AFFIDAVIT PURSUANT

TO 10 CFR 2.790

Combustion Engineering, Inc.)
State of Connecticut)
County of Hartford) SS.:

I, P. L. McGill depose and say that I am the Vice President, Commercial, of Combustion Engineering, Inc., duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations and in conjunction with the application of Baltimore Gas & Electric Company, for withholding this information.

The information for which proprietary treatment is sought is contained in the following document:

Response to NRC Questions on CEN101(B)-P Calvert Cliffs Unit 2 Cycle 2 Reload Submittal, Amendment 2-P.

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Combustion Engineering in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1. The information sought to be withheld from public disclosure is design and performance characteristics, which is owned and has been held in confidence by Combustion Engineering.

2. The information consists of test data or other similar data concerning a process, method or component, the application of which results in a substantial competitive advantage to Combustion Engineering.

3. The information is of a type customarily held in confidence by Combustion Engineering and not customarily disclosed to the public. Combustion Engineering has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The details of the aforementioned system were provided to the Nuclear Regulatory Commission via letter DP-537 from F.M. Stern to Frank Schroeder dated December 2, 1974. This system was applied in determining that the subject documents herein are proprietary.

4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.

5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

6. Public disclosure of the information is likely to cause substantial harm to the competitive position of Combustion Engineering because:

a. A similar product is manufactured and sold by major pressurized water reactors competitors of Combustion Engineering.

b. Development of this information by C-E required thousands of man-hours of effort and hundreds of thousands of dollars. To the best of my knowledge and belief a competitor would have to undergo similar expense in generating equivalent information.

c. In order to acquire such information, a competitor would also require considerable time and inconvenience related to developing mathematical models and computer codes.

d. The information required significant effort and expense to obtain the licensing approvals necessary for application of the information. Avoidance of this expense would decrease a competitor's cost in applying the information and marketing the product to which the information is applicable.

e. The information consists of supporting data for analyses, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Combustion Engineering, take marketing or other actions to improve their product's position or impair the position of Combustion Engineering's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

f. In pricing Combustion Engineering's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of Combustion Engineering's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.

g. Use of the information by competitors in the international marketplace would increase their ability to market nuclear steam supply systems by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on Combustion Engineering's potential for obtaining or maintaining foreign licensees.

Further the deponent sayeth not.

P. L. McGill

Vice President, Commercial

Sworn to before me

this 9th day of October 1977

Notary Public

ETHELYN H. COLPITTS, NOTARY PUBLIC
State of Connecticut No. 33976
Commission Expires March 31, 1983

PROPRIETARY INFORMATION
COMBUSTION ENGINEERING, INC.

RESPONSE TO NRC QUESTIONS ON CEN-101(B)-P CALVERT CLIFFS UNIT 2 CYCLE 2 RELOAD SUBMITTAL - AMENDMENT 2-P

October 9, 1978

000001

Copy No. _____

Combustion Engineering, Inc.
Nuclear Power Systems
Power Systems Group
Windsor, Connecticut

LEGAL NOTICE

THIS REPORT WAS PREPARED AS AN ACCOUNT OF WORK SPONSORED BY COMBUSTION ENGINEERING, INC. NEITHER COMBUSTION ENGINEERING NOR ANY PERSON ACTING ON ITS BEHALF:

A. MAKES ANY WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED INCLUDING THE WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, WITH RESPECT TO THE ACCURACY, COMPLETENESS, OR USEFULNESS OF THE INFORMATION CONTAINED IN THIS REPORT, OR THAT THE USE OF ANY INFORMATION, APPARATUS, METHOD, OR PROCESS DISCLOSED IN THIS REPORT MAY NOT INFRINGE PRIVATELY OWNED RIGHTS; OR

B. ASSUMES ANY LIABILITIES WITH RESPECT TO THE USE OF, OR FOR DAMAGES RESULTING FROM THE USE OF, ANY INFORMATION, APPARATUS, METHOD OR PROCESS DISCLOSED IN THIS REPORT.

Rephrased NRC Questions

1. What is the minimum DNBR which occurs during the CEA Withdrawal transient?

2. What parametric studies have been performed to select the worst case CEA Withdrawal transient for the determination of the [γ] bias term in the TM/LP trip system?

3. Is the case presented in the license submittal the worst case as determined by these parametrics?

Response

As stated in CENPD 199P, the CEA Withdrawal transient is one of the design basis events analyzed to determine a bias factor used in establishing the TM/LP trip setpoints. This bias factor, along with conservative temperature, pressure and power readings, assures that the TM/LP trip will prevent the DNBR from dropping below the SAFDL limits (DNBR = 1.19 based on the CE-1 correlation) for a CEA Withdrawal event.

As noted in previous responses to NRC questions, the CEA Withdrawal transient is examined to determine that case which produces the largest differences between measured core inlet temperatures at the time a trip signal is actuated and the actual core inlet temperatures at the time of minimum DNBR. The parameters which are of primary importance in determining the rate of temperature and power increase are: 1) reactivity insertion rate due to rod motion and moderator temperature feedback effects, 2) gap thermal conductivity, 3) Resistance Temperature Detector (RTD) response characteristics, and 4) initial axial power shape. To determine the worst case CEA Withdrawal transient, a parametric analysis was performed over a range of each of these parameters; [except RTD time constant and axial shape] to establish the worst case parametric combination. The worst axial power shape (or more specifically, scram worth versus insertion) was determined to be the [most bottom peaked] axial power distribution. This power distribution maximizes the time required to terminate the decrease in DNBR following a trip. The RTD time constant was set at the maximum value (5 seconds) currently allowed by Tech Specs.

To establish the worst combination of reactivity insertion and gap thermal conductivity, the parametric analyses displayed in Figure 1 was performed. Figure 1 shows that the largest bias to the TM/LP trip is produced for the case of [low] gap thermal conductivity and [high] reactivity insertion rate. The parameters for this worst case are summarized in Table 1.

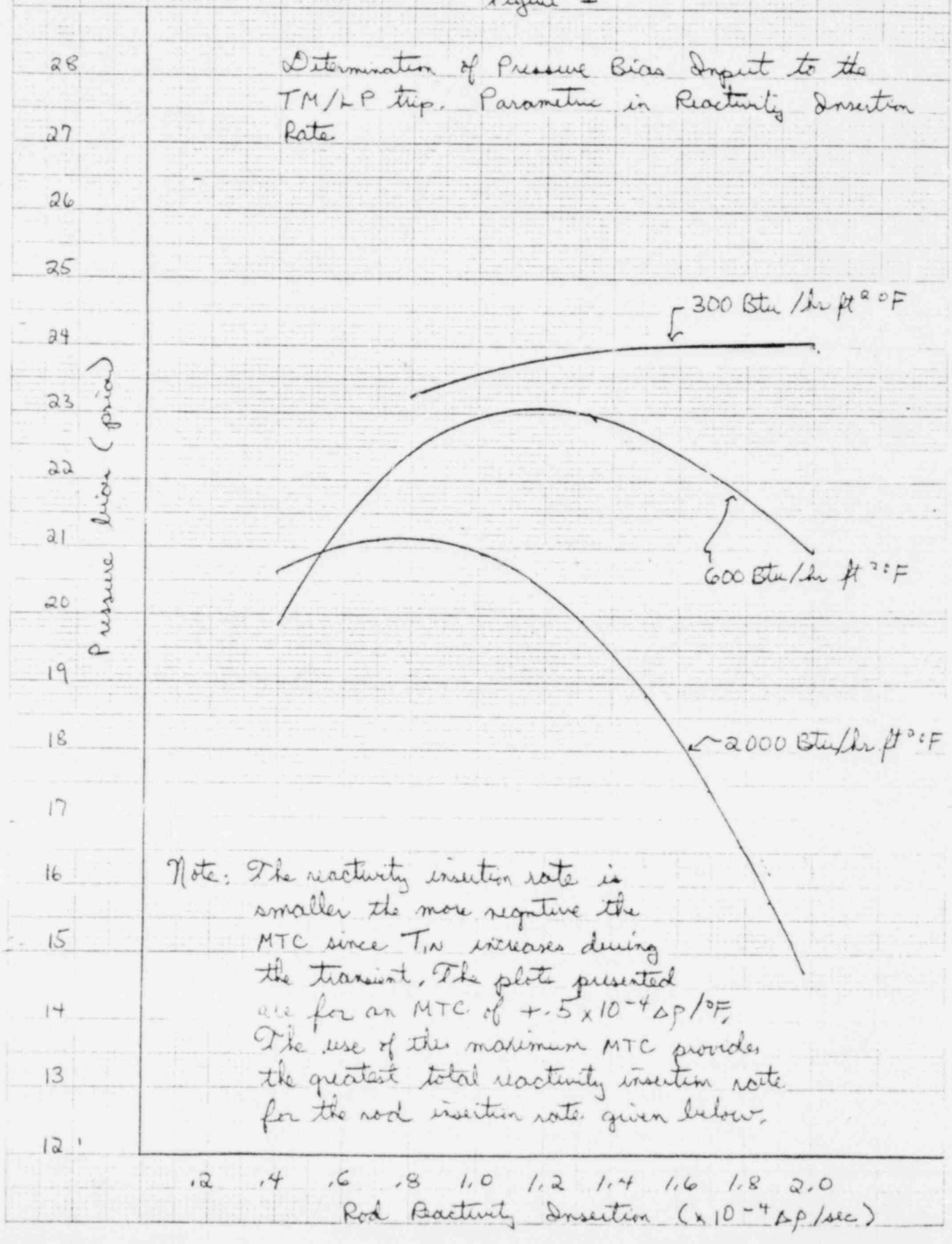
TABLE 1

KEY INPUT PARAMETERS FOR CEA WITHDRAWAL TRANSIENT

Reactivity Insertion Rate	2×10^{-4} $\Delta\rho$/sec
Moderator Temperature Coefficient	$+.5 \times 10^{-4}$ $\Delta\rho/^{o}F$
Gap Thermal Conductivity	[300] BTU/Hr-Ft^2 ^{o}F
Resistance Temperature Detector Time Constant	5 Seconds
Axial Shape Index	[+.67]

Figure 1

Determination of Pressure Bias Input to the TM/LP trip. Parameter is Reactivity Insertion Rate



Note: The reactivity insertion rate is smaller the more negative the MTC since T_{IN} increases during the transient. The plots presented are for an MTC of $+.5 \times 10^{-4} \Delta\rho/°F$. The use of this maximum MTC provides the greatest total reactivity insertion rate for the rod insertion rate given below.

RESPONSE TO NRC QUESTIONS ON
CEN-101(B)-P CALVERT CLIFFS UNIT 2
CYCLE 2 RELOAD SUBMITTAL - AMENDMENT 2-NP

October 9, 1978

Combustion Engineering, Inc.
Nuclear Power Systems
Power Systems Group
Windsor, Connecticut

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A. MAKES ANY WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED INCLUDING THE WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, WITH RESPECT TO THE ACCURACY, COMPLETENESS, OR USEFULNESS OF THE INFORMATION CONTAINED IN THIS REPORT, OR THAT THE USE OF ANY INFORMATION, APPARATUS, METHOD, OR PROCESS DISCLOSED IN THIS REPORT MAY NOT INFRINGE PRIVATELY OWNED RIGHTS; OR

B. ASSUMES ANY LIABILITIES WITH RESPECT TO THE USE OF, OR FOR DAMAGES RESULTING FROM THE USE OF, ANY INFORMATION, APPARATUS, METHOD OR PROCESS DISCLOSED IN THIS REPORT.

Rephrased NRC Questions

1. What is the minimum DNBR which occurs during the CEA Withdrawal transient?

2. What parametric studies have been performed to select the worst case CEA Withdrawal transient for the determination of the [ ] bias term in the TM/LP trip system?

3. Is the case presented in the license submittal the worst case as determined by these parametrics?

Response

As stated in CENPD-199P, the CEA Withdrawal transient is one of the design basis events analyzed to determine a bias factor used in establishing the TM/LP trip setpoints. This bias factor, along with conservative temperature, pressure and power readings, assures that the TM/LP trip will prevent the DNBR from dropping below the SAFDL limits (DNBR = 1.19 based on the CE-1 correlation) for a CEA Withdrawal event.

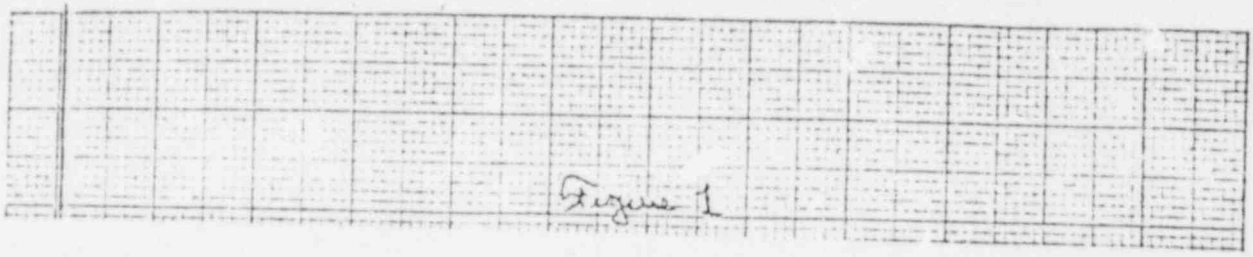
As noted in previous responses to NRC questions, the CEA Withdrawal transient is examined to determine that case which produces the largest differences between measured core inlet temperatures at the time a trip signal is actuated and the actual core inlet temperatures at the time of minimum DNBR. The parameters which are of primary importance in determining the rate of temperature and power increase are: 1) reactivity insertion rate due to rod motion and moderator temperature feedback effects, 2) gap thermal conductivity, 3) Resistance Temperature Detector (RTD) response characteristics, and 4) initial axial power shape. To determine the worst case CEA Withdrawal transient, a parametric analysis was performed over a range of each of these parameters; [ ] to establish the worst case parametric combination. The worst axial power shape (or more specifically, scram worth versus insertion) was determined to be the [ ] axial power distribution. This power distribution maximizes the time required to terminate the decrease in DNBR following a trip. The RTD time constant was set at the maximum value (5 seconds) currently allowed by Tech Specs.

To establish the worst combination of reactivity insertion and gap thermal conductivity, the parametric analyses displayed in Figure 1 was performed. Figure 1 shows that the largest bias to the TM/LP trip is produced for the case of [ ] gap thermal conductivity and [ ] reactivity insertion rate. The parameters for this worst case are summarized in Table 1.

TABLE 1

KEY INPUT PARAMETERS FOR CEA WITHDRAWAL TRANSIENT

Reactivity Insertion Rate	2×10^{-4} $\Delta\rho$/sec
Moderator Temperature Coefficient	$+.5 \times 10^{-4}$ $\Delta\rho/^{o}F$
Gap Thermal Conductivity	[ ] BTU/Hr-Ft^2 ^{o}F
Resistance Temperature Detector Time Constant	5 Seconds
Axial Shape Index	[ ]



Determination of Pressure Bias Input to the TM/LP Trip

AFFIDAVIT PURSUANT

TO 10 CFR 2.790

Combustion Engineering, Inc.)
State of Connecticut)
County of Hartford) SS.:

I, P. L. McGill depose and say that I am the Vice President, Commercial of Combustion Engineering, Inc., duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations and in conjunction with the application of Baltimore Gas and Electric Company for withholding this information.

The information for which proprietary treatment is sought is contained in the following document:

Amendment 5-P to CEN10(1)(B)-P Calvert Cliffs Unit 2 Cycle 2 Reload Submittal Update.

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Combustion Engineering in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1. The information sought to be withheld from public disclosure are detailed results of fuel inspection programs and results of specific analysis, which is owned and has been held in confidence by Combustion Engineering.

2. The information consists of test data or other similar data concerning a process, method or component, the application of which results in a substantial competitive advantage to Combustion Engineering.

3. The information is of a type customarily held in confidence by Combustion Engineering and not customarily disclosed to the public. Combustion Engineering has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The details of the aforementioned system were provided to the Nuclear Regulatory Commission via letter DP-537 from F.M. Stern to Frank Schroeder dated December 2, 1974. This system was applied in determining that the subject documents herein are proprietary.

4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.

5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

6. Public disclosure of the information is likely to cause substantial harm to the competitive position of Combustion Engineering because:

a. A similar product is manufactured and sold by major pressurized water reactors competitors of Combustion Engineering.

b. Development of this information by C-E required thousands of man-hours of effort and hundreds of thousands of dollars. To the best of my knowledge and belief a competitor would have to undergo similar expense in generating equivalent information.

c. In order to acquire such information, a competitor would also require considerable time and inconvenience related to conducting an extensive fuel inspection program and subsequent analysis.

d. The information required significant effort and expense to obtain the licensing approvals necessary for application of the information. Avoidance of this expense would decrease a competitor's cost in applying the information and marketing the product to which the information is applicable.

e. The information consists of detailed results of a fuel inspection program and analytical results, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Combustion Engineering, take marketing or other actions to improve their product's position or impair the position of Combustion Engineering's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

f. In pricing Combustion Engineering's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of Combustion Engineering's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.

g. Use of the information by competitors in the international marketplace would increase their ability to market nuclear steam supply systems by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on Combustion Engineering's potential for obtaining or maintaining foreign licensees.

Further the deponent sayeth not.

P. L. McGill

Vice President, Commercial

Sworn to before me

this 12th day of October 1978

Notary Public

My Commission Expires Mar. 31, 1983