LETTERS TO THE EDITOR

LOAD DURATION CURVES

The method used in making electricity forecasts described in the "Market Survey for Nuclear Power in Developing Countries, General Report" printed by the International Atomic Energy Agency (Sep. 1973) makes use of load duration curves for arriving at system load factors. The method described involves fitting a fifth degree polynomial to approximately 40 points of data expressing the fraction of maximum load as a function of fraction of time period. The report states that the fits are quite good.

In 1969, Paul C. Fine and I had occasion to use load duration curves in some of our studies. We also discovered that fifth degree polynomials made acceptable fits to these curves. In addition, we found that the coefficients of the fifth degree polynomial were closely related to just two quantities—the ratio of the minimum load to the maximum load during the period, and the ratio of the average load to the maximum load. The expression we developed is

$$y = \bar{y} - (1 - y_1)(x - \tfrac{1}{2}) - 3(1 + y_1 - 2\bar{y})(x - \tfrac{1}{2})^2 + 8(1 - \bar{y})(x - \tfrac{1}{2})^3 + 20(1 + y_1 - 2\bar{y})(x - \tfrac{1}{2})^4 - 32(1 - \bar{y})(x - \tfrac{1}{2})^5 \quad ,$$

where

y = ratio of the load to the maximum load

y_1 = ratio of the minimum to the maximum load

$\bar{y}$ = ratio of the average to the maximum load

x = fraction of the total hours in the period that the ratio of the load to the maximum load exceeds y.

This expression gives $y = 1$ when $x = 0$, $y = y_1$ when $x = 1$, and $y = \bar{y}$ when $x = \frac{1}{2}$. The expression has proven to be useful since, in many instances, values for y_1 and y are available when no further information can be obtained. Furthermore, the equation can be obtained without the use of sophisticated computers. This equation was checked on actual annual data from large U.S. utility systems and overall foreign country systems. In nearly every case, the values calculated from the equation fell within ±10% of the actual values—in fact, in most cases they fell within ±6%.

Perhaps this information will be useful to some of your readers.

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July 30, 1974

Corrigenda

C. W. PENNINGTON, T. S. ELLEMAN and K. VERGHESE, "Tritium Release from Niobium," *Nucl. Technol.*, **22**, 405 (1974)

The authors have noted the following corrections in their paper:

1. The average weight fraction (instead of atom fraction as quoted on p. 406) of tritium was 0.005 ppm.
2. The Arrhenius expression on p. 408 should read

   $D(\text{cm}^2/\text{sec}) = \exp(-4.79 \pm 3.78)\exp(-47.9 \pm 5.6/RT)$.
3. The Arrhenius expression on p. 409 should read

   $D_a(\text{cm}^2/\text{sec}) = \exp(6.73 \pm 3.78)\exp(-47.9 \pm 5.6/RT)$.

The authors regret the errors and the inconvenience it may have caused the readers.