DISCUSSION

G. P. Sabol[1] (written discussion) — (1) You presented much of your data as weight gain as a function of $(1/T)$. Is there a reason for this choice as the independent variable? Did you try any other functions?

(2) Zr-Nb alloys, especially the binary alloys, have different sensitivities to LiOH than Zircaloy. Therefore, for solid comparison of Δw data, it is necessary that the materials be in the same region of corrosion or the exposures be long enough to assure the absence of Li-accelerated corrosion. What was the rationale for applying the same LiOH screening tests to rank different Zr-Nb alloys as was used to rank Zircaloy of different heat treatments?

R. A. Perkins and R. A. Busch (authors' closure) — (1) This data presentation was chosen because the slope of a straight line for these coordinates yields the activation energy for the corrosion process. This is true for the weight gain data if the time is constant and there is no change in the rate constant during the time of exposure. The activation energy was evaluated for pre-transition when weight gain values were less than 20 mg/dm² at 16 h. The activation energy for post-transition was obtained only for the highest Li concentration with weight gains over 100 mg/dm². McDonald et al. observed that there was no apparent pre-transition region for Zircaloy corrosion in 0.1 M LiOH solutions, and we observed weight gains in a second 16-h exposure to be equivalent to those of the initial exposure, which indicates that linear kinetics are observed early in the corrosion process. The data were not plotted using other coordinates.

(2) There was simply an attempt to see if the supercritical LiOH-accelerated test could be effectively applied to the Zr-Nb alloys in addition to the Zircaloys. The result was that it could not.

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