MAR 0 7 1983

Docket No. STN 50-470

Mr. A. E. Scherer, Director
Nuclear Licensing
Combustion Engineering, Inc.
1000 Prospect Hill Road
Windsor, Connecticut 06095

Dear Mr. Scherer:

Subject: CESSAR - Request for Additional Information

By letter dated October 8, 1982, you submitted Parts II and III of a report on Statistical Combination of Uncertainties for the CE System 80 plants. We have found that additional information concerning the October 8, 1982 submittal is required before we can complete our review.

Within seven days following your receipt of this letter, please provide your schedule for responses to the enclosed questions. If appropriate, we can meet with you to discuss either the questions or your responses to assure that the necessary information will be provided.

Please contact Gary Meyer (301-492-9787), the CESSAR Project Manager, should you require any further clarification of the enclosed request for information.

Sincerely,

/s/

Cecil O. Thomas, Chief
Standardization & Special
Projects Branch
Division of Licensing

Enclosure:
As stated

cc: See next page

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Combustion Engineering, Inc.

MAR 0 7 1983

cc w/enclosure(s):

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ENCLOSURE

QUESTIONS REGARDING CESSAR - 80 SCU PARTS II & III

The following questions are directed toward Enclosure 1-P to LD-82-079 "Statistical Combination of Uncertainties, Part II." Due to the similarity of the analysis presented in Parts II and III, these questions apply to Part III as well.

1. It is incorrect to interpret a non-parametric tolerance limit as a mean value plus a constant times the standard deviation. In Section 2.3.2, the non-parametric "$K\sigma$" is calculated from equation 2-4 by using the determined one-sided tolerance limit and the known mean error. Provide justification for this approach to treat non-normal error distributions.

2. Section 2.3.3 states that the reactor core simulator DNB-OPM is adjusted by a correction factor which is randomly sampled from the Cumulative Distribution Function (CDF) of the CETOP-D/CETOP-1 error. However, the ratio of CETOP-D to CETOP-1 output is not random, but is completely determined by the input such as RC flow rate, pressure and temperature to the codes. The effect of using CETOP-1 instead of CETOP-D cannot be countered by randomly selecting a value from the CETOP-D/CETOP-1 error CDF. This problem also applies to CETOP-2/CETOP-1. Provide justification for your evaluation of the DNB-OPM modeling error described in section 2.3.3.

3. Section 2.4.1.2 states that the Fxy used by CPC are verified by a CECOR calculation of Fxy during startup testing. Why wasn't the CECOR Fxy error and standard deviation evaluated for each time-in-life?

4. With regard to the penalty factors for the CPC power distribution algorith m (Section 2.4.1.3), provide a detailed description on how the maximum sensitivity factors associated with RSF, TSF, SAM and BPPCC were determined. In particular, how many rod configurations were used, how many RSF (as well ad TSF, SAM and BPPCC) values were used per configuration and how was ΔR determined?

5. The procedure used throughout the report for evaluating variable sensitivity is determined by evaluating

$$\left(\frac{\partial(\%Y)}{\partial(\%x_1)} \right)$$

where $y = fn\ (x_1, x_2, x_3 \ldots x_N)$ and x_1 is the variable whose sensitivity is being determined. Demonstrate that the sensitivity does not change for different values of x_2, x_3, etc.

6. Justify, derive or provide a reference for equation 2-9 in Section 2.4.1.2. What, if any, are the restrictions on the Pi's necessary for the validity of the equation?

7. Section 2.4.1.4 discusses the treatment of uncertainties associated with axial fuel densification, fuel rod bow, computer processing and engineering factors. Explain why the axial fuel densification uncertainty factor is handled differently from the other factors.

8. Provide a detailed description on how the axial fuel densification uncertainty, fuel and poison rod bow uncertainties, and the engineering factor uncertainty are determined. What, if any, are the restrictions of these uncertainties (i.e., plant specific or generic)?

9. Provide a justifiction for using the root-sum-square method to combine the quantities referred to as "$K\sigma$" values in equation 2-14 of Section 2.4.1.5. Show that the result can indeed be used to obtain a 95% probability/95% confidence tolerance limit.

10. Describe the wide ranges of radial peaking factors and axial shape indices (ASI) used in determining the dynamic pressure uncertainty in Section 2.4.2.2.

11. Explain why an average partial derivative of DNB-OPM with respect to the pressurizer pressure is used for pressure sensitivity and provide additional details on how the average is determined. The same question also applies to other uncertainty factors such as DNBR computer processing uncertainty, fuel rod bow uncertainty and system parameter uncertainties, etc.

12. Reference the origin of values for the secondary calorimetric power measurement error, the secondary calorimetric power to the CPC power calibration allowance, and the thermal power transient offset as described in Appendix B. Provide justification for these values.

13. Appendix A of the report states that CETOP-1 and CETOP-2 are simplified versions of CETOP-D and perform the on-line thermal-hydraulic calculations for the plant monitoring and protective systems respectively. Provide a detailed description on the difference between CETOP-1 and CETOP-2 and CETOP-D. Has CETOP-1 been approved by the NRC?

14. The report does not provide values of uncertainties and errors and indicates that they will be provided later. Are these values plant-specific? What are the generic values? Provide a list of items which are plant-specific for each individual CESSAR plant and describe how these plant specific items interface with the CESSAR generic submittal.