PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 148764

Date: January 18, 1979

Title: Steam Dump Valves Fail to Close Following Load Rejection at Beaver Valley 1

The failure sequence was:

1. With the reactor at 92% power, the 1B heater drain pump tripped due to low heater drain tank level.
2. During the subsequent load rejection, the condenser steam dump valves opened as required, but failed to close because the valve operators were exposed to cold temperatures due to improperly positioned air dampers in the turbine building.
3. Low steam line pressure resulted in a reactor trip and safety injection.

Corrective action:

The air dampers were properly positioned.

Design purpose of failed system or component:

The condenser steam dump valves direct steam flow from the steam generators directly to the main condenser in the event of a loss of load or turbine trip, permitting reactor runback in lieu of trip.

Unavailability of system per WASH 1400:* not addressed in WASH-1400.

Unavailability of component per WASH 1400:* motor-operated valve, failure to operate: $1 \times 10^{-3}/D$.

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

Reactor at 92% Power	1B Heater Drain Pump Trips Due to Low Heater Drain Tank Level	Condenser Steam Dump Valves Open for Unit Load Rejection	Condenser Steam Dump Valves Fail Open Due to Excessively Low Operator Temperatures Due to Misposition Ventilation Dampers	Reactor Trip	Safety Injection	Potential Severe Core Damage
						No
						Potential
						ATWS Sequence
						No
						No
						ATWS Sequence
						No

NSIC 148764 — Actual Sequence for Steam Dump Valves Fail to Close Following Load Rejection at Beaver Valley

Steam Line Break	Reactor Trip	Steam Generator Isolation	Auxiliary Feedwater and Secondary Heat Removal	High Pressure Injection	PORV Opened Due to Continued HPI	PORV or PORV Isolation Valve Closure	Long Term Core Cooling	Potential Severe Core Damage	Sequence No.
*								No	1
								No	2
								Yes	3
								No	4
								Possible (with worst case stuck rod)	5
								No	6
								Yes	7
								Yes	8
								Yes	9
								Yes	10

NSIC 148764 — Sequence of Interest for Steam Dump Valves Fail to Close Following Load Rejection at Beaver Valley 1

*small

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 148764

DATE OF LER: April 18, 1979

DATE OF EVENT: January 18, 1979

SYSTEM INVOLVED: Main steam

COMPONENT INVOLVED: Condenser steam dump valves

CAUSE: Valves failed to close due to exposure to abnormally low temperatures resulting from improper damper position, human error

SEQUENCE OF INTEREST: Steam line break

ACTUAL OCCURRENCE: Stuck open steam dump valves

REACTOR NAME: Beaver Valley 1

DOCKET NUMBER: 50-334

REACTOR TYPE: PWR

DESIGN ELECTRICAL RATING: 852 MWe

REACTOR AGE: 2.7 yr

VENDOR: Westinghouse

ARCHITECT-ENGINEERS: Stone & Webster

OPERATORS: Duquesne Light Co.

LOCATION: 5 miles east of East Liverpool, Ohio

DURATION: N/A

PLANT OPERATING CONDITION: 92% power

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

DISCOVERY METHOD: Operator observation, SI initiation

COMMENT: The LER does not specify how many of these valves stuck open. However, the FSAR (section 10.3) states that all the steam dump valves open on a step load decrease and the failure of 9 remaining open is equivalent to a steam line break.