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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

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

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

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) Docket Nos. 50-400 OL
) 50-401 OL
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APPLICANTS' ANSWERS TO WELLS EDDLEMAN'S GENERAL INTERROGATORIES
AND INTERROGATORIES ON CONTENTION 45 TO APPLICANTS CAROLINA
POWER & LIGHT COMPANY et al. (FIRST SET)

Applicants Carolina Power & Light Company and North Carolina Eastern Municipal Power Agency, pursuant to 10 C.F.R. § 2.740b, hereby submit the following answers to "Wells Eddleman's General Interrogatories and Interrogatories on Contention . . . 45 to Applicants Carolina Power & Light et al. (First Set)." 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 GENERAL INTERROGATORIES

INTERROGATORY NO. G1(a). Which contentions of Wells Eddleman do Applicants agree are now admitted in this proceeding, NRC Dockets 50-400/401 O.L.?

ANSWER G1(a). See Applicants' answer filed on April 28, 1983.

INTERROGATORY NO. G1(b). for each such contention, provide for any answers to interrogatories by Wells Eddleman which Applicants have previously or presently received (except those suspended by Board order, if any), the following information:

ANSWER G1(b). The answers to General Interrogatories herein are restricted to Eddleman Contention 45.

INTERROGATORY NO. G1(c). Please state the name, present or last known address, and present or last known employer of each person whom Applicants believe to know (1) has first-hand knowledge of the facts alleged in each such answer; or (2) upon whom Applicants relied (other than their attorneys) in making such answer.

ANSWER G1(c). The following list identifies those persons who provided information upon which Applicants relied in answering the interrogatories on Eddleman Contention 45 and indicates the particular interrogatory answer(s) for which each such person provided information.

<u>Person</u>	<u>Answer No(s).</u>
Mr. Samuel P. Grant — Principal Engineer 411 Fayetteville Street Raleigh, North Carolina 27602 employed by CP&L	45-1(a), 45-1(c)2, 45-1(c)5, 45-1(c)6, 45-1(c)7, 45-1(d), 45-1(d)9, 45-1(d)10, 45-1(h), 45-1(i)
J.R. Schulties, E.M. Burns, C.W. Hirst, all under the direction of Thomas F. Timmons Post Office Box 355 Pittsburgh, Pennsylvania 15230 all individuals employed by Westinghouse Electric Corporation, Power Systems	45-1(a), 45-1(b), 45-1(c)1-6, 45-1(d) 45-1(d)1, 45-1(d)6 45-1(h), 45-1(i), 45-1(j), 45-1(k)
Dean Shaw Michael G. Gagliardi 2 World Trade Center New York, New York 10048 employed by Eabaco	45-1(a), 45-1(d), 45-1(d)3, 45-1(d)4, 45-1(d)5, 45-1(d)6, 45-1(e), 45-1(f) 45-1(g), 45-1(i), 45-1(j)

INTERROGATORY NO. G1(d). please identify all facts concerning which each such person identified in response to G1(c)(1) above has first-hand knowledge.

ANSWER G1(d). See answer to Interrogatory No. G1(c).

INTERROGATORY NO. G1(e). please identify all facts and/or documents upon which each person identified in response to G1(c)(2) above relied in providing information to respond to the interrogatory, including the parts of such documents relied upon.

ANSWER G1(e). All facts or documents relied upon by those individuals identified in the answer to Interrogatory No. G1(c) are indicated within the responses to the specific interrogatories on Contention 45.

INTERROGATORY NO. G1(f). Please identify any other document(s) used or relied upon by Applicants in responding to the interrogatory.

ANSWER G1(f). See answer to Interrogatory No. G1(e).

INTERROGATORY NO. G1(g). Please state which specific fact each document, identified in response to G1(e) and G1(f) above, supports, in the opinion or belief of Applicants, or which Applicants allege such document supports.

ANSWER G1(g). Applicants have indicated which specific facts are supported by the documents identified, in the responses to the specific interrogatories on Contention 45.

INTERROGATORY NO. G1(h). Please state specifically what information each person identified in response to G1(c)(1) or G1(c)(2) above provided to or for Applicants' affiant in answering the interrogatory. If any of this information is not documented, please identify it as "undocumented" in responding to this section of General Interrogatory G1.

ANSWER G1(h). See answer to Interrogatory No. G1(c).

INTERROGATORY NO. G2(a). Please state the name, present or last known address, title (if any), and present or last known employer, and economic interest (shareholder, bondholder, contractor, employee, etc.) if any (beyond expert or other witness fees) such person holds Applicants or any of them, for each person you intend or expect to call as an expert witness or a witness in this proceeding, if such information has not previously been supplied, or has changed since such information was last supplied, to Wells Eddleman. This applies to Eddleman and Joint Contentions as admitted, or stipulated by Applicants.

ANSWER G2(a). Applicants have not yet identified the expert or other witnesses they expect to call in this proceeding. When and if such witnesses are identified, Applicants will supplement this response in a timely manner.

INTERROGATORY NO. G2(b). Please identify each contention regarding which each such person is expected to testify.

ANSWER G2(b). See answer to Interrogatory No. G2(a).

INTERROGATORY NO. G2(c). Please state when you first contacted each such person with regard to the possibility of such person's testifying for Applicants, if you have contacted such person.

ANSWER G2(c). See answer to Interrogatory No. G2(a).

INTERROGATORY NO. G2(d). Please state the subject matter, separately for each contention as to which each such person is expected to testify, which each such person is expected to testify to.

ANSWER G2(d). See Answer to Interrogatory No. G2(a).

INTERROGATORY NO. G2(e). Please identify all documents or parts thereof upon which each such witness is expected to, plans to, or will rely, in testifying or in preparing testimony.

ANSWER G2(e). See answer to Interrogatory No. G2(a).

INTERROGATORY NO. G3(a). Please identify any other source(s) of information which Applicants have used to respond to any interrogatory identified under G1 above, stating for each such source the interrogatory to which it relates, and what information it provides, and identifying where in such source that information is to be found.

ANSWER G3(a). Applicants have identified all such other sources of information, if any, within the answers to the specific interrogatories.

INTERROGATORY NO. G3(b). Please identify any other source(s) of information not previously identified upon which any witness identified under G2 above, or other witness, has used in preparing testimony or exhibits, or expects to use in testimony or exhibits, identifying for each such source the witness who is expected to use it, and the part or part(s) of such source (if applicable) which are expected to be used, and, if not previously stated, the fact(s) or subject matter (or both) to which such source relates.

ANSWER G3(b). See answer to Interrogatory No. G2(a).

INTERROGATORY NO. G4(a). please identify all documents, and which pages or sections thereof Applicants intend or expect to use in cross-examination of any witness I call in this hearing. For each such witness, please provide on a timely basis (ASAP near or during hearings) a list of all such documents, the subject matter Applicants believe they relate to, and make the document(s) available for inspection and copying as soon as possible after Applicants decide or form intent to use such document in cross-examination.

ANSWER G4(a). Applicants have not yet identified which documents, if any, they intend to use in cross-examination of Mr. Eddleman's witnesses.

INTERROGATORY NO. G4(b). please identify any undocumented information Applicants intend to use in cross-examination of each such witness for me.

ANSWER G4(b). See answer to Interrogatory No. G4(a).

INTERROGATORY NO. G5(a). for each contention Applicants state or admit is an admitted Eddleman contention under G1(a) above, or an admitted joint intervenor contention, please state whether Applicants have available to them experts, and information, on the subject matter of the contention.

ANSWER G5(a). Applicants have available to them experts and information on the subject matter of Contention 45.

INTERROGATORY NO. G5(b). If the answer to (a) above is other than affirmative, state whether Applicants expect to be able to obtain expertise in the subject matter, and information on it, and if not, why not.

ANSWER G5(b). Not applicable.

INTERROGATORY NO. G7. Please identify all documents which Applicants plan, expect or intend to offer as exhibits (other than for cross-examination) with respect to each Eddleman contention admitted which is included in your current response to G-1(a), in this proceeding.

For each such document, specify the contention and the subject matter to which it relates.

ANSWER G7. Applicants have not yet identified the documents they intend to offer as exhibits relating to Eddleman Contention 45.

INTERROGATORY NO. G8. Please identify all other information, not identified in response to the above general interrogatories, that Applicants rely on or use or plan or expect to use in preparing testimony, or in conducting cross-examination, or in preparing exhibits, for this proceeding, with respect to each Eddleman contention and Joint contention which is admitted in this proceeding and on which discovery is currently open or on which discovery has been open under the schedule laid out by the Board 3-10-83.

Please state for each such item of information the contention and subject matter to which it relates.

OBJECTION - To the extent that this interrogatory seeks information beyond the scope of the answer provided below, it is objected to as being overly broad, irrelevant, burdensome, and seeking protected or privileged information.

ANSWER G8. Applicants have not yet identified any "other information" which they plan to use in this proceeding relating to Eddleman Contention 45 beyond that discussed in the answers to the specific interrogatories herein.

ANSWERS TO INTERROGATORIES ON CONTENTION 45

INTERROGATORY NO. 45-1(a). What NRC reports, regulatory guides, or staff technical positions, or rules have Applicants used in preparing their analysis of water hammer with respect to the Harris plant? Please list each such report and its NRC identifying number and date, and what pages or sections Applicants used,

OBJECTION - Applicants believe that Contention 45 as it has been admitted by the Licensing Board addresses the adequacy of the actual design of specific systems in the Harris plant to withstand water hammer events. To the extent that this Interrogatory No. 45-1(a) requests information concerning earlier phases of the design process of such systems, Applicants object to it as seeking information which is

irrelevant as beyond the scope of the Contention and is unlikely to give rise to information relevant to the issue of the adequacy of the actual design of such systems. To the extent that it was not unduly burdensome for Applicants to provide information relating to early design stages, they have provided it, but do not waive this objection by so doing. Applicants and Mr. Eddleman have discussed this issue but have been unable to resolve it.

ANSWER 45-1(a). Applicants have applied General Design Criterion (GDC) 4 of 10 CFR Part 50, Appendix A, 10 CFR §50.55a and NUREG 75/087, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" in preparing analyses of water hammer for safety systems at the Shearon Harris Nuclear Power Plant.

The sections of the Standard Review Plan (SRP) used were as follows:

Section 3.9.2	Dynamic Testing and Analysis of Systems, Components and Equipment
Section 3.9.3	ASME Code Class 1, 2, and 3 Components, Component Supports, and Core Support Structures
Section 6.3	Emergency Core Cooling System
Section 10.3	Main Steam Supply System
Section 10.4.7	Condensate and Feedwater System

There are no regulatory guides or rules for preparing water hammer analyses.

INTERROGATORY 45-1(b). If your answer to a above is none, do Applicants concede the validity of Eddleman 45 is proved?

ANSWER 45-1(b). Not applicable.

INTERROGATORY 45-1(c). If there are any reports, guides, staff technical positions or rules CP&L or Applicants did use with respect to water hammer at Harris, please state: (for each):

OBJECTION to sub parts 1 and 2 - See Objection to Interrogatory No. 45-1(a).

1. Whether it was used in the design of the plant originally, and if so how.

ANSWER 45-1(c)1. GDC 4 and 10 CFR §50.55a were utilized by Applicants to establish the requirements for the original design.

2. Whether it was used in redesign or updating the design of the plant, and if so when and how.

ANSWER 45-1(c)2. GDC 4, 10 CFR §50.55a and the SRP have been used by Applicants in the refinement of the design. They were used by the Applicants to establish the requirements for the refinements. Applicants' design process is ongoing in nature.

3. Exactly what reports, guides, NRC rules, and staff positions Applicants believe they are in full compliance with with respect to water hammer at Harris?

ANSWER 45-1(c)3. Applicants interpret this question as referring to any documents identified in their answer to Interrogatory 45-1(a). Applicants believe that the Harris plant is in full compliance with 10 CFR §50.55a and 10 CFR Part 50, Appendix A, GDC 4.

Pursuant to 10 CFR §50.34(g), compliance with the SRP is not required; therefore, Applicants have not evaluated the Harris facility to determine its compliance with the SRP.

4. Exactly what information in each such rule, report, guide or position identified in c3 above is what Applicants contend they comply fully with?

ANSWER 45-1(c)4. The Applicants are in full compliance with the total statement of GDC 4 and all requirements of 10 CFR §50.55a.

5. For each such compliance claimed in c4 above, please state succinctly all facts, analysis, or expert opinion (identifying the expert(s) whose opinion is it) that Applicants contend support their position.

ANSWER 45-1(c)5. Review by the NRC in accordance with the applicable standard review plan and preoperational tests at Shearon Harris will demonstrate compliance.

6. exactly what items or parts of anything identified in a above do Applicants believe they are not yet in full compliance with?

ANSWER 45-1(c)6. None.

7. Is NRC still to issue further guidance on Task A-1 Water Hammer under its schedule in NUREG-0606? If so, state what guidance and when it is due. State for each such guidance whether Applicants are assured they have complied with all its requirements.

ANSWER 45-1(c)7. It is Applicants' understanding that the NRC expects to complete Task A-1, Water Hammer, at the end of this year. It is expected that the NRC will issue NUREG-0927 at that time and that the document will contain recommendations. The Applicants will consider all relevant recommendations at that time and evaluate their applicability to the Harris plant.

8. For every noncompliance or less than full compliance identified under c6 or c7 above, state the extent of the noncompliance and what CP&L is doing to comply (if nothing, please say so) with applicable guidance, rules, etc (per a above) and when, if ever, Applicants expect to achieve full compliance.

ANSWER 45-1(c)8. Not applicable.

9. For each noncompliance in 8 above where Applicants expect to achieve full compliance in the future, please state all significant factors or occurrences now known to Applicants which would or could delay such full compliance.

ANSWER 45-1(c)9. Not applicable.

10. To the extent that noncompliances are identified in respect to water hammer above, do Applicants concede that Eddleman 45 is correct in its claims? Please so state for each noncompliance if not all are included in your answer to the preceding sentence.

ANSWER 45-1(c)10. Not applicable.

INTERROGATORY NO. 45-1(d). Describe specifically what leaks, shutdowns and/or transients Applicants believe can cause water hammers in the Shearon Harris Nuclear Power Plant, and where those water hammers can occur (which sections of piping, etc.) and the location of such. or each such, please state:

OBJECTION - Contention 45 as admitted by the Board addresses the adequacy of the design of three specific systems in the Harris plant, i.e., feedwater, ECCS and Main Steam System, to withstand water hammer events. To the extent that this interrogatory seeks information about systems other than those three, it is beyond the scope of the contention and is irrelevant. Applicants have been unsuccessful, thus far, in resolving this issue with Mr. Eddleman.

ANSWER 45-1(d). Applicants believe that water hammer in the Shearon Harris plant could occur in systems utilizing fast acting valves under possible transient conditions, which may include shutdowns. The systems are designed or are being designed to withstand the effects of the postulated water hammer. The Applicants believe that leaks in the subject SHNPP fluid systems cannot reasonably be expected to result in a water hammer in such a manner as to affect the safe operation of the plant.

1. Exactly how leaks in such section(s) will be detected on a continuous basis or otherwise inspected for, and how assurance is had that all such leaks will be properly identified, for each such section or location where a water hammer can occur.

OBJECTION - It is Applicants' position, which they have explained to Mr. Eddleman, that interrogatories such as this which seek information concerning operating and maintenance plans, procedures, and activities are irrelevant to Contention 45 which addresses the adequacy of the design of specific systems in the Harris plant. As yet, Applicants and Mr. Eddleman are in disagreement concerning this issue.

2. Will the Harris plant be shut down if a leak or other evidence indicates a water hammer is possible in this section or sections of pipe or other area? If not, please state why not.

OBJECTION - See objection to Interrogatory No. 45-1(d)1.

3. What tests will detect steam voids or slugs inside the pipes, at all times?

OBJECTION - See objection to Interrogatory No. 45-1(d)1.

ANSWER 45-1(d)3. Thermocouples will be used during preoperational testing.

4. Are there instruments in these section(s) and each such section to detect steam voids or condensate buildup or water slugs continuously?

ANSWER 45-1(d)4. No.

5. If answer to d4 is affirmative, identify all such and their reliability and testing.

ANSWER 45-1(d)5. Not applicable.

6. If Answer to d4 is not affirmative for all places a water hammer can occur, please state what damage a water hammer there could do, at maximum (worst case analysis) if Applicants have performed such analysis. If applicants have not performed such analysis, please so state.

ANSWER 45-1(d)6. Applicants have not performed such an analysis; however, the plant safety-related systems are designed to the single failure criteria which provide the ability to achieve and maintain safe shutdown.

7. Please state for each section identified in 4 above or any part of 4 above the frequency of visual inspection by operators (a) during operation; (b) during shutdown for refueling (c) during any other shutdown (d) during accidents which isolate containment, which is assured by procedures or plant technical specifications.

OBJECTION - See objection to Interrogatory No. 45-1(d)1.

8. Please state for each section to which d7 above applies, how far the inspector will be from each part of each such section, what level of lighting is assured, and what minimum level of leak can and will be visually detected from that distance, for each required visual inspection, (and state whether such conditions of visual inspection are incorporated into and CP&L procedure in its Robinson nuclear plant, its Brunswick plant, or for the Harris plant). Please state all analysis and calculations made to determine the alertness of inspectors, all checklists of what they will inspect for leaks that can indicate water hammer, all calculations and analysis showing what inspectors can see, and identify any section of the pipe or other device in which water hammer can occur which is not visible during inspection rounds in each of the situations in d7a,b,c, and d above.

OBJECTION - See objection to Interrogatory 45-1(d)1.

9. Please describe exactly how the Harris inspection program will detect possible precursors to water hammer, the formation of slugs, voids, and leaks, and conditions where valve closure could cause water hammer, or valve opening could. Please answer this for all possible water hammer events under 45-1 d above.

ANSWER 45-1(d)9. Preoperational testing will be performed.

10. Please provide the results of any analysis of water hammer events done by Applicants which take into account possible failures in the inspection programs described above in your responses re Eddleman 45 in this set of interrogatories, or any future set, (continuing basis: respond when interrogatories are answered or study/analysis is done, reasonably promptly).

ANSWER 45-1(d)10. Applicants have performed no such analysis.

INTERROGATORY NO. 45-1(e). Describe any means used in Harris design to isolate the shock wave of a water hammer from air and water lines used in control systems for safety-related equipment, feedwater and AFW systems, etc.

OBJECTION - See objection to Interrogatory 45-1(d).

ANSWER 45-1(e). No specific means are used in the Shearon Harris design to isolate the shock wave of a water hammer. Systems are designed to minimize the

potential for experiencing water hammer events and where appropriate they are designed to withstand postulated water hammer induced loads.

INTERROGATORY NO. 45-1(f). Have Applicants analyzed or studied the effect of water hammer on other systems such as air and water control lines at all? If so, what have they studied, with what results, based on what information?

ANSWER 45-1(f). No.

INTERROGATORY NO. 45-1(g). Have Applicants analyzed the water hammer resulting at McGuire nuclear station on restart after a shutdown on or about December 2 or 3, 1981, which caused that plant's electrical generator to be flooded. If so, what were the results of this study or analysis as to whether such an event could occur at Harris?

ANSWER 45-1(g). No.

INTERROGATORY NO. 45-1(h). Have Applicants analyzed water hammer events at other Westinghouse PWRs at all? If so, identify all such analyses and make copies available.

ANSWER 45-1(h). Applicants have reviewed all such events known to them to learn of any possible impact on SHNPP systems, but have not performed any formal analyses of any of them.

INTERROGATORY NO. 45-1(i). Have Applicants in their possession any other studies of water hammer not identified above? If so, please identify each such and make all those not from NRC available for inspection and copying.

ANSWER 45-1(i).

1. U. S. Nuclear Regulatory Commission, "Water Hammer in Nuclear Power Plants," USNRC Report NUREG-0582, July, 1979.
2. Saha, P., et al., Brookhaven National Laboratory, "An Evaluation of Condensation-Induced Water Hammer in Preheat Steam Generators," USNRC Report NUREG/CA-1600, September 1980.
3. Green, S. J., and Welty, C. S. Jr., "Workshop Proceedings: Steam Generator Water Hammer," EPRI WS-78-132, (June, 1979).
4. U. S. Nuclear Commission, "Investigation and Evaluation of Cracking Incidents in Piping in Pressurized-Water Reactors, USNRC Report NUREG-0691, September 1980.

5. An Evaluation of Water Hammer in Nuclear Power Plants, A. W. Serkiz, U.S. Nuclear Regulatory Commission Division of Safety Technology, Washington, D. C., to be published.
6. Evaluation of Water Hammer Events in Light Water Reactor Plant, R. A. Uffer et al., Quadrex Corp. NUREG/CR2781, July, 1982.
7. Initiation of Water Hammer in Horizontal and Nearly Horizontal Pipes Containing Steam and Subcooled Water, Bjorge and Griffith, M.I.T. given at 1982 ANS meeting.
8. Evaluation of Water Hammer Events in Light Water Reactors, USNRC NUREG/CR-2731, July, 1982.
9. Evaluation of Water Hammer Potential in Preheat Steam Generators, Quadrex Corp. NUREG/CR-3090, December, 1982.
10. Preheat Steam Generator Status, Presentations, February 1982, Westinghouse Water Reactor Divisions (Proprietary).
11. Preheat Steam Generator, Customer Working Group Meeting, July 1982, Westinghouse Water Reactor Divisions. (Proprietary)

INTERROGATORY NO. 45-1(j). Exactly how do Applicants propose to keep all systems abutting or feeding the ECCS full of water at all times? Please state a succinct but full reply to this.

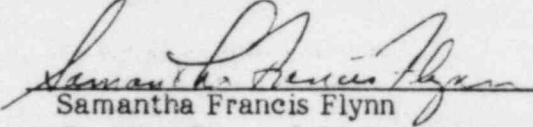
ANSWER 45-1(j). Those systems abutting or feeding the ECCS are designed to be kept full of water through initial piping layout, proper fill and vent procedures, and maintenance of water levels in those tanks providing elevation head for the systems.

INTERROGATORY NO. 45-1(k). Exactly how do Applicants verify that all such systems in j above are full of water at all times? Please state for each means of verification whether or not it is automatic, continuous, or requires manual or visual effort. If it is not automatic, state what human effort is required to do it and when and at what frequency it will be done. If it is not continuous [sic] state when it is done and how often. State also all procedures requiring any of the preceding at Harris.

ANSWER 45-1(k). Low level alarms are provided on those tanks that supply water (elevation head) to the ECCS or systems abutting the ECCS. Such alarms are automatic and are listed in Section 7.5 of the FSAR.

This is the 3rd day of June 1983.

Objections submitted by:


Samantha Francis Flynn
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602
(919) 836-7707

Attorneys for Applicants:

Thomas A. Baxter, Esquire
John H. O'Neill, Jr., Esquire
Shaw, Pittman, Potts & Trowbridge
1800 M Street, N.W.
Washington, D. C. 20038
(202) 822-1000

Richard E. Jones, Esquire
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602
(919) 836-6517

UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION 83 JUN -6 11:51

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

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

Docket Nos. 50-400 OL
50-401 OL

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

AFFIDAVIT OF SAMUEL P. GRANT

State of North Carolina

County of Wake

SAMUEL P. GRANT, being duly sworn according to law, deposes and says that he is Principal Engineer of Carolina Power & Light Company; that the answers to interrogatories on Contention 45 contained in "Applicants' Answers to Wells Eddleman's General Interrogatories and Interrogatories on Contention 45 to Applicants Carolina Power & Light Company et al. (First Set)" 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.

Samuel P. Grant
SAMUEL P. GRANT

Sworn to and Subscribed before me,
this the 3rd day of June, 1983.

Joette Markham
Notary Public

My Commission Expires:

February 16, 1988

CERTIFICATE OF SERVICE

DOCKETED

I hereby certify that a copy of the Applicants' Answers to Wells Eddleman's General Interrogatories and Interrogatories on Contention 45 to Applicants Carolina Power & Light Company (First Set) has been served by deposit in the United States Mail, first class prepaid, addressed to the parties listed below this the 3rd day of June, 1983. 11:51

James L. Kelley, Esquire
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

John D. Runkle, Esquire
Conservation Council of North Carolina
307 Granville Road
Chapel Hill, North Carolina 27514

Mr. Glenn O. Bright
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

M. Travis Payne, Esquire
Edelstein and Payne
Post Office Box 12643
Raleigh, North Carolina 27605

Dr. James H. Carpenter
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. Richard D. Wilson
729 Hunter Street
Apex, North Carolina 27502

Charles A. Barth, Esquire
Myron Karman, Esquire
Office of Executive Legal Director
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Wells Eddleman
718-A Iredell Street
Durham, North Carolina 27705

Docketing and Service Section
Office of the Secretary
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Thomas A. Baxter, Esquire
John H. O'Neill, Jr.
Shaw, Pittman, Potts & Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Mr. Daniel F. Read, President
Chapel Hill Anti-Nuclear
Group Effort
Post Office Box 524
Chapel Hill, North Carolina 27514

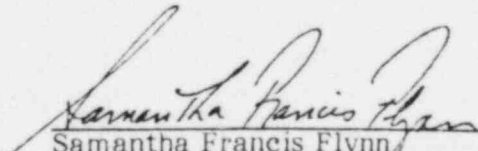
Dr. Phyllis Lotchin
108 Bridle Run
Chapel Hill, North Carolina 27514

Deborah Greenblatt, Esquire
1634 Crest Road
Raleigh, North Carolina 27606

Bradley W. Jones, Esquire
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street
Atlanta, Georgia 30303

Ruthanne G. Miller, Esquire
Atomic Safety and Licensing
Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Karen E. Long, Esquire
Staff Attorney
Public Staff
North Carolina Utilities Commission
Post Office Box 991
Raleigh, North Carolina 27601


Samantha Francis Flynn
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602
(919) 836-7707