Docket Nos.: 50-454, 50-455,
50-456 and 50-457

Mr. Henry E. Bliss
Nuclear Licensing Manager
Commonwealth Edison Company
Post Office Box 767
Chicago, Illinois 60690

Dear Mr. Bliss:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - THOT REDUCTION PROGRAM FOR BYRON/BRAIDWOOD

By letter dated December 4, 1987, you provided a description of your Thot reduction program and proposed an amendment to the Byron/Braidwood Technical Specification revising the figure which depicts the normalized heat flux hot channel factor as a function of core height. Enclosed is a request for additional information that we need to complete our review of your submittal. Please respond within 45 days of receipt of this letter.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

/S/

Leonard N. Olshan, Project Manager
Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects

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Project Directorate III-2
Division of Reactor Projects - III,
IV, V and Special Projects

cc: See next page

Mr. Henry Bliss
Commonwealth Edison Company

Byron/Braidwood

cc:

Mr. William Kortier
Atomic Power Distribution
Westinghouse Electric Corporation
Post Office Box 355
Pittsburgh, Pennsylvania 15230

Joseph Gallo, Esq.
Hopkins and Sutter
1050 Connecticut Ave., N.W.
Suite 1250
Washington, D. C. 20036

C. Allen Bock, Esquire
Post Office Box 342
Urbana, Illinois 61801

Regional Administrator
U. S. NRC, Region III
799 Roosevelt Road, Bldg. #4
Glen Ellyn, Illinois 60137

Ms. Bridget Little Rorem
Appleseed Coordinator
117 North Linden Street
Essex, Illinois 60935

Mr. Edward R. Crass
Nuclear Safeguards and Licensing Division
Sargent & Lundy Engineers
55 East Monroe Street
Chicago, Illinois 60603

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
RR#1, Box 79
Braceville, Illinois 60407

Dr. Bruce von Zellen
Department of Biological Sciences
Northern Illinois University
DeKalb, Illinois 61107

U. S. Nuclear Regulatory Commission
Byron/Resident Inspectors Office
4448 North German Church Road
Byron, Illinois 61010

Ms. Lorraine Creek
Rt. 1, Box 182
Manteno, Illinois 60950

Mrs. Phillip B. Johnson
1907 Stratford Lane
Rockford, Illinois 61107

Douglass Cassel, Esq.
109 N. Dearborn Street
Suite 1300
Chicago, Illinois 60602

Ms. Pat Morrison
5568 Thunderidge Drive
Rockford, Illinois 61107

David C. Thomas, Esq.
77 S. Wacker Drive
Chicago, Illinois 60601

Elena Z. Kezelis, Esq.
Isham, Lincoln & Beale
Three First National Plaza
Suite 5200
Chicago, Illinois 60602

cc:

Mr. Charles D. Jones, Director
Illinois Emergency Services
and Disaster Agency
110 East Adams Street
Springfield, Illinois 62706

Mr. Michael C. Parker, Chief
Division of Engineering
Illinois Department of
Nuclear Safety
1035 Outer Park Drive
Springfield, Illinois 62704

Michael Miller, Esq.
Sidley and Austin
One First National Plaza
Chicago, Illinois 60603

George L. Edgar
Newman & Holtzinger, P.C.
1615 L Street, N.W.
Washington, D.C. 20036

Commonwealth Edison Company
Byron Station Manager
4450 North German Church Road
Byron, Illinois 61010

QUESTIONS ON T_{HOT} REDUCTION FOR
BYRON/BRAIDWOOD UNITS 1 AND 2

1. In Section 3.6 of Attachment C of the above Reference, which pertains to the impact of the T_{hot} reduction program on the Technical Specifications, you state that "A statistical setpoint study performed previously for Byron Units 1 and 2 provided increased margin in total allowance to various Technical Specification related instrumentation setpoints. Based on an evaluation of the sensitivities of the study for the reduced temperature parameters, it has been concluded that the setpoint allowances accounted for in the statistical evaluation remain valid."

   Please provide the references for the stated statistical setpoint study and the evaluation. Was this reviewed and approved by the NRC? What is the value of the increased margin in total allowance to the various Technical Specification related instrument setpoints? Provide the summary of the study for the reduced temperature parameters for which you state that the statistical evaluation remains valid.

2. You have stated in Section 3.1 of Attachment C of the above Reference that both the small break and large break LOCA conditions have been reanalyzed and that the reanalyses are presented in Appendix A of your report. Appendix A contains marked-up sections of Chapters 6.2.1.5 and 15.6.4 of the Byron/Braidwood FSAR. For the large break LOCA you state, in insert 4, that the chopped cosine power shape results in the most severe calculated consequence as required for LOCA analysis in 10 CFR Part 50, Appendix K. For the small break LOCA you state on page 15.6-19 that - "Figure 15.6-48 presents the hot rod power shape utilized to perform the small break analysis presented here. This power shape was chosen because it provides an appropriate distribution of power versus core height and also local power is maximized in the upper regions of the reactor core (10 ft. to 12 ft.). This power shape is skewed to the top of the core with the peak local power occurring at the 10.0 ft. core elevation."

Please explain how the hot rod power shape was arrived at for both the large and small break LOCA to satisfy the requirements of 10 CFR 50.46, Appendix K which states that - ". . . A range of power distribution shapes and peaking factors representing power distributions that may occur over the core lifetime shall be studied and the one selected should be that which results in the most severe calculated consequences . . ."

3. In Attachment C, Appendix B of the above Reference, the Technical Specification change for Figure 3.2.-2 is provided. This figure shows K(Z) normalized $F_Q(Z)$ as a function of core height. In comments to this revision you have stated in Attachment D of Reference 1 that - "This revision to the third line segment of the K(Z) curve will allow reactor operation with an increased heat flux hot channel factor at high core location."

   In order to compare the results of your analysis with the revised K(Z) curve please provide figures similar to Figure 3.2-2 with the results of your analysis imposed for the power shape. This should include curves of linear heat generation rate (kw/ft) vs. elevation (ft) including core average and hot rod values and the K(Z) limit for the SBLOCA.

4. On P.6 is a statement that the increases in F_Q and $F_{\quad H}$ were addressed only in the LOCA analysis. Will these increases be addressed for other accident analyses where they may affect (1) local power density, (2) minimum DNBR?

5. In Section 3.4 (P.13) on Non-LOCA Transients - Please explain why the parameters modified differ as shown below:

   19.3°F reduction in nominal RCS T_{ave} (P.13)
   19.6°F in Table 2.1-1 (P.5)

6. In Figure 3.4-1 (P.31) - No labels are shown on the curves which show solid and dashed lines for curves of delta I vs. T_{ave}. Please identify what the solid and dashed lines represent.

7. In Table 15.6-1 (Sheet 1 of 5) P. 15.6-3, why is the event of "rods begin to drop" (42.6 sec) listed after the event of "minimum DNBR occurs" (43.7 sec).

8. In Table 15.6 (P. 15.6-35), "Input parameters used in the ECCS analysis," there are listings for initial loop flow, inlet and outlet temperature and steam pressure. Reduced and nominal T_{hot} values are given. What are the nominal and reduced T_H values. Provide a background for the values stated and explain why the nominal values differ from the crossed out values used initially. Is this due to increases in peak linear power and peaking factors F_Q and F_Z? Was the original analysis with no steam generator tube plugging? Does the 18°F reduction in T_H require such a large steam pressure reduction of about 200°F from 977°F? Is the safety injection flow input for the ECCS analysis reduced by 5% as mentioned in page 6?

9. In Table 15.6-3, Page 15.6-36a - Large Break LOCA Results Fuel Cladding Data:

   For the column heading Nominal T_{Hot} why is the temperature 622.3°F instead of 618.4°F? Is the max ECCS column the ECCS flow without the 5% reduction in safety injection flow as stated in page 6 for LOCA accidents?

10. In Table 15.6-4, page 15.6-37, - SBLOCA Results Fuel Cladding Data:

    Why is the T_{hot} = 622.3°F instead of 618.4°F as used originally?

11. On page 15.6-19, why is there a decrease in the elevation for peak power from 10.5 ft. to 10.0 ft.?

12. Have any other Westinghouse plants had a:

    a) Mod of T_{Hot} reduction? Which ones?
    b) Mod of 3rd line segment of K(Z) curve removed? Which ones?