

UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION

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 USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD 83 SEP 19 A10:27

In the Matter of)

CAROLINA POWER & LIGHT COMPANY)
 AND NORTH CAROLINA EASTERN)
 MUNICIPAL POWER AGENCY)

(Shearon Harris Nuclear Power Plant,)
 Units 1 & 2)

OFFICE OF SECRETARY
 DOCKETING & SERVICE
 BRANCH

Docket Nos. 50-400 OL
 50-401 OL

APPLICANTS' ANSWERS TO WELLS EDDLEMAN'S
 INITIAL INTERROGATORIES RELATING TO EDDLEMAN CONTENTION 15-AA

Applicants Carolina Power & Light Company and North Carolina Eastern Municipal Power Agency, pursuant to 10 C.F.R. §2.740b, hereby submit the following responses to Wells Eddleman's Initial Interrogatories Relating to Eddleman Contention 15-AA. Mr. Eddleman initially submitted interrogatories relating to Contention 15 on January 15, 1983. Because he subsequently sought to revise the original Contention 15, the Board permitted Applicants to defer answering the interrogatories pending a determination on the admission of a revised contention. Tr. 584-85 (Feb. 24, 1983 Prehearing Conference). After Contention 15-AA was admitted by a Board order dated August 18, 1983, Applicants reached an agreement with Mr. Eddleman as to which interrogatories from the original set would be answered as the first round of discovery on this contention. In addition, Applicants have revised the wording of some interrogatories to reflect their understanding of the parties' agreement as to the scope of those interrogatories. The provision of answers to these interrogatories is not to be deemed a representation that Applicants consider the information sought to be relevant to the issues to be heard in this proceeding.

ANSWERS TO INTERROGATORIES

INTERROGATORY NO. 1. Please state succinctly how CP&L and its principal witness, Wilson Morgan, derived a projected 80% capacity factor for all Shearon Harris Nuclear Units, as stated in N. C. Utilities Commission Docket No. E-2 sub 203 (1971) in the matter of a certificate of convenience and necessity to construct the Harris Plant.

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ANSWER: The projected 80% capacity factor was based on nuclear industry projections in the late 1960's. The industry projections were apparently based on the minimal regulation experienced at that time and anticipated high unit availabilities. It is recollected that industry projections reflected the anticipation of relatively short refueling outages (probably on the order of 6 to 8 weeks per year) and relatively low forced outages rates, typical of the fossil-fired units with which the utility industry had operating experience at that time.

INTERROGATORY NO. 2. Please state any other information known to CP&L which significantly contributed to this 80% capacity figure.

ANSWER: Other than the information provided in response to Interrogatory 1 above, no other information regarding the basis for the 80% capacity factor is recollected.

INTERROGATORY NO. 3. Please list all documents that Mr. Morgan or other persons who assisted him in preparation of his testimony can recollect from which the above information and the 80% capacity factor were derived, indicating for each how the information was used in arriving at the 80% capacity factor.

ANSWER: Information on nuclear industry projections and historical data reflecting utility operating experience were considered in arriving at the projected 80% capacity factor; however, no specific documents or publications are recollected.

INTERROGATORY NO. 4. Please list all experts, consultants, or other persons who Mr. Morgan or his assistants can recollect who were consulted by Mr. Morgan or CP&L in arriving at the 80% capacity factor. For each, please indicate whether the person is employed by CP&L, and the current or last address of said person if known to CP&L.

ANSWER: CP&L arrived at the projected 80% capacity factor as described in the Company's response to Interrogatory 1 above. Ebasco Services reviewed and concurred with the assumptions.

INTERROGATORY NO. 5. Please explain briefly how and in what terms Mr. Morgan supported the 80% capacity factor upon cross-examination in N. C. Docket No. E-2 sub 203. Identify the transcript of his testimony if available.

ANSWER: Applicants do not have a transcript of the Harris certificate of public convenience and necessity hearing under NCUC Docket No. E-2, Sub 203. The order from that proceeding reflects only one statement regarding capacity factor, which was made under cross-examination by Mr. Morgan, that "the Harris Plant will achieve the

80% plant capacity factor used in the nuclear-fossil economic studies even though the highest predicted plant capacity factor for CP&L in 1972 is 70%". As stated in the Company's response to Interrogatory 1 above, the 80% capacity factor was based on industry projections for nuclear combined with operating experience with existing fossil units.

INTERROGATORY NO. 6. Please indicate whether CP&L intends to call Mr. Morgan as a witness in this NRC operating license proceeding, 50-400, etc., O. L.

ANSWER: Applicants have not determined at this time what witnesses will appear in the Harris operating licensing proceeding.

INTERROGATORY NO. 7. Please state succinctly all significant bases used by CP&L or its witnesses in N.C.U.C. Docket No. E-100 sub 40 (1981 load forecast) to arrive at the 70% capacity factor for Shearon Harris Units used by them therein.

ANSWER: The 70% capacity factor projection reflected in the 1981 load forecast proceeding before the NCUC was generally consistent with and based on the nuclear industry experience for units similar to the Harris units, during the 1970's. Specifically, CP&L relied upon its experience with its other Westinghouse PWR reactor, Robinson Unit No. 2.

INTERROGATORY NO. 8. Please list all documents that are readily available (without an extensive file search) used in arriving at said 70% capacity factor; indicating for each how it was used and what weight, if any, was given to the information contained therein, citing the page(s) where such information is contained.

ANSWER: The 70% capacity factor projection had been determined in the late 1970's and was the figure that the Company was using at the time of the 1981 load forecast hearing. In arriving at the 70% projection, various information regarding industry experience and projections as well as the Company's experience with its Robinson Unit 2 were used. However, no specific documents that may have been used as a basis in arriving at the 70% capacity factor are recollected.

INTERROGATORY NO. 9. Please list all experts, consultants and/or CP&L employees consulted by CP&L or its employees in arriving at said 70% capacity factor figure used in Docket No. E-100 sub 40, and the current or last known address of each such person if known to CP&L.

ANSWER: CP&L did not rely on any outside experts or consultants in arriving at the 70% capacity factor projection. However, CP&L did consult with its nuclear operations staff in reviewing the Company's experience with its Robinson Unit 2. Although it is not recollected which particular members of the staff were consulted, the head of the Generation Department which included nuclear operations at that time was Mr. B. J. Furr, whose present business address is 411 Fayetteville Street, Raleigh, North Carolina 27602.

INTERROGATORY NO. 10. Please indicate whether CP&L expects to call Bobby L. Montague as a witness in this NRC licensing proceeding.

ANSWER: Applicants have not determined at this time what witnesses will appear in the Harris operating licensing proceeding.

INTERROGATORY NO. 11. For all CP&L nuclear units, please state the unit's capacity factors (listed by unit), forced outage rate (by unit), partial forced outage rate (by unit), availability factors and planned maintenance and/or refueling operations in terms of days or hours outage in each year for the years 1983-96, as reflected in the inputs to the PROMOD computer program prepared for witness C Wayne King in N.C.U.C. Docket No. E-100 sub 41 (December 1982 hearing).

ANSWER: The table included as Attachment A provides the capacity factors, planned maintenance, and equivalent forced outage rates for all CP&L nuclear units as reflected in the PROMOD computer model used by Mr. King in the proceeding under NCUC Docket No. E-100, Sub 41. For this study, availability factors approximately equal capacity factors.

The following data is in response to Interrogatory No. 11.

ATTACHMENT A

Year	BRUNSWICK #1			BRUNSWICK #2			ROBINSON #2			HARRIS #1			HARRIS #2		
	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)
1983	65	9	20	74	0	24	50 ⁽²⁾	8	19						
1984	68	7	20	50	17	24	39 ⁽²⁾	17	19						
1985	66	8	20	63	8	24	48	21	19	53	0	30 ⁽³⁾			
1986	66	8	20	62	8	24	69	8	19	58	8	27 ⁽³⁾			
1987	66	8	20	61	8	24	69	8	19	51	8	24 ⁽³⁾			
1988	66	8	20	62	8	24	69	8	19	63	8	22			
1989	65	8	20	62	8	24	69	8	19	53	8	22	64	0	30 ⁽³⁾
1990	65	8	20	60	8	24	69	8	19	64	8	22	59	8	27 ⁽³⁾
1991	65	8	20	60	8	24	69	8	19	64	8	22	62	8	24 ⁽³⁾
1992	65	8	20	61	8	24	69	8	19	64	8	22	63	8	22
1993	65	8	20	61	8	24	69	8	19	65	8	22	64	8	22
1994	65	8	20	61	8	24	69	8	19	65	8	22	65	8	22
1995	65	8	20	61	8	24	69	8	19	65	8	22	65	8	22
1996	65	8	0	62	8	24	69	8	19	65	8	22	65	8	22

NOTE:

The above data is from the PROMOD model run used by CP&L in the proceeding under NCUC Docket E-10, Sub 41.

- (1) Full and partial forced outages are included in an equivalent forced outage rate (EFOR).
- (2) For study purposes, Robinson 2 was derated to 475 MW due to steam generator limitations. The capacity factor is based on the MDC rating of 665 MW.
- (3) These are approximate EFORs adjusted to reflect a break-in or maturing period for the Harris units.

INTERROGATORY NO. 13. Please identify all documents that are readily available which were used in preparing the information requested in interrogatory 11 above, indicating for each what page(s) were used, how the data was used, what weight was given to it, and whether the document is in the possession of CP&L.

ANSWER: The information supplied in Interrogatory 11 reflects the planning assumptions which were used in early 1982 for the referenced study. These planning assumptions were based primarily on data reflecting CP&L's and general industry experience, available at that time. These planning assumptions are periodically revised to reflect changing system conditions and the availability of more current data. Other than historical Company records reflecting such data, no particular documents were used as a basis for the planning assumptions.

INTERROGATORY NO. 14. Please identify all consultants, experts or CP&L employees who were consulted in preparing the information used to calculate or compute the information presented by witness King in Docket No. E-100 sub 41, listing for each a current or last known address and stating whether each is currently employed by CP&L.

ANSWER: CP&L used no consultants or outside experts to prepare the information presented by the Company's witness, Mr. King, before the NCUC in the proceeding under Docket No. E-100, Sub 41 to determine avoided cost rates for cogeneration and small power production. Various departments or units within the Company contributed to this information. The heads of the departments or units who were consulted by Mr. King are as follows:

Mr. B. L. Montague	Vice President of Planning & Coordination
Mr. N. L. Edge	Vice President of Rates & Service Practices
Mr. G. F. Dowd	Director of Financial Forecasting & Evaluation
Mr. W. V. Coley, Jr.	Manager of Engineering & Construction Support Services

The business address for each of these CP&L personnel is 411 Fayetteville Street, Raleigh, North Carolina 27602.

INTERROGATORY NO. 15. Please state whether CP&L intends to call Mr. King as a witness in this NRC O.L. proceeding.

ANSWER: Applicants have not determined at this time what witnesses will appear in the Harris operating licensing proceeding.

INTERROGATORY NO. 20. Please state what, if any, warranty, guarantee or promise CP&L has provided to NCEMPA as to the capacity factor(s) of Harris nuclear units or other CP&L power plants NCEMPA purchased an interest in.

ANSWER: CP&L has provided no warranty, guarantee, or promise to the North Carolina Eastern Municipal Power Agency (NCEMPA) regarding capacity factors of any of its units.

INTERROGATORY NO. 25. For the Harris Units 1 and 2, please state how CP&L arrived at each of the following items of "production planning information" filed with the North Carolina Utilities Commission by CP&L on 6-30-82 under FERC Order No. 48, PURPA Section 133: Item 22, Net Generation-GWH; Item 21, Hours Connected to Load; Items 16 and 17, Planned Maintenance, Days/Year and Equivalent Forced Outage Rate Percentage; Item 6, Estimated Unit Life.

ANSWER: The information requested is contained in Subsection 290.302(b) of the Company's June 30, 1982 filing with the Federal Energy Regulatory Commission (FERC) in response to PURPA Section 133. Item 21, Hours Connected to Load, and Item 22, Net Generation, were obtained from output of the Company's production cost simulation model (PROMOD). A description of PROMOD is given in the Company's PURPA 133 filing under Subsection 290.302(d).

At the time (6/30/82) that the data in the PURPA 133 document were provided, Item 16, Planned Maintenance, of the Harris units was based on the Company's experience and projections at Robinson Unit 2, a similar type nuclear unit.

Item 17, Equivalent Forced Outage Rate (EFOR), as supplied was an immature EFOR, because, as required by PURPA, it represents the first full calendar year of operation of each unit. New units generally mature within a few years after the commercial operation date. The projected immature EFOR of Harris Units 1 & 2 as provided, was based on EFOR data for nuclear units from the North American Electric Reliability Council (NERC) for the period 1971-1980.

Item 6, Estimated Unit Life, was based on the average number of years of estimated service life of currently operating nuclear units. These values have been

approved for use by the Company in the North Carolina, South Carolina, and Federal regulatory jurisdictions for rate making purposes.

INTERROGATORY NO. 28. Please state (if known to CP&L) the lifetime capacity factor in commercial operation for each Westinghouse PWR in the world which has Westinghouse Model D steam generators. Please list plants with D-4 steam generators (e.g., Krsko Yugoslavia) separately and state "unknown" if CP&L does not possess the information.

ANSWER: Lifetime capacity factors for U.S. licensed operating reactors can be obtained from U.S. Nuclear Regulatory Commission, Licensed Operating Reactors: Status Summary Report (NUREG-0020) (published monthly). CP&L does not have or maintain information on lifetime capacity factors of non-U.S. reactors, although information to determine lifetime capacity factors might be available through research of nuclear industry publications such as Nucleonics Week. To Applicants' knowledge, the only operating Westinghouse PWR with D-4 steam generators is Krsko in Yugoslavia. According to data reported in Nucleonics Week Vol. 24 No. 34 (August 25, 1983) at 14, the 1983 capacity factor for Krsko through July is 77.2%.

INTERROGATORY NO. 29. Are the data for assumed capacity factor, forced outage rate, planned days or hours of outages for maintenance and planned days or hours of outages for repairs used to derive or compute the fuel cost savings in the 5 sensitivity cases in ER Amendment 5 the same as the data identified in answer to interrogatory no. 11? If not, explain the differences in the data.

ANSWER: The table included as Attachment B provides capacity factors, planned maintenance, and equivalent forced outage rates for all CP&L nuclear units as reflected in the Company's study for Harris ER Amendment 5. The differences in data can be determined by comparing this table with the table provided in response to Interrogatory 11.

The differences in the data reflect the dynamic nature of the Company's planning assumptions, which are revised to reflect changing system conditions and additional experience. In the ER Amendment 5 study, it should be noted that a sensitivity analysis was performed on the Harris units' capacity factors over a range of such capacity factors from 50% to 70%, as noted in Attachment B.

The following data is in response to Interrogatory No. 29.

ATTACHMENT B

Year	BRUNSWICK #1			BRUNSWICK #2			ROBINSON #2			HARRIS #1			HARRIS #2		
	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)	Capacity Factor (%)	Planned Maint. (Weeks)	EFOR ⁽¹⁾ (%)
1983	68	7	20	74	0	24	45 ⁽²⁾	12	19						
1984	68	7	20	50	17	24	39 ⁽²⁾	17	19						
1985	66	8	20	62	8	24	48	21	19	58	0	29 ⁽³⁾			
1986	65	8	20	61	8	24	69	8	19	69	8	16			
1987	65	8	20	61	8	24	69	8	19	70	8	16			
1988	65	8	20	62	8	24	69	8	19	70	8	16			
1989	65	8	20	61	8	24	69	8	19	70	8	16	66	0	29 ⁽³⁾
1990	64	8	20	60	8	24	69	8	19	70	8	16	69	8	16
1991	65	8	20	60	8	24	69	8	19	70	8	16	70	8	16
1992	64	8	20	60	8	24	69	8	19	70	8	16	70	8	16
1993	65	8	20	61	8	24	69	8	19	70	8	16	70	8	16
1994	65	8	20	61	8	24	69	8	19	70	8	16	70	8	16

NOTE:

The above data is from the base case PROMOD model run for the Harris ER Amendment 5. The nuclear capacity factors do not vary significantly in the sensitivity cases except for the two sensitivity cases where the Harris units capacity factors were modeled at approximately 50 and 60 percent. In these two cases, the weeks of maintenance remained the same and the equivalent forced outage rates were approximately 36 and 26 percent, respectively, for both Harris Units 1 and 2.

- (1) Full and forced outages are included in an equivalent forced outage rate (EFOR).
- (2) For study purposes, Robinson 2 was derated to 475 MW due to steam generator limitations. The capacity factor is based on the MDC rating of 665 MW.
- (3) This is an approximate EFOR adjusted to reflect a break-in or maturing period for the Harris units.

INTERROGATORY NO. 37. Please identify all witnesses (not identified previously) CP&L intends to call or is considering calling in this NRC proceeding with respect to Eddleman Contention 15-AA.

ANSWER: CP&L has not determined at this time what witnesses will appear in the Harris operating licensing proceeding, with respect to Eddleman Contention 15-AA.

INTERROGATORY NO. 38. Please state whether CP&L has ever considered Harris capacity factors lower than 50%.

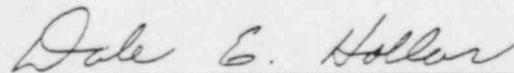
ANSWER: CP&L has not considered that the Harris units would normally operate at capacity factors lower than 50%.

INTERROGATORY NO. 39. Please describe or state succinctly all significant reasons why CP&L's estimate of Harris capacity factor declined from 80% originally (as testified to by Wilson Morgan) to 70% as stated by CP&L in Docket No. E-100 sub 40. For each such reason, state whether its effect is continuing or has ended to CP&L's knowledge.

ANSWER: Two principal factors which contributed to the decrease in capacity factor projections for the Harris Plant are 1) industry experience with units similar to the Harris units, including CP&L's experience with Robinson Unit 2; and 2) acknowledgment of the impacts of increased regulatory requirements. Applicants do not foresee significant decreases in capacity factor projections below current industry experience due to these factors in the future.

Dated: September 16, 1983

Submitted by:



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AFFIDAVIT OF B. M. WILLIAMS

County of Wake)
)
State of North Carolina)

B. M. Williams, being duly sworn according to law, deposes and says that he is Director of Staff Services - Planning and Coordination Department of Carolina Power & Light Company; that the answers to Interrogatories on Eddleman Contention 15-AA contained in "Applicants' Answers to Wells Eddleman's Initial Interrogatories Relating to Eddleman Contention 15-AA" are true and correct to the best of his information, knowledge and belief; and that the sources of his information are officers, employees, agents and contractors of Carolina Power & Light Company.

B. M. Williams
B. M. Williams

Sworn to and subscribed before
me this 16th day of September 1983.

Richard H. Hester
Notary Public

My commission expires: 7/6/88