### 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.

7810180103

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.  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.

 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.

-2-

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.

-3-

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.

Misul

Vice President, Commercial

Sworn to before me

this 9th day of October 1977

Notary Public apetto

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

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

11

12

1'

.1.

October 9, 1978

This document contains proprietary information and is not to be transmitted or reproduced without specific written approval from Combustion Engineering, Inc.

# 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, ON 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  $[\gamma]$  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

46.3

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 bius 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 Veedback effects, 2) gap thermal conductivity, 3) Resistance Temperature Detector (RiD) 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 Moderator Temperature Coefficient Gap Thermal Conductivity Resistance Temperature Detector Time Constant Axial Shape Index 2x10<sup>-4</sup> Δp/sec +.5x10<sup>-4</sup> Δp/<sup>0</sup>F [300] BTU/Hr-Ft<sup>2 0</sup>F 5 Seconds [+.67]



16 15

į 1

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

12

1.0

## LEGAL NOTICE

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

A. MAKES ANY WARBANTY OF REPRESENTATION. EXFRESS OR IMPLIED INCLUDING THE WARBANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, WITH RESPECT TO THE ACCURACY, COMPLETENESS, ON 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 FROCESS 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 Moderator Temperature Coefficient Gap Thermal Conductivity Resistance Temperature Detector Time Constant Axial Shape Index 2x10<sup>-4</sup> Δp/sec +.5x10<sup>-4</sup> Δp/<sup>0</sup>F [ ] BTU/Hr-Ft<sup>2 0</sup>F 5 Seconds [ ]

	The state of the second s	The second secon	a de la compa de la compa de	A CONTRACTOR OF THE OWNER OWNER OF THE OWNER OF THE OWNER OF THE OWNER OWNER OWNER OF THE OWNER OWNE		An approximate the state of the second	and the second sec		
1	the set of the state of the set of the		and the second se	a set and a set a set of	And only a 1 to a second	And a side of the second		And in the other sectors will be a sector of the sector of	the second se
1		a contraction of the second	the processing of the second second second	A second second	An and the second se		一 一 四 下 牙 下 加 大 黄 素 子 黄 田	and the second of the second of the second	the second se
A M	NY NY TANDARY STREET, NY TANÀNA DIA MANANA	the local and the second as a first to be help when a	and a star beaution		And a second sec		and the second sec	and the second of the second sec	A president date and
	A S S R R S S R R R R R R R R R R R R R		the second second second second	The state of the s	A C C	and the second s		·····································	and share the second share the
1 1 1		A DESCRIPTION OF A DESC	The Part of the Statement of the Stateme	Reach to be in the second			NAME & COMPANY OF TAXABLE ADDRESS	and a set of the set of the set of the	
A	a new processing a construction of the section of	I to see a see desired that the second register second datase where	and the second se		2	A REAL PROPERTY OF A REAL PROPER	the state of the sector of the sector of		1
1	the second is seen with the strategy of a local	and the state of the second se	and the second second	A second from the second	Bridden attact and a bit of	A rate property is conserved. In		· · · · · · · · · · · · · · · · · · ·	a service a base of the service of t
		A second s	I American Providence	Transa and a start of			And a second sec	the Rest of the second s	
A	The second state of the se	a second in the second se	and a second design of the		1	Part of the second s	the second design of the second		and the second second second second
1 1 1 1 1 1	A such the state of the second of the second s	the second has been as a second to be		A CONTRACT OF A DESCRIPTION OF A DESCRIP	State of the second second second	And the second second second	the second se	1. 如何是你是不是 人名 人名人名人名	a chemit burner man
		a contraction of the second second	and the second second second	A man a data in a man			and the second second second second	and the second s	
1 1	A PROPERTY AND A PROPERTY	All which the second second second second	and the second s			and the first of the second	Not I do bride said is the of the se		and the provide state
And and a second	the contrappending and given in second design in a	suprementation in the second second in the second sec		C. T. T. C. L. L. S. W. M.	A COLUMN AND A COLUMN AND A	A result have been an an an and an and		The second	A had a set the boundary of the
1 1 1		the second s	and the second se	Brand Street Street Street Street Street	Being and the second se		A THE R. P. R. P. LEWIS CO., N. Y. Y. Y.	and the second second	
		a contract of the second second second second	and and a second second	And the second sec		the second s	strend bread in a literature administration of the same in-		Contraction of the second s
1	A REAL POINT AND A REAL POINT AND A	I want to a star be a straight to		Long stress in the	and the state of the second se	1	the second second second second	the second se	- In this section when party and the
And the second second second	and the second sec	Contraction of the second s	A Designed and the state of the	North Royal and	A C M C R . March			AND THE REPORT OF THE REPORT OF	
	and the second se	The second	and the second s	and the second se		a set a second set	A REAL PROPERTY AND A REAL PROPERTY.		
A				and the second s	[1] A. F. B. D. M. A.	1 1	a start to set the	The second s	and a summer of
Manufactor in 18			REAL REAL PROPERTY.	And the state of the second				Part of the set of the set of the	and the second
		a second se	of the second second second second second				the second secon		Contraction of the second s
	A WEAT AND A DECK	A DESCRIPTION OF A DESC			CONTRACTOR CONTRACTOR	and them are be insertioned	the street of th		A DOMESTIC AND AND AND
	the state of the s			Company of the second of	ALL ALL AND AND A		and the second se	an income the original of the location of the	and the second se
		a second provide the second provide the second provide the	a description of a local state				The second second second	and the second state of th	Contraction of the second s
and the second s	THE PARTY PROPERTY AND ADDRESS OF A DRESS OF	A state of the state of the second state of the		1		the second state of the second	the second se		Trees & more & a
and the second second	And and the second seco	and the second se	The second second second	the second	1	and start in the second		A DESCRIPTION OF A DESCRIPTION OF A	where he will be
		a service of the second s	and the second s	- A 1 ( 1 ) )			the second second second	a second s	and the second s
1	The second	and the second se		- proverse a		the little second	strate of a second state		Contraction Reasonable and a
Sec. 1 and 22	states had \$1000 from \$1000 for \$100			the second s	And a state of the	and the second se	and the second second second	a state was been able to a second of a	Annual Annual State
	And the second sec	and the second s	the same branches and	A summer and a set of a			a second of the second s	A descent and a second s	Contraction of the second s
				and the second	The second second second	the property and the	10 Winter to State Lines, in the local lines	and the second se	And in case of the local division of the loc
					COLUMN THE REAL OF THE REAL OF			the production of protocol of the later of t	ter ter an
							the second second second second second	and the second design of the s	
									The reaction of the design of the second

Determination of Pressure Bias Input to the TM/LP Trip

 ${\cal S}_{i}$ 

14

R

..

.

## 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 locument:

@mendment D-P to CENIOP 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.  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.

 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 compatitive position of Combustion Engineering because:

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

-2-

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

-3-

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.

1.19

Vice President, Commercial

Sworn to before me

this 12th day of October 1978

Notary Public My Commission Expires Mar. 31, 1983