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To: Joe Muscara -RES

From: Saurin Majumdar

Pages: 3

Subject: Weibull plot attached

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ITEM #

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June 30, 2000

To: Distribution

From: S. Majumdar

Subject: Weibull increase in number of cracked tubes with time

Gorman et al. (NUREG/CR-6521) have fitted the observed number of cracked tubes with time at various plants with a 2-parameter Weibull distribution as follows:

$$F(t) = 1 - \exp\left[-\left(\frac{t}{t_1}\right)^b\right]$$

where F is the fraction of tubes cracked at time t and t_1 is a characteristic time. The Weibull modulus b has been reported by Gorman et al. to vary typically between 2 and 10. In Fig. 1, I have shown a plot for the variation of number of cracked tubes with time, using a fictitious plant with 1000 susceptible tubes and $t_1 = 10$ years. On a semi-log plot, as in Fig. 1, an exponential rise of number of cracked tubes with time would appear as a straight line. Thus, early in life, the number of tubes cracked would rise exponentially, particularly for high values of b . But the actual number of cracked tubes would depend strongly on the value of the Weibull modulus b .

xc: W. J. Shack

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