

FAILURE PROBABILITY AND FREQUENCY CALCULATIONS

1. Frequency of secondary depressurization from stuck open main steam line safety-relief valve

o Frequency of a challenge to the safety relief valve (to open):

Reactor trips caused by the loss of condenser heat sink (i.e., inadvertent closure of all MSIVs, loss of condenser vacuum, and loss of condenser bypass) will challenge the SRVs.

From NUREG/CR-5750, the initial plant fault (IPF) for the loss of condenser heat sink (LOHS) category was used to estimate the frequency of SRV challenges. The IPF occurs prior to the reactor trip at which time the steam generation rate is the greatest. The functional impact category for LOHS includes all occurrences—those that occur prior to (i.e., IPF) and shortly after the reactor trip. Loss of heat sink events that occur shortly after the reactor trip will result in a lower steam generation rate from decay heat. This smaller rate is within the capacity of the isolatable atmospheric dump valves (ADVs).

NUREG/CR-5750 (Ref. 1) shows a between plant variation of the LOHS IPF category. From Table G-7, the IPF frequency of LOHS for Indian Point 2 is $2.5E-2$ per critical year.

o Frequency of secondary depressurization event at IP2 is:

- Frequency of a challenge to the safety relief valve = $2.5E-2$ /cr. yr.
- Number of SRVs on the affected steam generator at IP2 = 5
- Probability of SRV failure to close after first lift = $9E-3$ /demand
From IP2 IPE.
- Number of demands on each SRV prior to failure = 1 demand
Assume first post trip lift will result in one SRV failure to close. Shortly after the reactor trip, the ADVs will remove decay heat levels
- Frequency of secondary depressurization event =
 $(2.5E-2/\text{cr. yr.})(5 \text{ SRVs})(1 \text{ demand})(9E-3/\text{demand}) = 1.1E-3/\text{critical year}$

11/08/00

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References

1. J. P. Poloski, et. al., *Rates of Initiating Events at U.S. Nuclear Power Plants: 1987-1995*, NUREG/CR-5750, February 1999.

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