conservative *vis-à-vis total* core melt frequency and that was what I was examining. I would also point out that we have some newer results, which have been submitted to the Editor, that increase the 95% margin from ~4 to ~9 (under special statistical assumptions). However, this leads to about 16 total core melts to make *that* estimate true. It is true that statistics can be abused; I don't believe I have done so.

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FURTHER INFORMATION ON "WASH-1400: A COMPARISON OF EXPERIENCE AND PREDICTION"

In a recent paper,[1] we attempted to evaluate the effect of future reactor experience on predictions of core melt probability. The approach taken was to assume that the current bounding values obtained from the chi-square tables

$$\lambda_{true} < \lambda^*(\alpha) = \frac{\chi_2^{2\,1-\alpha}}{2T(1980)} \ , \quad \Pr[\lambda_{true} < \lambda^*(\alpha)] = \alpha$$

would be valid for all time. Using this result, the uncertainty in the WASH-1400 estimates for $\lambda^*(\alpha)$ could be shown to be at most a factor of 3.88.

Further work[2] shows that this conclusion is reasonable for $\alpha \lesssim 0.75$ but not for $\alpha = 0.95$. The new results (both numerical and analytical) can be made clear in an example. After T reactor years of experience, $\exp(-\lambda T)$ is the probability of an event having occurred. For the sake of exposition, suppose $\lambda T = 1$ implies the event occurs. If no events occur up to T_0, then $\lambda_0^* = \chi_2^2/2T_0$. Accepting λ_0^* as the failure rate, then an event should occur by $T = T_0(1 + 2/\chi_2^2)$, which yields a new estimate for $\lambda^* = \chi_4^2/2T_0(1 + 2/\chi_2^2)$. By induction, the time to r events is

$$T_0 + S_r = T_0 \prod_{i=0}^{r-1} \left(1 + \frac{2}{\chi_{2i+2}^2}\right)$$

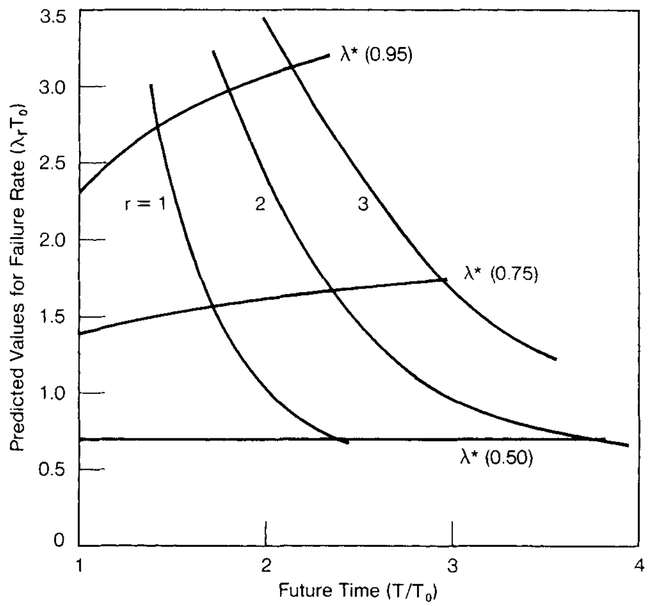

Fig. 1. Predicted values of failure rate estimates.

and the failure rate estimate at the end of the interval is

$$\lambda_r^* = \frac{\chi_{2r+2}}{2T_0 \prod_{i=0}^{r-1} \left(1 + \frac{2}{\chi_{2i+2}^2}\right)} \ .$$

Inherent in this is that both λ_r^* and S_r are functions of α, the time to r failures being much greater for low values of α than for high values. The relation between r and T and the prediction of $\lambda^*(\alpha)$ is shown in Fig. 1. A very interesting result is that at T_0 we have the estimate

$$\Pr[\lambda_{true} < \lambda_0^*(\alpha)] = \alpha \ ,$$

but using $\lambda_r^*(\alpha)$ as the estimate for the following time interval indicates that $\lambda_r^*(\alpha) > \lambda_{r-1}^*(\alpha)$ for $\alpha \lesssim 0.75$. This disrupts the probability estimate. This has interesting implications concerning the very conservative nature of this type of extrapolation.

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