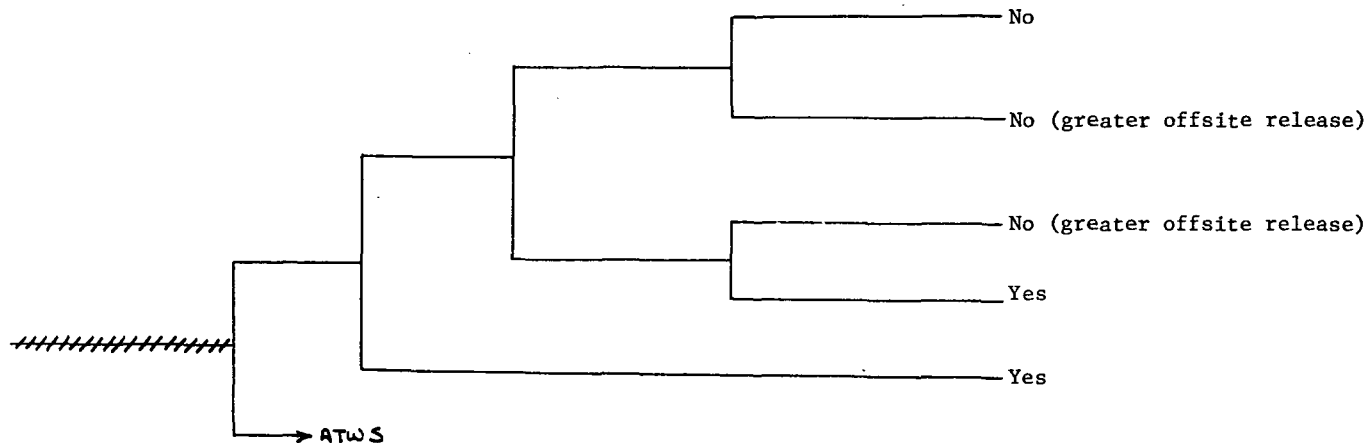
7. Steam Generator "A" level increased much more rapidly than usual, indicating a tube break in that generator.
8. Loop "A" Main Steam Isolation Valve closed by operator.
9. No. 11 SI pump was stopped.
10. Operator began depressurizing RCS using PORV.
11. When the pressurizer level reached the high level setpoint the second SI pump was stopped.
12. One hour after the break occurred, RCS pressure was at 910 psig, the same pressure as steam generator "A".

Reactor at 100% Power	Steam Generator "A" Tube Rupture and Consequent Air Ejector High Radiation Alarm	Turbine Runback and Load Reduction Due to Decreasing RCS Pressure	Operator Starts Second and Third Charging Pumps Because of Decreasing RCS Pressure	Reactor Trip Due to Low RCS Pressure	Safety Injection Due to Low RCS Pressure, Main Coolant Pumps Stopped by Operator	Loop "A" MSIV Closed by Operator	Pressurizer Filled to High Level Setpoint, SI Pumps Stopped, and RCS Depressurized to Below Steam Generator Relief Valve Set Pressure Using PORV	Potential Severe Core Damage
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NSIC 152563 - Actual Occurrence for Tube Break Occurs in Steam Generator at Prairie Island 1

Steam Generator Tube Rupture	Reactor Trip	Safety Injection	Ruptured Steam Generator Isolated	RCS Depressurized to Below Steam Generator Relief Valve Setpoint	Potential Severe Core Damage
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NSIC 152563 — Sequence of Interest for Tube Break Occurs at Prairie Island 1

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 152563

DATE OF LER: October 16, 1979

DATE OF EVENT: October 2, 1979

SYSTEM INVOLVED: Reactor Coolant System

COMPONENT INVOLVED: Steam Generator

CAUSE: Tube Break

SEQUENCE OF INTEREST: Steam generator tube rupture

ACTUAL OCCURRENCE: Steam generator tube break

REACTOR NAME: Prairie Island 1

DOCKET NUMBER: 50-282

REACTOR TYPE: PWR

DESIGN ELECTRICAL RATING: 530 MWe

REACTOR AGE: 5.8 yr

VENDOR: Westinghouse

ARCHITECT-ENGINEERS: Pioneer Services

OPERATORS: Northern States Power Co.

LOCATION: 28 miles SE of Minneapolis, Minn.

DURATION: N/A

PLANT OPERATING CONDITION: 100% power

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

DISCOVERY METHOD: Operational Event

COMMENT: -