

Risk Assessment for IP2 SG Tube Degradation  
Leading to SG Tube Failure on February 14, 2000

For SDP, risk is assessed for the *condition* of the tubes over the time that degradation exceeded allowable levels.

This is *different* from the ASP program analysis of the event that actually occurred.

The condition of the tube made it vulnerable to several potential causes for failure:

spontaneous failure (with potential flows ranging from tens of gpd to hundreds of gpm)

steam system depressurization transients

reactor coolant system over-pressurization transients

core damage accidents (with steam system dry and depressurized but RCS not fully depressurized)

The risk assessment process considers the frequency of each of these challenges, the probability that the tube would fail given each, and the probability that the challenge with tube failure would lead to core damage.

Of these, the spontaneous rupture dominates the risk estimate at about  $1 \times 10^{-4}$ /RY averaged over the last year.

$7.7 \times 10^{-5}$

The steam system depressurization transients and the core damage accidents could add about  $1 \times 10^{-6}$ /RY each if the tubes were susceptible for a whole year, but it is not clear whether they were.

Although the frequency of each of these accident sequences could be subjected to more detailed analysis, it is not expected that the result would be to reduce the total core damage frequency increment to a value below  $1 \times 10^{-5}$ /RY.

Because the numerical threshold between "red" and "yellow" is  $1 \times 10^{-5}$ /RY for core damage accidents that would create large releases, it does not appear that more detailed analysis would change the "color" assessment.

4.7E-5

★ Left a CDF for SGTR & why

Assumptions - 0.5 - Rupture/lead  
1.0 / yr SGTR IE

C/43