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To: Brian Holian, ^{RI} Peter Wilson; Richard Barrett; Steven Long ^{N.R.L.}
Date: 12/26/00 7:07AM
Subject: Risk Assessment of IP2 SGTR & Loss of Bus 6A

Per Steve's requested I've attached the risk evaluation completed to address this condition. I will add that since we completed this evaluation, the ASP folks have analyzed the Aug. 99 loss of bus 6A event and have significantly reduce the CCDP for this event over previous estimates by Region I and the licensee. The reason for the reduction is better estimates for recovery actions and methods which weren't included in the previous evaluations. Sunil would be your contact for the latest information regarding this analysis. To my understanding, the attached evaluation is the only attempt to assess the risk of a SGTR and the loss of bus 6A. Hope this helps! If not please give me a call 610-337-5186. Thanks

DPH

- 1 How reasonable are the risk calculations? - The first event discovered latent failures that were not picked up during surveillance testing or maintenance. Also, first trip was "spurious," it was only "luck" that that trip occurred before the tube rupture event occurred. (There was no other reactor trip in between these two events.) Had the latent failures in the plant on August 15, 1999 not been corrected, then it is probable that the manual trip in response to the SGTR would have triggered a LOOP and the lockout of one EDG for the same "mechanistic" reasons, making the SGTR event more difficult to control.

This is an excellent question, and not an easy one to answer. For actual events, the NRC method calls for calculation of a conditional core damage probability (CCDP); that is, the likelihood that core damage would occur given the actual conditions in the event. We generally expect to have a few events each year with CCDP in excess of $1E-6$, which means that there was a one-in-a-million chance that core damage would have occurred. Events having CCDP in excess of $1E-3$ occur about once every other year.

The CCDP calculations for the two Indian Point events have evolved as we learned more about the actual conditions. Currently we treat the August, 1999 electrical bus failure and the February, 2000 steam generator tube failure as unrelated events, and we estimate their CCDP at $5E-5$ and $2E-6$, respectively. If the two events had occurred concurrently, the CCDP would be greater than the higher individual value ($5E-5$) due to the complicating effect of additional equipment failures and the additional stress on the operators. An early NRC calculation of the hypothetical combined event showed a CCDP that was about 40% greater than the higher individual CCDP. While our understanding of the two events has changed since then, this result still has some validity, and indicates that the effect of postulating a combined event on the CCDP would not be overly large.

A second question is how likely would a combined event be, given the existing conditions. This is not as easy to estimate as it may seem. During the period when the two events actually occurred, it was probably 50/50 whether the steam generator event occurred before the electrical condition was revealed. However, there was a period before the electrical condition existed when the tube failure could have occurred. Finally, it would take some analysis to determine whether the conditions in a trip initiated by a tube failure would have led to the failure of the 6A bus. All in all, the likelihood of a joint occurrence was less than 50%, and possibly much lower.

For the Indian Point 2 events, the current practice of taking events one-at-a-time would not lead to significantly different NRC actions, either for event response or performance assessment purposes, than the combination of the two events taken separately. However, the possibility exists that an entirely different conclusion could be drawn for another combination of events at some future time. Should NRC processes take this possibility into account?