3. D. H. NGUYEN, "Reply to 'Comments on "The Uncertainty in Accident Consequences Calculated by Large Codes Due to Uncertainties in Input,"' " *Nucl. Technol.*, **52**, 441 (1981).

4. STEVEN M. BAKER, "Further Comments on 'The Uncertainty in Accident Consequences Calculated by Large Codes Due to Uncertainties in Input,'" *Nucl. Technol.*, **53**, 410 (1981).

5. M. ZELEN, "Bounds on a Distribution Function That Are Functions of Moments to Order Four," *J. Res. Nat. Bur. Stand.*, **53**, 377 (1954).

REPLY TO "CONTINUING COMMENTS ON 'THE UNCERTAINTY IN ACCIDENT CONSEQUENCES CALCULATED BY LARGE CODES DUE TO UNCERTAINTIES IN INPUT' "

Cox et al.[1] have had the opportunity to make their point that the Monte Carlo method is preferable over the moment matching method for the construction of probability distribution functions. Their continued use of my paper[2] to press the issue indicates that they have missed the point in my reply[3] to their earlier critique.[1]

The objective of my work[2] was to determine the confidence level in the calculation of fuel pin failure time using an accident code. For this particular application, I was satisfied that the moment matching method was acceptable: the shapes of the distributions obtained by this method[3] did not differ significantly with those obtained by the Monte Carlo method.[1] It was not an objective of my work[2] to determine the potential error of the moment matching method when applied to other specific cases. Furthermore, I have not applied the Monte Carlo method to the same problem, and therefore cannot evaluate the relative accuracy of the two methods for this problem.

Such an evaluation does exist, however.[4] Reference 4 compared the Monte Carlo method and the moment matching method and concluded that "the two methods of uncertainty analysis produce densities with no significant difference." Reference 4 went further to recommend the Response Surface Method (which used the moment matching technique) as the more economical method of uncertainty analysis.

I believe that few would question the potential accuracy which the Monte Carlo method could provide. But even with today's computer speed, this accuracy is being paid for at a high price. In the uncertainty analysis of large computer codes, economy has become an overriding consideration. Furthermore, one cannot deny the fact that the moment matching method can be and has been successful, as part of an economical tool for uncertainty analysis.[4] It appears to me that there is a trade-off betwen the two methods, and it would be more constructive to define criteria for this trade-off than a generalized condemnation of a particular method based on specific examples. Such trade-off criteria should account for not only accuracy, but also economy and convenience in connection with the uncertainty analysis of large codes.

D. H. Nguyen

Hanford Engineering Development Laboratory
P.O. Box 1970
Richland, Washington 99352

August 10, 1981

REFERENCES

1. DAVID C. COX, PAUL BAYBUTT, and ROBERT E. KURTH, "Comments on 'The Uncertainty in Accident Consequences Calculated by Large Codes Due to Uncertainties in Input,'" *Nucl. Technol.*, **52**, 439 (1981).

2. DONG H. NGUYEN, "The Uncertainty in Accident Consequences Calculated by Large Codes Due to Uncertainties in Input," *Nucl. Technol.*, **49**, 80 (1980).

3. DONG H. NGUYEN, "Reply to 'Comments on "The Uncertainty in Accident Consequences Calculated by Large Codes Due to Uncertainties in Input,"' " *Nucl. Technol.*, **52**, 441 (1981).

4. NEIL D. COX, "Comparison of Two Uncertainty Analysis Methods," *Nucl. Sci. Eng.*, **64**, 258 (1977).