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Subject: More numerology

I think the results of the integrated assessment which takes into account the number of crack nozzles and the crack size distribution as well as the variability in CGRs gives the numbers the PRA types really need. The distribution of crack size is the hokiest part of that analysis and I did some more calcs to see what other estimates would give me.

In the assessment I sent you Sunday, I assumed the distribution of crack sizes decreased linearly from 20-300. This meets basic criteria: (1) consistent with experience that small cracks are more likely than big cracks, and (2) the fraction of big cracks >160 is conservative with respect to current field experience (roughly $2/20 = 0.1$).

Quadratic and cubic distributions in crack size would be more consistent with experience in terms of ratio of large cracks to small cracks. The fractions of cracks >160 are:

linear .30
quad .17
cubic .09

Thus both the linear and the quadratic meet the requirement that they be conservative with respect to field experience, but the cubic is marginal.

The corresponding probabilities of failure at 18 and 24 months with no credit for inspection are:

linear
18 0.16
24 0.26
quadratic
18 0.076
24 0.16
cubic
18 0.037
24 0.111

The "best estimate" is probably the quadratic. It gives a distribution more consistent with experience than the linear, but maintains a reasonable degree of conservatism with respect to the likelihood of large cracks. For the more "realistic" distributions, the differences between 18 and 24 months are even larger than for the linear distribution.

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