

RELATED CORRESPONDENCE

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DOCKETING & SERVICE
BRANCHUNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSIONBEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
CAROLINA POWER & LIGHT COMPANY)	Docket Nos. 50-400 OL
AND NORTH CAROLINA EASTERN)	50-401 OL
MUNICIPAL POWER AGENCY)	
)	
(Shearon Harris Nuclear Power)	
Plant, Units 1 and 2))	

APPLICANTS' RESPONSES TO
JOINT INTERVENORS' GENERAL INTERROGATORIES
AND INTERROGATORIES ON CONTENTION VII (FIRST SET)

Applicants Carolina Power & Light Company ("CP&L") and North Carolina Eastern Municipal Power Agency, pursuant to 10 C.F.R. § 2.740b, hereby submit the following responses to "Joint Intervenors' General Interrogatories and Interrogatories on Contention 7 (VII) to Applicants Carolina Power & Light Company, 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.

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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: The contentions of Intervenor Eddleman which are admitted to this proceeding are set forth in various memoranda and orders issued by the Atomic Safety and Licensing Board, all of which are available to Joint Intervenors.

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: The answers to General Interrogatories herein are restricted to Joint Intervenor Contention VII.

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 or 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: The following list identifies those persons who provided information upon which Applicants relied in answering the interrogatories on Contention VII and indicates the particular interrogatory answer for which such person provided information:

<u>PERSON</u>	<u>INTERROGATORY NO(S)</u>	<u>SUBJECT MATTER</u>
Kevin W. Shaw Carolina Power & Light Shearon Harris Plant P.O. Box 101 New Hill, North Carolina 27562	1, 7, 11	Mr. Shaw has provided information relating to the use of steam generators at the Shearon Harris Plant.

<u>PERSON</u>	<u>INTERROGATORY NO(S)</u>	<u>SUBJECT MATTER</u>
J. Michael McDowell Carolina Power & Light Harris Energy and Environmental Center Route 1, New Hill, North Carolina 27562	1, 2, 3, 4, 5, 7, 14	Mr. McDowell has provided information relating to AVT water chemistry.
Blaine G. Rieck Carolina Power & Light H.B. Robinson Plant P.O. Box 790 Hartsville, South Carolina 29550	1, 2, 3, 6, 8, 9, 10	Mr. Rieck has provided information relating to the use of steam generators at CP&L's H.B. Robinson Plant.
M.G. Zaalouk Carolina Power & Light 411 Fayetteville Street Mall Raleigh, North Carolina 27602	1, 6, 11, 12, 14, 15	Dr. Zaalouk has provided information relating to the use of steam generators at the Shearon Harris plant and the H.B. Robinson Plant and to Applicants' knowledge about steam generators in use at other nuclear power plants.
Thomas F. Timmons Westinghouse Electric Corporation P.O. Box 355 Pittsburgh, Pennsylvania 15230	8, 11, 13	Mr. Timmons has pro- vided information relating to recommen- dations made by Westinghouse.
Francis X. Thomson Carolina Power & Light 411 Fayetteville Street Mall Raleigh, North Carolina 27602	16	Mr. Thomson has pro- vided information relating to the Westinghouse Steam Generators Owners Group.

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: 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: All facts or documents relied upon by those individuals identified above are indicated within each response to the specific interrogatories on Contention VII.

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

ANSWER: See Answer 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: Applicants have indicated which specific facts are supported by the documents identified, within each response to the specific interrogatories on Contention VII.

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: See Answer 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 in 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: Applicants have not yet identified the expert or other witnesses they expect to call in this proceeding regarding Contention VII. 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: See Answer 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: See Answer 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: See Answer 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: See Answer 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: Applicants have identified all other such sources of information, if any, within the answers to the specific interrogatories set forth herein.

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) or 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: See Answer 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: Applicants have not at this time 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: See Answer 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: Applicants have available to them experts and information on the subject matter of Contention VII.

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: Not applicable.

INTERROGATORY NO. G6(a). For each document identified in response to any interrogatory herein, or referenced in response to any interrogatory herein, please supply all the following information which has not already been supplied:

- (i) date of document;
- (ii) title or identification of document;
- (iii) all authors of the document, or the author;
- (iv) all qualifications (professional, technical) of each author of the document;
- (v) the specific parts, sections or pages of the document, if any, upon which Applicants rely;
- (vi) the specific information each part, section or page identified in response to (v) above contains
- (vii) identify all documents used in preparing the document, to the extent known (and also to the extent not identified in the document itself);
- (viii) state whether Applicants possess a copy of the document;
- (ix) state all expert opinions contained in the document, upon which Applicants rely, or identify each such opinion
- (x) identify the contention(s) with respect to which Applicants rely upon (a) the expert opinions (b) the facts identified in the document.
- (xi) state whether Applicants now employ any author(s) of the document, identifying each person for each document;

- (xii) state whether Applicants have ever employed any author(s) of the document, identifying each such person for each document; and
- (xiii) identify all sources of data used in the document. Answers to all the above may be tabulated or grouped for efficiency.

ANSWER G6(a)(i)-(xiii): All such information available to the Applicants with regard to each document identified in response to an interrogatory herein contained in the particular document which is being made available to Joint Intervenors. It would be particularly burdensome for Applicants to research all historical employment records to determine whether the authors of each document identified herein have ever been employed by Applicants. However, Applicants will supplement this response in a timely manner if and when Joint Intervenors identify any such author regarding whom they are particularly interested in determining this information.

INTERROGATORY NO. G7(a). 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 in this proceeding which (i) is included in your current response to G1(a), or (ii) is the subject of interrogatories in this set; please state for which contention or contentions each exhibit will be or is expected to be offered.

ANSWER: Applicants have not yet identified those documents they intend to offer as exhibits relating to Contention VII.

INTERROGATORY NO. G7(b). Please identify all documents which Applicants plan, expect or intend to use in cross-examination of any other parties' witnesses or joint intervenor witness in this proceeding, with respect to (i) Eddleman contentions identified under G7(a)(i) (or G1(a))

above, or any other Eddleman contention which is the subject of interrogatories in this set; (ii) each Joint contention now admitted in this proceeding; (iii) per our agreement of 4-8-83, each contention of each other party to this proceeding which is currently admitted. Please identify for each such document the witnesses, or witness, and all contentions with respect to whom (or which) that document is planned, expected, or intended to be offered or used.

ANSWER: Applicants have not yet identified those documents they intend to use for cross-examination of any witness.

INTERROGATORY NO. G7(c). Please identify which of the documents identified in response to (b) above (i) will be offered into evidence by Applicants, and (ii) which of the same documents Applicants expect to offer into evidence or intend to offer as evidence or exhibits in this proceeding.

ANSWER: See Answer G7(b).

INTERROGATORY NO. G10(a). Where the above general interrogatories and/or specific interrogatories below, or any of them, call for identification of documents, (i) and no documents are identified, is that the same as Applicants stating that there are no documents responsive to this general interrogatory, in each case where no documents are identified? (ii) and documents are identified, is that the same as Applicants stating that the identified documents are the only ones presently known which are responsive to the interrogatories? (iii) If your answer to G10(a)(ii) is other than affirmative, please state all reasons for your answer. (iv) If your answer to G10(a)(i) above is other than affirmative, please state all reasons for your answer.

ANSWER: (i) Yes.

(ii) Yes.

(iii) Not applicable.

(iv) Not applicable.

INTERROGATORY NO. G10(b). Where any interrogatory, general or specific, herein, calls for factual information (i) and an opinion is stated in response, is that the expert opinion of any person(s) identified as having contributed information to that response? (ii) and facts are given or identified (or a fact is) in response, but no documents are identified, does

that mean Applicants have no documents containing such fact(s)? (iii) If your answer to (i) above is affirmative, please state for each such response all qualifications of each expert upon whom Applicants rely for each such answer. The qualifications need be stated only once for each such person if they are clearly referenced in other answers. (iv) if your answer to (i) above is other than affirmative, please state which opinions, if any, given in response to interrogatories (general or specific) herein is the opinion of an expert, identify each expert whose opinion you used in response to each interrogatory, and state in full the qualifications of each such expert. (v) If your answer to (i) above is other than affirmative, please identify all opinions of non-experts used in your responses, and identify each non-expert whose opinion is included in each answer herein. (vi) If your response to (ii) above is other than affirmative, please identify each document which contains a fact not previously documented in your response(s), stating what the fact is, and at what page, place, chapter or other specific part the document contains such fact.

ANSWER: (i) Yes.

(ii) See Answers G1(e), (f)

and (g) and G10(a)(i) above.

(iii) See Attachments (A)-(F) herein.

(iv) Not applicable.

(v) Not applicable.

(vi) Not applicable.

INTERROGATORY NO. G11. For each answer to each interrogatory herein (or any subpart or part thereof), please identify each item of information in possession of Applicants (including facts, opinions of experts, and documents) which (a) contradicts the answer you made, (i) in whole (ii) in part (please identify each such part for each item of information identified); (b) casts doubt on your answer (i) in whole (ii) in part (please identify each such part for each item of information identified); (c) Please identify all documents not already identified in response to parts (a) and (b) above (and their subparts) which contains any item of information asked for in (a) or (b) above. Please identify for each such document what information item(s) it contains and what answer(s) each such item is related to.

ANSWER: G11(a)-(c): Applicants have no such information.

INTERROGATORIES ON CONTENTION VII

INTERROGATORY NO. 7-1. Do Applicants, their employees, consultant(s) or subcontractor(s) or contractor(s) dealing with steam generators have any documents relating to (a) vibration problems in Westinghouse model D-4 steam generators (b) tube cracking in Westinghouse steam generators which have AVT water chemistry and (i) Inconel-600 tubes (ii) carbon steel support plates (c) damage caused by loose-metal or other loose objects in steam generators (d) steam generator tube failure analyses? (e) For each affirmative answer to each of the above parts or subparts, please list all such documents. (f) Please also list all documents relating to (i) detection of loose parts in steam generators (ii) detection of loose metal in steam generators (iii) detection of other foreign objects in steam generators, which any of the above possess. (g) If not already stated, please state who possesses each document identified in response to any of the above interrogatories.

ANSWER: (a) Yes.

(b)(i) Yes.

(ii) Yes.

(c) Yes.

(d) Yes.

(e)-(g). Applicants have searched the Technical Library and files of the CP&L Engineering and Licensing sections at the CP&L offices in Raleigh, the document control facility at the Harris Plant site, the Radiological and Chemical Support Section Files at the Harris Energy and Environmental Center and the document control vault at the H. B. Robinson Plant site (which contains approximately 1400 microfilm cartridges, 180 boxes of hard copy documents and approximately 24 shelves of reference material). The following groups of documents may contain information that is responsive to Interrogatory No. 7-1(e)-(g):

<u>Location</u>	<u>Documents</u>	<u>Volume</u>
Raleigh	EPRI reports and other library materials	30 shelves
	Files of Engineering	10 Ft. ³
	Files of Engineering	2 Ft. ³
Harris Plant site	Shop order 120 file	1 File Drawer
Energy & Environmental Center	File and Library on AVT water chemistry	File Drawer & Two Bookcases
H. B. Robinson Plant site	Special Procedure 418 (4/23/82)	approximately 50 pages
	Special Procedure 426 (6/4/82)	approximately 50 pages
	Special Procedure 476 (4/29/83)	approximately 50 pages
	Special Procedure 539 (2/4/84)	approximately 50 pages

Due to the great volume of documents that may be responsive to Interrogatory No. 7-1(e)-(g) it would be overly burdensome for Applicants to identify each document individually. These documents will be made available for Joint Intervenor's inspection at a mutually convenient time as set forth in detail in "Applicants' Response to Joint Intervenor's Request for Production of Documents (Contention VII)."

INTERROGATORY NO. 7-2(a). Have Applicants ever used (i) AVT water chemistry (ii) any other water chemistry similar to AVT, in a nuclear power plant? (b) For each affirmative answer above, please identify the plant or plants, define and/or specify the water chemistry used, identify all documents in your possession specifying such water chemistry and/or its maintenance and/or its effects, and state from what date to what date such water chemistry was used in each such plant for

steam generators. (c) If you have used any other water chemistry than those identified above at a nuclear plant for steam generators, please state (i) why you used it instead of AVT or something like AVT; (ii) all specifications of this other water chemistry (iii) the identification of all documents in your possession related to this other water chemistry, particularly those related to corrosion, cracking, denting, formation of "crud", "green grunge" or other corrosion products, effects of this water chemistry on Inconel-600 alloy, effects of this water chemistry on any other steam generator tube material in use at that nuclear plant, effects of this water chemistry on other metals (e.g. those of tube support plates) used in the steam generators at that plant, and tube failure analyses and/or failure experience at plant(s) using this water chemistry. (iv) If you had used AVT or something like it (see (a)(ii) above) at this plant prior to using this water chemistry, please (aa) state all reasons why you changed from AVT or AVT-like water chemistry to this water chemistry (bb) identify all documents related to the change in water chemistry, recommendations for it, any CP&L or CP&L contractor or consultant or subcontractor analysis of the change in water chemistry, or any predictions of the effects on (bb-a) cracking (bb-b) corrosion (bb-c) tube failure, of (bb-d) changing to this water chemistry or (bb-e) using this water chemistry. (v) If there is more than one plant for which the answer to any part of (a) above is affirmative, or more than one water chemistry for which any part of (a) above has an affirmative answer, please answer the above subparts (b) thru (c)(iv)(bb-e) separately for each plant and for each water chemistry.

ANSWER: (a)(i) No.

(ii) No.

(b) Not applicable.

(c)(i) Applicants used phosphate steam generator water chemistry at the H.B. Robinson Plant in accordance with the manufacturer's recommendation at the time that plant went into operation.

(ii) Phosphate chemistry specifications utilized at the H.B. Robinson Plant are found in pertinent files listed in response to (c)(iii) infra.

(iii) The following records relating to water chemistry are contained in CP&L's files at the H.B. Robinson Plant site:

<u>Date</u>	<u>File</u>	<u>Description</u>	<u>Volume/Media</u>
1971-1980	2-B-4	S/G Blowdown, Steam Lines, Valves	5866 p./Microfilm
1971-1980	2-0-6-J	Primary Systems	726 p./Microfilm
	2-0-6-K	Secondary Systems & S/G	972 p./Microfilm
	2-0-10	Water Treatment	66 p./Microfilm
1980	ERC-4A	Chemistry Reports	1985 p./Microfilm
1980	ERC-4D	Chemical Feed Data	42 p./Microfilm
1981	2-B-4	S/G Blowdown, etc.	Approx. 300 p./ Hard Copy
1981	2-0-6-J	Primary Systems	Approx. 200 p./ Hard Copy
1981	2-0-6-K	Secondary Systems & S/G	Approx. 400 p./ Hard Copy
1981	2-0-10	Water Treatment	Approx. 200 p./ Hard Copy
1981	ERC-4A	Chemistry Reports	1/2 File Cabinet Drawer
1981	ERC-4D	Chemical Feed Data	1/2 File Cabinet Drawer
1982-1984	18-10510	Water Chemistry	4500 p./Microfilm
1982-1984	18-10540	S/G Chemistry Analyses	
1973-1984		Special Procedures	1900 pp. Microfilm
1973-1984		Eddy Current Tapes	29 Boxes Hard Copy

In addition, approximately two file drawers of information concerning the use of phosphate chemistry at the H.B. Robinson Plant are located at the Harris Energy & Environmental Center.

Due to the large volume of documents that may be responsive to Interrogatory No. 7-2(c)(iii) it would be overly burdensome for Applicants to identify each document individually. These documents will be made available for Joint Intervenors' inspection at a mutually convenient time as set forth in detail in "Applicants' Response to Joint Intervenors' Request for Production of Documents (Contention VII)."

(iv) Not applicable.

(v) Not applicable.

INTERROGATORY NO. 7-3(a). For each nuclear plant and each water chemistry you identify or specify in response to any part of 7-2 above (or any subpart(s) thereof), please state (i) the predicted rate of tube failure (ii) the predicted (aa) rate (bb) number of cracks formed in tubes (iii) the predicted rate of tube corrosion (iv) the predicted maximum tube wall thinning that was associated with that water chemistry (v) the predicted maximum rate of tube wall thinning associated with that water chemistry (vi) the predicted average rate of tube wall thinning associated with that water chemistry (vii) whether any synergistic corrosion effects of any kind were predicted with that water chemistry, and particularly (aa) synergisms associated with the water chemistry (bb) synergisms associated with the metal(s) used in the condensers (cc) synergisms associated with the metals in the other steam piping of that plant (dd) synergism associated with the metal of the turbine blades of that plant (ee) synergisms associated with the metal of the turbine shaft of that plant (ff) synergisms associated with contaminants in the (ff-a) primary side (ff-b) secondary side of the steam generator. (viii) For any of the above subparts of (vii) list all effects predicted other than synergisms, or taken into account in deciding to use that water chemistry, which are associated with the matter inquired about in that subpart.

ANSWER: No prediction has been made for a rate of tube failure, cracking, corrosion or thinning at the H.B. Robinson Plant.

INTERROGATORY NO. 7-3(b). For each item inquired about above, please state (i) all actual observed instances or rates or occurrences of it which CP&L is now aware of, specifying which plant and which water chemistry each relates to (ii) identification of all documents in your possession relating to the actual occurrence or rate of that item. (PS please recall what John O'Neill has said about synergisms being arguable by us.)

ANSWER: See Response to Interrogatory No. 7-3(a). Rates and occurrences of H.B. Robinson steam generator tube failures are documented in Licensee Evaluation Reports and eddy current analysis tapes. See Response to Interrogatory No. 7-2(c)(iii). H.B. Robinson Plant Licensee Evaluation Reports for years from 1971-1980 (then known as Abnormal Occurrences) are on micro-film, as are the Licensee Evaluation Reports for 1982, 1983 and portions of 1981 and 1984. The remaining Licensee Evaluation Reports for 1981 and 1984 are available in hard copy. All Licensee Evaluation Reports are stored at the H.B. Robinson site.

Due to the large volume of documents that may be responsive to Interrogatory No. 7-3(b), it would be overly burdensome for Applicants to identify each document individually. These documents will be made available for Joint Intervenor's inspection at a mutually convenient time as set forth in detail in "Applicants' Response to Joint Intervenor's Request for Production of Documents (Contention VII)."

INTERROGATORY NO. 7-3(c). Were any estimates or calculations or predictions made concerning the amount of radiation exposure to be incurred in (i) inspecting (ii) maintaining (iii) cleaning (iv) repairing (v) replacing steam generators at any CP&L nuclear plant? If so, for each area identified above, for each such plant (e.g. Harris, Robinson 2), please state (aa) the date of the estimate calculation or prediction (bb) who made it (cc) all qualifications of that person or person(s) to make it (dd) a list of all documents and work papers referenced or involved in making it, or in which that estimate, calculation or prediction is made.

ANSWER: For information on the estimated radiation exposure to personnel and the public due to the replacement and storage of the original steam generators used at the H.B. Robinson Plant and the estimated dose associated with steam generator repairs, see "Final Environmental Statement related to steam generator repair at H.B. Robinson Steam Electric Plant, Unit No. 2 (NUREG-1003)" (November 1983) in NRC Docket No. 50-261, especially at Sections 4 and 5; "H.B. Robinson Unit No. 2 Steam Generator Report" filed in NRC Docket No. 50-261 by CP&L on January 6, 1983 (as revised on March 31 and May 23, 1983), especially at Sections 3.4, 3.5 and 7.6; and "Safety Evaluation Report related to steam generator repair at H.B. Robinson Steam Electric Plant Unit No. 2 (NUREG-1004)," in NRC Docket No. 50-261, at Section 5. The back-up data and raw information from which these reports were compiled are contained in files at the H.B. Robinson Plant. The data have not been segregated or analyzed in the form in which Joint Intervenors have requested and due to the large volume of data it would be unreasonably burdensome for Applicants to do so.

INTERROGATORY NO. 7-3(d). Does CP&L maintain any records of (i) individual radiation exposure (ii) internal radionuclide exposure (iii) total person-rem of exposure, involved in (aa) inspecting (bb) maintaining (cc) cleaning (dd) repairing (ee) replacing steam generators at Robinson 2? (iv) for each subpart above for which your answer is affirmative, please list all such records and produce (you may substitute numbers for names and/or identifying information in individual records) copies of the information, stating which or (sic) the 3 x 5 (15) subparts above the information relates to.

ANSWER: (i) Yes.

(ii) Yes.

(iii) Yes.

(iv) A search of specific records of exposure during maintenance of steam generators would require a search of all Radiation Work Permits - a task requiring many man-months of effort. This information is available on microfilm at the H.B. Robinson Plant site. See Response to Interrogatory No. 7-2(c)(iii) above.

A condensed form of exposure records during all outages since 1974 is maintained in the ALARA group files at the H.B. Robinson Plant site.

INTERROGATORY NO. 7-3(e). For each of the items in (d) above (15 items) for which CP&L does not maintain records, (i) does the NRC have records of it for Robinson 2 to your knowledge? (ii) do you keep any information other than records concerning this item? (iii) Please list all documents containing (aa) NRC information (bb) other information you possess, concerning this item.

ANSWER: Not applicable.

INTERROGATORY NO. 7-3(f). Do you possess any information on radiation exposure associated with (i) steam generators (ii) S.G. inspection (iii) S.G. maintenance (iv) S.G. cleaning (v) S.G. repairs (vi) S.G. replacement, at other nuclear plants (aa) in the US (bb) outside the US? Please list all documents containing such information that you possess for each of the 2 x 6 (12) things inquired about above.

ANSWER: Applicants have approximately 200 pages of reports that relate to steam generator related radiation exposure records at other nuclear power plants.

INTERROGATORY NO. 7-3(g). Do you have any comparisons of radiation exposure associated with CP&L steam generators versus radiation exposure associated with any other nuclear utility's or utilities' or plant's or plants' steam generators, not identified above? If so please identify all documents containing such comparisons and state where the comparisons are in each such document.

ANSWER: No.

INTERROGATORY NO. 7-4(a). Who invented AVT water chemistry? (b) Is AVT water chemistry ever used in non-nuclear boilers? If so, where, when, or in what types of boilers? (c) Does CP&L use AVT water chemistry in any non-nuclear boilers? Which ones? For how long? (d) Has CP&L ever used AVT water chemistry in a non-nuclear boiler where you don't use it now? If so, why did you change? (e) Please identify all documents not identified in response to interrogatories above, which describe AVT water chemistry, its uses, its problems, and/or its advantages if any. (f) Do you know anything about corrosion rates in non-nuclear boilers using AVT water chemistry? If so, please state what you know and identify all documents concerning such corrosion rates you possess, and identify also all documents on which you rely in stating what you know about corrosion rates in non-nuclear boilers with AVT water chemistry. (g) please state all differences known to you, including pressures, flow rates, temperatures, metals used, other components used, etc. between non-nuclear boilers of each type stated in response to (b) above, and the Harris steam generators.

ANSWER: (a) AVT water chemistry was utilized in the supercritical fossil units of the 1950's to meet the demands of that type unit. Applicants are not aware that any one individual invented the treatment and do not know which organization may have invented AVT chemistry.

(b) Yes.

Applicants are not aware of all of the details of industry practice in use of AVT in non-nuclear boilers but are aware that it is commonly practiced and used in many fossil-fueled plants of various types.

(c) Yes.

Roxboro 3, Roxboro 4, Mayo 1

AVT has been used on Roxboro 3 since approximately June 1975 and on Roxboro 4 and Mayo 1 since those units were started.

(d) No.

(e) Applicants possess documents such as internal CP&L correspondence, correspondence with non-nuclear boiler manufacturers, and correspondence with non-nuclear plant chemistry consultants that may relate to the use of AVT on the above identified non-nuclear boilers. Due to the volume of these documents, it would be unreasonably burdensome for Applicants to identify each document individually. These documents will be made available for Joint Intervenors' inspection at a mutually convenient time, as described in detail in "Applicants' Response to Joint Intervenors' Request for Production of Documents (Contention VII)."

(f) CP&L has not made any direct corrosion rate measurements on non-nuclear boilers using AVT or other chemistry. Non-direct comparisons such as sample tube analysis programs, measurements of hydrogen evolution, and general experience indicate no quantifiable difference in corrosion rates on non-nuclear boilers using AVT versus those boilers using other chemistries. The advantages of using AVT and reasons for that choice on non-nuclear boilers are different from the advantages on nuclear boilers; for CP&L's boilers these reasons relate to steam purity. Information concerning the use of AVT in non-nuclear boilers is available in text books, trade journal publications, and papers presented at trade associations such as the International Water Conference. Applicants may possess some of these documents in their library. Documents that may be relevant will be made available upon request by the Joint Intervenor at a mutually convenient time, as described in detail in "Applicants' Response to Joint Intervenor's Request for Production of Documents (Continuation VII)."

(g) Applicants do not have the design parameters for all non-nuclear boilers in the industry which are using AVT. Each CP&L fossil boiler mentioned in (c) above is substantially different from each other boiler and from the Harris plant in pressures, flow rates, metals, and other components.

INTERROGATORY NO. 7-5(a). Do you have any information or know anything about Westinghouse recommending changing away from AVT water chemistry for PWRs at any time? (b) Please state

what you know and identify all documents related to any such recommendation for any PWR or PWRs, which information or documents is/are in your possession, (c) Do you have any information of (sic) know anything about Westinghouse recommending changing from any other water chemistry (or chemistries) to AVT for PWRs at any time? If so, please state each water chemistry from which a switch to AVT was recommended, when it was recommended, and identify all documents concerning each such recommendation for each such water chemistry, and all documents specifying each such water chemistry or predicting its effects or effects that wouldn't or shouldn't happen with it.

ANSWER: (a) No.

(b) Not applicable.

(c) Yes. Westinghouse recommended changing from phosphate chemistry to AVT in a letter from E.A. Watjen, Manager, Westinghouse Carolina Power & Light Projects to S. McManus, Carolina Power & Light Engineering, dated August 19, 1974 (File No. CQL-2426). Westinghouse currently recommends the use of AVT.

INTERROGATORY NO. 7-6(a). Did Westinghouse make any warranty for the original Robinson 2 steam generators? (b) Did Westinghouse give any prediction or projection of the useful life of the original Robinson 2 steam generators? (c) Who manufactured the replacement Robinson 2 steam generators? When did CP&L order those replacement steam generators? Why did you order them? Who made the decision to order them? What did they cost? Was that over or under the budget for their cost? (d) did the maker of the Robinson 2 replacement steam generators make any warranty for them? (e) did the maker of the Robinson 2 replacement steam generators give any prediction or projection of their useful life? (f) For each affirmative answer to (a), (b), (d) or (e) above please (i) identify all documents relating to the warranty or projection/prediction of useful life (ii) state the length of the (aa) warranty (bb) projected/predicted useful life (g) Please identify all documents related to CP&L's decision to replace the Robinson 2 steam generators, in particular statements or letters or memos from Robinson 2 plant management to CP&L senior management concerning the steam generators' (i) leaks (ii) deterioration (iii) replacement (iv) repair, including radiation exposure associated with it (v)

inspection or cleaning, including radiation exposure associated with either or both (vi) repair (vii) inspection (viii) cleaning (ix) maintenance (x) radiation exposure associated with maintenance, and also the minutes of any Board of Directors meetings at which steam generators at Robinson 2 were discussed and all documents signed by senior management related to replacement of the Robinson 2 steam generators or the need therefor. (b) Has CP&L or any lawyer or spokesperson for CP&L or any senior official of CP&L ever stated that the Robinson 2 steam generators would not have to be replaced, or should not have to be replaced in the useful life of that plant? If so, please list them all, stating who said what, and when? Please identify all documents you possess concerning each such statement.

ANSWER: (a) Westinghouse warranted the performance of the H.B. Robinson Unit 2 Nuclear Steam Supply System ("NSSS"), which includes the steam generators.

(b) No.

(c) Westinghouse manufactured the replacement steam generators. The replacement steam generators were ordered by CP&L management in March 1982 because the original steam generators were subject to accelerated corrosion of the steam generator tubes. The price of the steam generators is proprietary information available by inspection of the contract documents under the conditions described in "Applicants' Response to Joint Intervenor's Request for Production of Documents (Contention VII)." The price paid was the original price quoted by Westinghouse.

(d) Yes.

(e) No.

(f) With respect to the original steam generators:

(i) The warranty is contained in the NSSS contract for H.B. Robinson Unit 2.

(ii)(aa) One year.

(bb) Not applicable.

With respect to the replacement steam generators:

(i) See contract for replacement of H.B. Robinson steam generators, dated March 1, 1982.

(ii)(aa) The warranty terms are proprietary information contained in the contract documents.

(bb) Not applicable.

(g) Approximately 295 documents located in File No. 10-30005 at the H.B. Robinson Plant site relate to the replacement of steam generators. Due to the large number of these documents, it would be unreasonably burdensome for Applicants to identify each document individually. These documents will be made available for Joint Intervenor's inspection at a mutually convenient time, as described in "Applicants' Response to Joint Intervenor's Request for Production of Documents (Contention VII)."

(h) Applicants are not aware of any such statement ever having been made regarding the H.B. Robinson Unit 2 steam generators.

INTERROGATORY NO. 7-7(a). Where (or from whom) did CP&L get the idea of using AVT water chemistry for the Harris steam generators (S.G.s)? (b) When did you get this idea? (c) Please identify all documents relating to CP&L's decision to use AVT water chemistry for the Harris steam generators. (d) Please

state when CP&L first planned to use AVT water chemistry at Harris for the S.G.s (e) Has CP&L ever had any plans to use a water chemistry other than AVT for the Harris steam generators? If so, please state when, what water chemistry, and all reasons why you planned to use it instead of AVT. Please identify (i) all documents relating to your plans to use a non-AVT water chemistry (for each such water chemistry you planned to use, if more than one was planned for) and also (ii) all documents relating to changing your plans to using AVT. (iii) please also identify all documents (aa) specifying (bb) predicting or estimating or calculating or setting forth the effects of (cc) recommending each non-AVT water chemistry you have ever planned to use at Harris. (e) Did CP&L get the idea to use any of the above-identified non-AVT water chemistries at Harris from anyone? If so, who, and when? Please answer separately for each different water chemistry. (f) Has CP&L ever done any research concerning AVT water chemistry in steam generators? If so (i) when (ii) who did it (iii) what were the results (iv) who ordered it (v) identify all documents concerning or containing or reviewing this research, which you or your consultant(s), contractor(s) or subcontractor(s) possess. (g) If CP&L has ever planned to use a non-AVT water chemistry for Harris, who gave you the idea to switch to AVT (or switch back to it)? When? If anyone gave CP&L a recommendation concerning switching to AVT or using AVT at Harris, please identify all documents concerning such recommendation.

ANSWER: (a) See Response to Interrogatory No. 7-5(c).

(b) August 19, 1974.

(c) See Response to Interrogatory No. 7-5(c).

(d) October, 1974.

(e) Yes. Applicants originally planned to use phosphate chemistry at the Harris plant, as had previously been recommended by Westinghouse.

(i-iii) See Response to Interrogatory No. 7-5(c).

(e) (sic) See Response to (e) above.

(f) (i)-(v) CP&L participates in the Westinghouse Steam Generators Owners Group and EPRI and is

entitled, as are other members of those organizations, to receive reports prepared for organization members. CP&L possesses a copy of each EPRI report on hard copy or microfilm in its Technical Library. These documents occupy 30 shelves of space in the Technical Library. Due to the large number of these documents, it would be unreasonably burdensome for Applicants to identify each document individually. However, CP&L also possesses an extensive index of EPRI reports that can be made available for Joint Intervenors' inspection at a mutually convenient time as set forth in "Applicants' Response to Joint Intervenors' Request for Production of Documents (Contention VII)."

(g) See Response to Interrogatory No. 7-5(c).

INTERROGATORY NO. 7-8(a). Has CP&L ever received any information or recommendation NOT to use AVT water chemistry in (i) any PWR (ii) Harris? If so, from whom, and when? Please identify all documents concerning each such recommendation. (b) Has Westinghouse played any role not described in the above answers, in CP&L's decisions or actions concerning water chemistry at (i) Robinson 2 (ii) Harris? If so, for each, what was that role? Please identify all documents concerning that role. (c) Are you aware of any differing professional (or other) opinions (i) within CP&L (ii) at Westinghouse (iii) among other subcontractors or consultants you have who work with steam generators, concerning the (aa) use of AVT water chemistry at Harris (bb) the efficacy of AVT water chemistry at Harris in preventing leaks (cc) the efficacy of AVT water chemistry at Harris in preventing tube cracking (dd) the efficacy of AVT water chemistry at Harris in preventing tube wear from being excessive or occurring in more tubes than is acceptable (ee) the efficacy of AVT water chemistry at Harris in preventing tube failure? If any answer to any of the above subparts is affirmative, please state the dissenting or differing opinion, who holds it, and identify all documents you possess related to it or efforts to refute it or action taken or proposed to be taken against the person who holds or held it.

ANSWER: (a)(i) No.
(ii) No.
(b)(i) No.
(ii) No.
(c)(i) No.
(ii) No.
(iii) No.

INTERROGATORY NO. 7-9(a). Does CP&L keep any records of the (i) amount (ii) total amount of corroded material flushed or otherwise removed from the Robinson 2 original steam generators prior to their removal from that plant? (b) If answer to any part of (a) above is affirmative, please produce a copy of all such records and explain how the amount of corroded material is determined, calculated or recorded. (c) Do you possess any record, estimate or calculation of the amount of corroded material removed in cleaning, flushing, sludge lancing or otherwise from any steam generators using AVT and having (i) Inconel 600 tubes or (ii) carbon steel support plates? If so, please identify the plant or plants, the information, estimate or calculation, and identify all documents containing each such record, estimate or calculation.

ANSWER: (a)-(b) A file for special procedures pertaining to steam generator sludge removal in the years 1974-1984, available at the H.B. Robinson Plant site, contains approximately 600 pages of microfilm which may contain information responsive to this interrogatory. It would be overly burdensome for Applicants to set forth and explain each calculation and result contained in these documents. The documents will be made available for Joint Intervenor's inspection at a mutually convenient time as set forth in "Applicants' Response to Joint Intervenor's Request for Production of Documents (Contention VII)."

(c) Applicants possess a copy of a report on sludge-lancing techniques prepared by Rochester Gas & Electric Company. By prior agreement, Applicants must obtain the consent of the originating utility (Rochester Gas & Electric) before making the report available to third parties.

INTERROGATORY NO. 7-10(a). Do you know if anyone has prepared any estimate of radiation exposure to the public from the Robinson 2 steam generators (originals) being removed from that plant and stored? (b) If so, who has prepared such estimates, when, give each such estimate and identify all documents and workpapers in your possession concerning each such estimate. (c) Exactly how are the original Robinson 2 steam generators to be (i) stored (ii) ultimately disposed of, after they have been removed from Robinson 2? Where will such (i) storage (ii) disposal, take place, if you know. Please identify all documents in your possession related to (i) storage (ii) ultimate disposal of Robinson 2's original steam generators, including any which estimate radiation exposure therefrom to (aa) workers (bb) the public. (d) What sort of (i) radiation monitoring (ii) monitoring for leaks of radioactive material (iii) radiation shielding (iv) weather protection is being provided for the Robinson 2 steam generators once they are removed? Please specify all such in detail and identify all documents concerning each of the items (i) thru (iv) inquired about above.

ANSWER: (a) Yes.

(b)-(d) See Response to Interrogatory No.

7-3(c).

INTERROGATORY NO. 7-11(a). What modifications have been made to the Harris steam generators so far? (b) Please identify all documents concerning the (i) planning (ii) execution (including log books and work records) (iii) results of each such modification or set of modifications. (c) Exactly what modifications described in NUREG-0966 (SER for D2/D3 Steam Generator Design Modification, does CP&L plan to make at Harris? Please identify all documents related to each planned modification (d) Exactly what modifications described in NUREG-1014 (SER for Westinghouse D4/D5/E steam generator modification)

does CP&L plan to make at Harris? Please identify all documents, plans, blueprints and other information related to your plans for each such modification or set of modifications. (e) What modifications are now in progress on the Harris steam generators? Please identify all documents related to each such modification. (f) Please identify all documents describing or setting forth or giving reasons for the test program proposed for Harris steam generators during startup (preoperational testing, power ascensions, etc). (g) Please identify all changes made to your S.G. startup test program for Harris which relate to S.G. modifications or test the results thereof. You may supply a startup test plan for the S.G.s which you made before the S.G. problems at Ringhals and/or Krsko were discovered, instead of identifying all the changes. Please also identify all documents which plan or describe changes needed or to be made in the Harris preoperational test program as a result of (or related to) steam generator modifications. (h) when were the Harris steam generators delivered to the Harris site? (i) How were the Harris 1 steam generators stored before installation in Harris 1? Please identify all documents relating to such storage or any violation, deficiency, nonconformance, noncompliance or failure to follow procedure or failure to have a procedure for such storage. (j) What is being done with the Harris 2 steam generators? Are they being retained for possible replacement use at Harris 1? Have they been sold for scrap? If they are still being stored, please state how, and please identify any documents relating to such storage or violations or noncompliances with any CP&L regulation or procedure or any NRC rule or regulation concerning such storage. (k) Who manufactured the Harris 1 steam generators? The Harris 2 steam generators? When was each manufactured? (l) What heat treatment, if any, was used on the Inconel-600 tubes in the Harris 1 steam generators? Please identify all documents concerning the heat treatment of the tube material in the Harris 1 steam generators. (m) What heat treatment, if any, was used on the tubes of the Harris 2 steam generators? Is it the same as for the tube material of the Unit 1 steam generators? Please identify all documents concerning the heat treatment of the Unit 2 steam generator tubes. (n) Do you know if Westinghouse or anyone else is (i) offering (ii) recommending any other heat treating process (besides those used on Harris 1 SG tubes already) for Inconel - 600 steam generator tubes? If so, please describe that process, state who (i) offers it (ii) recommends it, and (iii) identify all documents concerning it, and (iv) state whether that process will be used on Harris 1's SG tubes, and if not, why not, giving all your reasons in detail. (o) Are the Harris 1 steam generator tube support plates made of Carbon steel? Are Harris 2's? (p) Please state exactly what alloy the tube support plates for (i) Harris 1 (ii) Harris 2 steam generators are made of. (q) What samples, if any, of the Inconel-600 used in Harris 1 steam generator tubes, have (i) been retained (ii) been tested in any way? (iii) please identify all

documents concerning such samples and/or any test(s) of any of them. (iv) Will CP&L or Westinghouse or the other custodian of such samples make any of them available to Joint Intervenor for testing or inspection? If so, which ones, and for what (testing, inspection, or both)(you should assume destructive testing may be included but you would get back the remains of any samples destructively tested). (r) What ASME or other codes, of what date(s) were used in manufacturing the Harris (i) 1 (ii) 2 steam generators? Do you possess a copy of such codes of that date? If so, please list them. (s) What differences between the ASME or other codes used to manufacture the Harris SGs, and the current codes applicable to SG manufacture, are there? Do you have a copy of the current codes applicable to SG manufacture? If so, please list all such codes you have a copy of. (t) What degree, percent, or amount of thinning of S.G. tube walls do you anticipate (i) on average (ii) as a maximum for a typical tube, (iii) as a maximum for any tube, as a result of expansion of the tube(s) in (aa) the Westinghouse S.G. "fix" described in NUREG-1014 (bb) any other S.G. modification now planned or considered for Harris. Please provide or identify all documents concerning your answer and all workpapers and documents relied on in calculating or arriving at it, for each item above (2 x 3, or 6 items). (u) What amount of corrosion or expansion of tube support plate material would be necessary to begin denting the Harris SG tubes (i) as they are now (ii) as they are projected to be after being expanded? (v) Do you have any monitoring data concerning vibration of steam generator tubes at (i) Krsko (ii) VC Summer (iii) McGuire (iv) Ringhals 3 (v) Almaraz (?spelling)? If so, for each plant, identify what data you possess, specifying which of it was recorded after the SGs at such plant were modified. For each plant, also identify which SG modifications have been made and when, if you know. If you know how many tubes have (aa) failed (bb) been plugged (cc) cracked (dd) been dented (ee) shown indications on eddy current testing, at any of these plants, please state how many have what problem at each plant. Please identify all documents concerning tube rupture, tube failure analysis, or any of the above tube problems at each plant listed in v-(i) thru v-(v) above. (w) Will there be a loose parts monitor on (i) the hot leg (ii) the cold leg (iii) the secondary side, of any S.G. at Harris 1? If so please identify the monitor, its maker, all documents concerning its performance (actual or projected), and its location, giving all details of its installation. Please also state, for each monitor, if that monitor (or that type of monitor) has ever been used at (aa) Oconee (bb) Point Beach (cc) Kewaunee (dd) Ginna (ee) Robinson 2 (ff) Krsko (gg) VC Summer (hh) Ringhals 3 (ii) Almaraz. Please identify all documents related to the use of each such monitor in operating nuclear plants (or any operating nuclear plant). Please state for each monitor the model number, its specifications, and any instructions of the manufacturer concerning its installation, maintenance, and/or reliability.

Please identify all documents relating to any of the above items in the preceding sentence. For each monitor identified above, please state if it is Class 1 equipment, and if not, all reasons why not. (x) Are there any loose parts monitoring devices now installed on the Harris SGs or piping leading to or from any of them? If so, please identify each such monitor and give all information about it that is requested in (w) above for monitors to be installed on Harris 1. (y) Please identify all documents related to performance of loose-parts monitoring devices which can be used on steam generators or associated piping, which you possess but have not yet identified. (z) Please identify any other loose-parts monitoring (i) devices (ii) methods which you plan to use at Harris, and all documents related to each. Please answer all questions in (w) above re each such device, and give the location(s) in which you now plan to use the device.

ANSWER: (a) The following modifications have been made to the Harris steam generators and feedwater system:

- (1) Utilize AVT steam generator water chemistry in lieu of phosphates;
- (2) Provide deep bed full flow condensate polishers;
- (3) Utilize 90-10, 70-30 Cu-Ni condenser tubes in lieu of admiralty condenser tubes;
- (4) Utilize 304 stainless steel tubes in all feedwater heaters. (Original design utilized admiralty low pressure heater tubes and 90-10 Cu-Ni high pressure heater tubes);
- (5) Improve condenser integrity by implementing integrally-grooved aluminum bronze tubesheets;

(6) Utilize fully-rolled steam-generator tubes within steam generator tube sheet. (Original design utilized partially-rolled tubes);

(7) Hydraulic expansion of 124 tubes at the first two baffle-plates in the preheater section of the steam generators;

(8) Implement split-feedwater flow.

(b)(i)-(ii) See Response to Interrogatory No. 7-1(e)-(g).

(iii) There are no results because the plant is not operational at this time.

(c) None, the Harris steam generators are D-4 model.

(d) The tube expansion and split-feedwater flow as explained in the Response to Interrogatory No.

7-11(a)(7)-(8). See Response to Interrogatory No. 7-1(e)-(g).

(e) A steam generator wet lay-up system design modification is in progress. See Response to Interrogatory No. 7-1(e)-(g).

(f) See Applicants' FSAR at § 14 for information regarding the Harris startup test program. Additionally, the SHNPP startup manual contains detailed information and directions regarding procedural development, format, instructions, etc.

(g) As steam generator modifications are initiated, design documents are reviewed by startup engineers for incorporation of changes/revisions into the final test procedures. Design documents (DCN's, FCR's, PW's) are located within the document control facility at the Harris site. At this time, the following startup procedures related to steam generator startup testing exist:

Steam Generator

<u>Procedure #</u>	<u>Procedure</u>	<u>% Complete</u>
1-3005-C-01	Secondary Hydro	100
1-3005-M-01	Secondary Side Inspection	100
1-3005-F-01	Secondary Flush	100

Steam Generator Blowdown

<u>Procedure #</u>	<u>Procedure</u>	<u>% Complete</u>
1-3010-F-01	System Flush	100
1-3010-C-01	System Hydro	81
1-3010-T-01	System Test	40

Steam Generator Chemical Addition

<u>Procedure #</u>	<u>Procedure</u>	<u>% Complete</u>
1-3015-F-01	System Flush	100
1-3015-H-01	System Hydro	100
1-3015-T-01	System Test	15

Steam Generator Wet Lay-up

<u>Procedure #</u>	<u>Procedure</u>	<u>% Complete</u>
1-3115-H-01	System Hydro	0
1-3115-F-01	System Flush	0
1-3115-T-01	System Test	0

As the startup engineers receive subsequent design change information, the above-listed procedures are subject to revision. Also, additional procedures may be implemented as appropriate. All documents relevant to the test programs are contained in fifteen file drawers at the Harris Plant site. Due to the large volume of these documents, it would be unreasonably burdensome for Applicants to identify each document individually. The documents will be made available for Joint Intervenors' inspection at a mutually convenient time as set forth in detail in "Applicants' Response to Joint Intervenors' Request for Production of Documents (Contention VII)."

(h) The Harris Unit 1 steam generators were delivered on:

June 18, 1976;

September 10, 1976; and

November 18, 1976

(i) The steam generators were stored in a nitrogen purge and in accordance with Westinghouse NSSS component receiving and storage guidelines as set forth in the CP&L equipment in-storage maintenance sheet. There was no violation, deficiency, nonconformance, noncompliance for storage of Harris 1 steam generators before installation in Harris 1.

(j) The Harris 2 steam generators are being stored in a nitrogen purge. They have not been retained for replacement use at Harris 1 or sold for scrap. See (i) above for storage guidelines.

(k) Westinghouse manufactured the Harris 1 and Harris 2 steam generators in 1975-76.

(l) The heat treatment consisted of mill anneal heat treatment in accord with IAW ASTM Specification for SB-163 tubular material. Applicants do not possess any such documents.

(m) See Response to (l) above.

(n) Westinghouse is recommending a heat treating process described in EPRI Report NP-3051, July, 1983.

(o) Yes. Yes.

(p) See response to (o).

(q) CP&L does not have any samples of Inconel 600 and is not entitled to obtain such samples from Westinghouse. Applicants do not possess any such documents.

(r) The Harris steam generators are designed and fabricated in accord with 10 C.F.R. Part 50, § 50.55(a) and the ASME Code, 1971 Edition Summer 1972 Addenda. See Applicants' FSAR at § 5.2.1.

(s) The codes will be made available for Joint Intervenors' inspection at a mutually convenient time, as described in "Applicants' Response to Joint Intervenors' Request for Production of Documents (Contention VII)." Applicants have not undertaken a systematic comparison of the past and current codes.

(t) See NUREG-1014, Appendix B.

- (u) See NUREG-1014, Appendix B at § 5.4.2.
- (v) See NUREG-1014, Appendix B at § 5 with regard to Krsko.
- (w)(i) No.
- (ii) No.
- (iii) Yes. The loose parts monitoring system at SHNPP has been approved by the NRC staff, LAP-83-508, October 28, 1983 (previously provided to counsel for Joint Intervenor). See Response to Interrogatory 7-1(e)-(g).
- (x) Not yet.
- (y)-(z). All relevant documents are contained in Shop Order 120 file, identified in response to Interrogatory No. 7-1(e)-(g).

INTERROGATORY NO. 7-12(a) Have you ever seen or possessed a copy of a report by Science Applications Inc. titled in whole or in part "Value Impact Analysis of Recommendations Concerning Steam Generator Tube Degradation and Rupture Events" or words to the same effect? (b) If answer to (a) is affirmative, are you familiar with the recommendations in that report? How many of them are there? Which, if any of them, do you (i) have implemented (ii) plan to implement (iii) plan not to implement at Harris? (c) For each such recommendation, please give all reasons why you (i) have implemented (ii) plan to implement or (iii) do not plan to implement it. (d) Please identify all documents concerning your decision(s) to implement or not implement each such recommendation of the "SAI report" referred to above.

ANSWER: (a) Yes.

(b) "Value Impact Analysis of Recommendations Concerning Steam Generator Tube Degradation and Rupture Events" sets forth a consultant's recommendations regarding proposed regulatory requirements under consideration by the N.R.C. Staff. It is not addressed to applicants for licenses or licensees.

(c) Not applicable.

(d) Not applicable.

INTERROGATORY NO. 7-13(a) What instrumentation have you installed in the Harris 1 SGs to detect vibration in (i) the preheater (ii) the tubes (iii) other parts of the steam generator? Please identify all documents describing such instrumentation, its preferred or proper conditions for operation, its durability under conditions where it is or will be installed, the manufacturer's specification of it, its design, its applicability to such monitoring, of its reliability under conditions where it is used or planned to be used. (b) What other nuclear plants have (i) the identical (ii) similar instruments installed for (iii) the same (iv) similar purposes, as those you identified in response to (a) above, to your knowledge? For each, please state the similarities and differences in the instrument(s) and the purposes for which each is used, to the extent you know them. (c) what other nuclear plants use loose-parts monitors of the types or models identified in response to 7-11(w), (x), or (z) above, to the extent you have not already identified all such plants? Please state what monitor (model or type or both) each such plant uses, for what purpose.

ANSWER: (a) (i) None.

(ii) None.

(iii) None.

(b) Not applicable.

(c) Fifteen domestic plants and thirteen non-domestic plants have loose-parts monitors of

the type or model identified in response to 7-11(w).

These plants utilize the Westinghouse digital Metal Impact Monitoring System (MIMS) for loose parts monitoring.

INTERROGATORY NO. 7-14(a) Please identify all studies of corrosion in steam generators not identified in response to above interrogatories, concerning (i) Inconel-600 tubes and AVT water chemistry (ii) SGs with AVT water chemistry (iii) PWRs with aluminum bronze parts in their condensers (iv) PWRs with alloys containing copper in their condensers (v) at Krsko (vi) at V C Summer (vii) at McGuire (viii) At any other PWR with Westinghouse steam generators (ix) at any PWR with Westinghouse D4 steam generators (x) at any PWR with Westinghouse D5 steam generators (xi) which involve analysis or estimates of tube failure (probability, number, time, etc) (xii) which involve analysis or estimates of tube cracking (xiii) which involve estimates or analysis of how many tubes will have to be plugged (xiv) which involve any estimates which have proved to be correct (aa) 5 years later (bb) more than 5 years later, concerning corrosion, tube wall thickness, tube rupture, tube cracking, number of tubes that have had to be plugged, etc. (xv) which deal with thinning of tube walls after expansion of tubes (xvi) which deal with corrosion of SG tubes during extended shutdowns (xvii) which deal with heat treatment of Inconel-600.

ANSWER: Applicants are not aware of any such studies in their files which have not been identified in response to previous interrogatories.

INTERROGATORY NO. 7-15(a). Is the tube metal in the Harris SGs Inconel-600? If not, please identify the tube metal, and answer the above interrogatories substituting the correct identify of the SG tube metal whenever the words "Inconel 600" occur. (b) Will CP&L commit itself unconditionally to never use a water chemistry other than AVT at Harris? Please give in detail all reasons for your answer, and identify all documents and work papers you used or relied upon in answering and all expert opinion(s) you relied on in making your answer. (c) please identify all water chemistries other than AVT which you

may consider for use at Harris and identify all documents describing each and/or its advantages, disadvantages and/or effects or claimed lack of effects. (d) For each water chemistry identified in response to (c) above, please state all circumstances under which CP&L would (i) consider using (ii) use, it at Harris 1.

ANSWER: (a) Yes.

(b) No. While Applicants have no present intention of using any steam generator water chemistry other than AVT, it would be imprudent to foreclose the possibility of advances in scientific knowledge over the next three to four decades that might warrant switching to an as yet undiscovered water chemistry regime.

(c) Applicants are unable to identify any water chemistry other than AVT that they may consider for use at Harris in the future.

(d) Not applicable.

INTERROGATORY NO. 7-16. What documents does CP&L possess related to the Owners Group Steam Generator Tube Rupture Subgroup? When do you plan to provide the commitment NRC requested 3-7-84 on operators response time (Ltr. from NRC Dkts. 50-244, 50-400 etc 3-7-84)?

ANSWER: The following documents have been published relative to the Westinghouse Steam Generator Tube Rupture Owners' Subgroup:

- 1) WOG-83-258, "SGTR Licensing Issues, Formation of Non-Generic Technical Subcommittee," October 7, 1983.
- 2) WOG-83-262, "Program to Address SGTR Issues," October 24, 1983.

- 3) WOG-83-271, "Steam Generator Tube Rupture Issues," November 9, 1983.
- 4) WOG-83-276, "SGTR Licensing Issues Subgroup, Meeting of November 15, 1983, Meeting Summary and Action Plan," November 9, 1983.
- 5) WOG-84-106, "WOG Subgroup on SGTR Licensing Issues - Notice of Meeting of January 26, 1984," January 11, 1984.
- 6) SGTR-WOG-84-001, "Formation of SGTR Subgroup," December 13, 1983.
- 7) SGTR-WOG-84-002, "Notice of NRC Meeting of February 23, 1984," February 14, 1984.
- 8) SGTR-WOG-84-003, "Westinghouse Owners' Group SGTR Subgroup, Summary of January 26, 1984 Meeting," March 8, 1984.
- 9) SGTR-WOG-84-004, "NRC/SGTR Subgroup Meeting of February 23, 1984," March 9, 1984.
- 10) SGTR-WOG-84-005, "SGTR Licensing Group Meeting Announcement," March 27, 1984.
- 11) Letter of December 9, 1983, A. Ladieu to D. G. Eisenhower (formal announcement of Owners' Group formation).
- 12) NRC letter of March 7, 1984, V. Hernes to Westinghouse Steam Generator Tube Rupture Owners' Group, "Summary of meeting held on February 24, 1984 in Bethesda, MD to discuss the proposed Westinghouse Steam Generator Tube Rupture generic program."

The NRC letter of March 7, 1984 stated that: "each plant agreed to formally submit a commitment that specifies they will abide by the Westinghouse/staff agreed upon resolution of this issue." However in a discussion on March 30, 1984 with V. Hernes, NRC Project Manager, it was acknowledged that this was incorrectly stated. The letter was meant to state that "each plant would consider formally submitting the commitment." This issue is currently under consideration at CP&L and no decision has been made on whether or not this submittal will be made.

Respectfully submitted,

By: *Pamela H. Anderson*

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and

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Samantha F. Flynn

Carolina Power & Light Company
P.O. Box 1551
Raleigh, North Carolina 27602
(919) 836-6839

Counsel for Applicants

Dated: April 9, 1984

In the Matter of

Docket Nos. 50-400 CL
50-401 OL

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

County of Wake

State of North Carolina

M. C. Zerk

John J. Amato
Notary Public

My commission expires February 18, 1985.

ATTACHMENT A

KEVIN W. SHAW

Resume

EDUCATION AND TRAINING

Bachelor of Science Degree in Mechanical Engineering,
Purdue University, December 1982

Nuclear Orientation and Introduction to Power Plants,
Bechtel Power Corporation, Los Angeles Power Division,
June 1981

Quality Assurance Codes and Standards Course, Carolina
Power & Light Company, February 1984

PROFESSIONAL SOCIETIES

American Society of Mechanical Engineers

EXPERIENCE

October 1983 - Associate Engineer, Harris Plant Engineering Section, Mechanical Unit, Carolina Power & Light Company, Shearon Harris Nuclear Power Plant, New Hill, North Carolina

January 1983 - Engineer, Mechanical Section, Bechtel Power Corporation, Norwalk, California

June 1982 - Co-op student engineer, Mechanical Section, Bechtel Power Corporation, Norwalk, California

June 1981 - Co-op student engineer, Mechanical Section, Bechtel Power Corporation, Norwalk, California

January 1980 - Co-op student engineer, Mechanical Section, Bechtel Power Corporation, Norwalk, California

June 1979 - HVAC installation/service - Klawinski Heating & Air Conditioning, Inc., Hammond, Indiana

ATTACHMENT B

JOHN MICHAEL McDOWELL

Principal Specialist - Chemistry

Born October 9, 1948

Education and Training

B.S. degree in Chemical Engineering, N.C. State University,
Raleigh, North Carolina (1970)

Introduction to Nuclear Engineering, N.C. State University,
Raleigh, North Carolina (1979)

Professional Societies and Status of Registration

Edison Electrical Institute Power Station Chemistry
Committee -- Chairman, Editorial Section

American Nuclear Society

Registered Professional Engineer in North Carolina
(August 1975)

Experience

June 1970 - Junior Engineer, Bulk Power Supply Department,
Central Office, Raleigh, North Carolina

May 1971 - Chemical Engineer, Fossil & Hydro Generation
Section, Bulk Power Supply Department, General Office,
Raleigh, North Carolina

July 1975 - Senior Engineer, Fossil & Hydro Generation
Section, Bulk Power Supply Department, General Office,
Raleigh, North Carolina

January 1977 - Senior Engineer, Generation Services
Section, Generation Department, General Office, Raleigh,
North Carolina

October 1977 - Project Engineer, Chemistry, Generation
Services Section, Generation Department, General Office,
Raleigh, North Carolina

May 1979 - Project Engineer, Chemistry, Generation
Services, HE&EC Section, Generation Department, General
Office, Raleigh, North Carolina

November 1979 - Principal Specialist, Chemistry,
Environmental & Radiation Control Section, Nuclear
Operations Department, Harris Energy & Environmental
Center, New Hill, North Carolina

March 1981 - Principal Specialist, Chemistry, Environ-
mental & Radiation Control Section, Technical Services
Department, Harris Energy & Environmental Center,
New Hill, North Carolina

February 1982 - Principal Specialist, Chemistry,
Radiological & Chemical Support Section, Technical
Services Department, Harris Energy & Environmental
Center, New Hill, North Carolina

August 1983 - Principal Specialist, Chemistry, Radio-
logical & Chemical Support Section, Operations Training
& Technical Services Department, Harris Energy &
Environmental Center, New Hill, North Carolina

ATTACHMENT C

BLAINE G. RIECK

Resume

EDUCATION:

B.S. Chemistry - Muhlenberg College, Allentown, Pennsylvania

Completed Courses:

Sales Management - Sales & Management Institute, New York,
New York

Methods-Time Management - Methods Engineering Council,
Pittsburgh, Pennsylvania

Package Engineering - Columbia University, New York, New
York

Corporate Management Courses Completed:

Technique and Functions of Management

Reactor Materials

Reactor Plant Technology

Management Techniques

Project Planning and Scheduling Techniques

Management Functions and Policies

The Rational Manager

Computer Concepts for Executives

Business Management

Market Planning and Strategy

Multinational Business Management

Public Utilities (PUR) Course

CAREER INTERESTS:

Management responsibility at the company or division executive level. Particular emphasis is placed on general management and ability to organize the business matrix of technical/administrative functions to be responsive to corporate objectives. Career interests are comprehensive and sensitive to requirements for flexible, cost-conscious personnel with matrixed communications skills.

CAREER EXPERIENCE:

January 1984 to Present - Carolina Power & Light Company
H. B. Robinson Steam Electric Plant, Post Office Box 790,
Hartsville, South Carolina 29950 - Manager, Control &
Administration

Responsible for managing Robinson Nuclear Project's Security, Materials Management, Records Management, Financial Planning & Control, Emergency Preparedness, and Administrative Services.

June 1982 to July 1982 - Carolina Power & Light Company, Post Office Box 1551, Raleigh, North Carolina 27602 - Nuclear Staff Support Section, Planning and Performance Specialist

Developed department goals and plans of action, analyze performance, develop an integrated planning process, prepare Conduct of Operations Manual, direct two-year Operating Procedures Standardization and Improvement Program, prepare Operating Procedures Standards and Administrative Documentation. Provide Organization, functional analysis consultation.

February 1981 to June 1982 - Gilbert Associates, Inc., Post Office Box 1498, Reading, Pennsylvania 19603 - Manager, Corporate Information Management Department

Organize and managed the Information and Records Management Department for this Architect/Engineer Consulting firm. Directed development of a Corporate Records Management System which was responsive to regulatory requirements for nuclear power plant projects and Corporate business needs. Provided consultation both in-house and to a wide variety of external clients.

April 1980 to February 1981 - Norflor Construction Corporation, 360 Landstreet Road, Orland, Florida 32809 - Project Manager

Managed and directed a project for this general contractor engaged in the construction of a major hospital addition and expansion program. Responsible for contractual, planning and scheduling, financial and administrative functions; subcontractors, and new business.

May 1978 to April 1980 - Smith & Gillespie Engineers, Inc., 1100 Cesary Boulevard, Jacksonville, Florida 32201 - Project Manager

Organized and directed a project engaged in design and construction of a total Wastewater Transport and Treatment System (4.0 MGD). Responsible for technical, contractual, financial, and administrative functions, interface with municipal and regulatory agencies (DER, EPA and Corps of Engineers).

December 1975 to May 1978 - Stiefel Associates, Inc.,
185 Country Ridge Road, Scarsdale, New York 10583 -
Vice President

Provided consulting service at the Corporate Executive level in the field of power and energy, serving the utility industry with expertise in Organization, Project Management, Procurement, Construction Quality Assurance, Financial and Administrative Control, Public Relations, Test and Startup, Contract Management, Records Management, Marketing, Long Range Planning, Scheduling and Business Systems. Clients included Florida Power Corporation, General Public Utilities, Seminole Electric Co-op.

May 1974 to December 1975 - Bechtel Power Corporation,
15740 Shady Grove Road, Gaithersburg, Maryland 20760 -
Project Manager

Managed the technical, contractual, financial, and administrative functions for a project plant design and construction management project. Product design was for six nuclear plants. Reorganized procurement function to be responsive to large long lead time purchases. Developed a unique nuclear records management system, first integrated system in the U.S.

June 1974 to May 1974 - Westinghouse Power Systems
Projects Division, Parkway Center, Pittsburgh, Pennsylvania
15220 - Manager, Administration and Planning, Deputy
Division Manager

Responsible for managing the organizational, functional, and manning planning for Power Systems International, relative to the objectives of customer responsibility, multinational growth and new business opportunities. Complete responsibility for forming and staffing a new division and dissolution of the previous organization. Then assumed position of Deputy Division Manager in new division. Managed procurement, transportation, office services, personnel, salary administration, and management development.

May 1970 to May 1972 - Westinghouse Hanford Company, P.O.
Box 1970, Richland, Washington 99352 - Manager, Corporate
Administration

Organized this new subsidiary and then assumed permanent position. Managed the corporate affairs of this subsidiary and contract administration, procurement and material control, public relations, security, and operations service. Responsible for policies and procedures, patents; and served as Assistant Secretary of the Company.

January 1969 to May 1970 - Westinghouse Electric Company, Nuclear Energy Systems, Post Office Box 355, Pittsburgh, Pennsylvania 15230 - Program Manager, Turnkey Project Division

Managed integrated planning and scheduling; competitive analysis; logistics, administration, procedures, management systems efforts for design and construction of six turnkey nuclear projects. Responsibilities included new business planning, acquisition studies, new division development and startup.

April 1968 to January 1969 - Westinghouse Electric - Tampa Division, 6001 Westshore Boulevard, Tampa, Florida 33616 - Manager, Business Development & Marketing Services

Assisted in construction management of this new division and startup phase. Responsible for the business development activity of the Tampa operation. This included integration of Tampa operations into the parent division structure and operations; evaluation of manpower growth and organization planning. Prepared financial and business plans, coordinated development of a management information system. Managed market planning and services, market communications.

October 1966 to April 1968 - Westinghouse Headquarters Engineering, Westinghouse Building, Gateway Center, Pittsburgh, Pennsylvania 15222 - Manager, Market Study Methods

Managed the development of techniques for customer study through the use of industrial engineering methods and equipment such as memo-motion picture filming, time and motion study and work simplification, and the application of resultant data to new product, product modification systems research and development.

August 1963 to October 1966 - Westinghouse Electric, Astronuclear Laboratory, Post Office Box 10864, Pittsburgh, Pennsylvania 15236 - Supervisor, Technical Publications

Organized and managed a department engaged in preparation of writing style standards, writing, editing, illustrating and publishing technical reports, progress reports, operating manuals, etc.; technical direction and preparation of progress films for nuclear rocket application to space vehicles program.

November 1955 to August 1963 - Westinghouse Electric Company, Bettis Atomic Power Laboratory, West Mifflin, Pennsylvania 15122 - Supervisor, Planning and Production Control

Managed planning, scheduling and production control for a nuclear fuel manufacturing department. Cost control and document control.

Supervisor, Employee Information

Organized an industrial relations department to implement a communications program for a plant of 3000 employees, including an employee newspaper, supervised training programs, and administration of a service fund and a suggestion system.

Assistant to the Project Manager

Supervised a planning group for technical program planning and guidance, management planning and liaison with construction sites of the first nuclear powered cruiser and aircraft carrier.

Core Project Manager

Managed the integration and coordination of development, design and manufacturing activities into a total effort to produce the prototype reactors for the world's first nuclear powered aircraft carrier.

January 1950 to November 1955 - Fisher Scientific Company, 635 Greenwich Street, New York, New York - Assistant to the Vice President

Responsible for new plant startup, general plant operation, reorganization, expansion of manufacturing depart-

ments. Purchased equipment, established labor levels, plant layout, methods, time standards and training. Products included chemicals, laboratory glassware, furniture and laboratory instrumentation.

CIVIC ACTIVITIES:

1958-1965

Seven years as Director, Community Mental Health Organization (two years as President).

1967-1970

Borough Councilman (two years as President and Chief Executive Officer).

1970-1972

Member, Tri-Cities Chamber of Commerce (Washington); Board of Directors member; Chairman, Industrial Development Committee; Division Chairman, Economic Development, Agriculture and Transportation Committee.

1971-1972

Board of Directors member, Kadlec Medical Center Foundation, Richland, Washington; Chairman, Publicity Committee.

1971-1972

Technical Review Committee, City of Kennewick Pyrolysis Waste Treatment Project.

1974

Member, Trade Mission to the Middle East, United States Department of Commerce.

1976-1978

Vice President, Church Council, Choir Director, Grace Lutheran Church, Tampa, Florida.

1977-1982

Certified listing - Who's Who in Finance and Industry.

REFERENCES:

Will be furnished upon request.

ATTACHMENT D

BIOGRAPHY

M. G. (Jimmy) Zaalouk

Dr. Zaalouk is the Manager, Nuclear Engineering Projects Section in the Nuclear Engineering & Licensing Department of Carolina Power & Light Company, and is responsible for the project engineering management of assigned Company nuclear plants' modifications. He holds a Ph.D (1966) and M.S. (1962) degree in Nuclear Engineering from North Carolina State University; a B.S. (1957) in Electrical Engineering from Cairo University and a Professional Engineer license in the State of North Carolina.

From 1981-1983, he held the position of Manager, Nuclear Engineering Division at Houston Lighting & Power Company, responsible for the nuclear engineering activities on the Company's nuclear power plants.

From 1972-1981, he was the Mechanical Nuclear Unit Manager at Carolina Power & Light Company, responsible for the mechanical/nuclear design modifications on cooperating nuclear plants (700 MWE PWR per unit and two 820 MWE BWR units) and headed the CP&L PWR Corporate Investigative Team of the Three Mile Island incident.

Prior to joining CP&L in 1972, he was an Assistant Professor at NCSU (1969-1972) and currently serves as an adjunct

Associate Professor at NCSU. From 1968-69, he was a visiting Senior Scientist at the Norwegian Institute for Atomic Energy. To date, he has published twenty-seven technical papers and nine technical reports in the field of Nuclear Reactor Engineering. He is a member of the ANS, a member of Sigma Xi, an active member of the ANS 19 Nuclear Standards Committee, appointed member of ANS National Program Committee and Chairman of the ANS, Reactor Operations Division Program Committee, and served as Chairman of the Counter Flow Steam Generator Owners Group.

He is listed in the "Who is Who in South and Southwest" and "American Men and Women in Science."

ATTACHMENT E

THOMAS F. TIMMONS

Resume

3/82 to present - Manager, RCS Components Licensing, Westinghouse Electric Corporation

Responsible for all licensing activities and safety evaluations for the Reactor Coolant System and its components for operating and non-operating plants. Licensing activities and safety evaluations require the use and interpretation of industry codes and standards and of regulatory rules, requirements and recommendations. These safety evaluations included evaluations of components of the RCS (reactor vessel, reactor internals, reactor coolant pumps and piping) and evaluations of the condition of the steam generators of Westinghouse operating plants with Models 27, 44, 51, D, E, and F steam generators and justifications for the continued safe operation of those plants. In addition this position is responsible for the evaluation of the safety of operating plants for which conditions have been changed from the original design basis. These safety evaluations are performed for all components of the RCS and for the RCS as a system. Managed a group of 8 engineers and 1 technician in the execution of these responsibilities.

From 4/82 to 9/83 served in a collateral position as Manager, Model D Steam Generator Licensing. In this position I was responsible for all licensing activities, positions and strategies for the Model D Preheat Steam Generator Program. This program involved integration of engineering design, analysis and testing information related to the preheat steam generator tube vibration issue. This information included structural analysis, tube vibration testing, laboratory testing of scale models, tube vibration testing, laboratory testing of scale models, tube vibration analysis, eddy current test data and thermal-hydraulic information. This

information was presented orally and in the form of reports to the utilities and regulators in Spain, Sweden, Brazil, Switzerland and the United States. This effort was successfully completed with the acceptance of the proposed modifications by the utilities and by the Regulators in the various countries.

2/80 to 3/82

Manager, Mechanical Fluid Systems Evaluation, Westinghouse Electric Corporation

Responsible for all licensing activities and safety evaluations for all fluid systems and mechanical components in the NSSS scope and its interfacing systems. The scope of this responsibility included the Reactor Coolant System, the Reactor Vessel, the Steam Generator, the Reactor Coolant Pump, etc. This function was performed for operating and for non-operating plants. The scope for steam generator evaluations included Models 27, 44, 51, D, E, and F. In this position I managed 8 engineers and 1 technician.

From 12/80 to 5/81 I served in a collateral position as Manager, Licensing, SCE Sleeving Program. In this position I was responsible for the development and execution of strategies for the successful return to power of the San Onofre Nuclear Generating Station Unit 1 (SONGS Unit 1) following the discovery of significant degradation of large numbers of the steam generator tubes. This program required the acquisition, evaluation and presentation of engineering information and licensing criteria related to the development, testing and field implementation of steam generator tube sleeving for the first full-scale steam generator tube sleeving program in the world. SONGS Unit 1 returned to power during June, 1981.

9/75 to 1/80

Senior Engineer, Safety Standards, Westinghouse Electric Corporation

Responsible for licensing activities and safety evaluations for human factors, structural analysis, reactor vessel in-

tegrity, operator action and accident monitoring instrumentation. These activities included overall program management for the definition of the licensing issue and the strategy to be employed and the successful implementation of the chosen strategy. This required frequent interaction with utility customers and the U.S. NRC to obtain satisfactory resolution of generic and plant specific licensing issues. In addition to these activities, I was also responsible for the development of the Westinghouse positions on regulatory criteria, particularly for U.S. NRC Regulatory Guides, and for the use of these positions in licensing documentation (e.g., in steam generator replacement reports for Surry 1 and 2 and for Turkey Point 3 and 4.)

1/73 to 8/75

Start-up Engineer, Operations Department,
WEDCO Corporation

Performed post installation and start up electrical testing of components and systems of the Indian Point Units 2 and 3.

10/72 - 12/72

Vacation.

9/69 to 9/72

Lieutenant, U.S.S. Bainbridge, U.S. Navy.

Served as Electrical Officer and as Reactor Laboratories Officer on the U.S.S. Bainbridge.

7/68 to 8/69

Ensign, U.S. Naval Nuclear Power School.

Attended Naval Nuclear Power School and Naval Nuclear Power Prototype School (SlW) as a student.

Education

Bachelors Degree in Mechanical Engineering, 1968. Marquette University, Milwaukee, Wisconsin.

ATTACHMENT F

FRANCIS X. THOMSON, JR.

Senior Engineer

Birth Date: January 2, 1950

I. Education:

- A. United States Merchant Marine Academy, Kings Point,
New York - B.S. in Mechanical Engineering - 1971
- B. Penn State University, University Park, Pennsylvania
M.S. in Mechanical Engineering - 1974

II. Experience

- A. August 1971 - August 1972
 - 1. Norfolk Naval Shipyard
 - a. Employed as a Design Engineer
- B. September 1972 - March 1974
 - 1. Penn State University
 - a. Graduate Assistant
- C. May 1974 - April 1983
 - 1. Westinghouse, Pittsburgh, Pennsylvania
 - a. Employed as a Senior Engineer in the
Westinghouse Nuclear Fuel Division
 - b. March 1980 - Employed as a Senior
Engineer in the Nuclear Technology
Division, Nuclear Safety Department
- D. June 1983
 - 1. Carolina Power & Light Company
 - a. Employed as a Senior Engineer in the
Nuclear Licensing Unit of the Technical
Services Department, Licensing
& Permits Section, located in the
General Office.
 - b. September 1983 - Transferred as a
Senior Engineer in the Nuclear
Licensing Unit to the Nuclear Engineering
Licensing Department, Nuclear
Licensing Section, located in the
General Office.

ATTACHMENT F

FRANCIS X. THOMSON, JR.

Senior Engineer

Birth Date: January 2, 1950

I. Education:

- A. United States Merchant Marine Academy, Kings Point,
New York - B.S. in Mechanical Engineering - 1971
- B. Penn State University, University Park, Pennsylvania
M.S. in Mechanical Engineering - 1974

II. Experience

- A. August 1971 - August 1972
 - 1. Norfolk Naval Shipyard
 - a. Employed as a Design Engineer
- B. September 1972 - March 1974
 - 1. Penn State University
 - a. Graduate Assistant
- C. May 1974 - April 1983
 - 1. Westinghouse, Pittsburgh, Pennsylvania
 - a. Employed as a Senior Engineer in the
Westinghouse Nuclear Fuel Division
 - b. March 1980 - Employed as a Senior
Engineer in the Nuclear Technology
Division, Nuclear Safety Department
- D. June 1983
 - 1. Carolina Power & Light Company
 - a. Employed as a Senior Engineer in the
Nuclear Licensing Unit of the Tech-
nical Services Department, Licensing
& Permits Section, located in the
General Office.
 - b. September 1983 - Transferred as a
Senior Engineer in the Nuclear
Licensing Unit to the Nuclear Engine-
ering Licensing Department, Nuclear
Licensing Section, located in the
General Office.