

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

RELATED CORRESPONDENCE

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

In the Matter of

CAROLINA POWER AND LIGHT CO. et al.
(Shearon Harris Nuclear Power Plant,
Units 1 and 2)

Docket 50-400 OL

Wells Eddleman's General Interrogatories and *Interrogatories on 41*
to Applicants Carolina Power & Light et al. *Contentions 9, 11, 41*
(EIGHTH Set) *45, 116, +*

Under 10 CFR 2.740, 2.741 and the Board's *8-K-83 + 3-10-83 +*
9-22-82 Memorandum(s) 132(X=)
and Order^(s), Wells Eddleman requests Applicants to answer separately
and fully in writing, under oath or affirmation, each of the
following interrogatories, and to produce a permit inspection and
copying of the original or best copy of all documents identified
in response to interrogatories as set forth below.

These interrogatories are intended to be continuing in nature,
and I request each answer to be promptly supplemented or amended as
appropriate under 10 CFR 2.740(e), should CP&L, NCEMPA, any other
or any contractor or consultant to any, some or all of those,
Applicant, or any employee of any or some or all of them, or any
individual acting on behalf of any or some of all of them, obtain
or create any new or differing information responsive to these
(where "Them" refers to the preceding listing(s))
general interrogatories. The request for production of documents
is also continuing and requests Applicants to produce promptly if
not immediately any additional documents the Applicants and others
acting on their behalf or employed by them, as listed in the previous

sentence, obtain which are responsive to the request(s) for production of documents below.

Where identification of a document is requested, please briefly describe the document (e.g. book, notebook, letter, memo, report, notes, transcript, minutes, test data, log, etc.) and provide the following information as applicable: document name, title, number, author(s), date of writing or of publication or both, addressee, date approved, by whom approved, and the name and address of the persons having normal custody of the document, and name and address of any person other than the preceding having actual possession of the document. When identifying documents in response to these interrogatories and requests, please state the portion or portions of the document (e.g. sections, chapters, pages, lines) upon which Applicants rely or which Applicants swear or affirm is/are responsive to the applicable interrogatory or request.

DEFINITIONS herein:

"Harris", "Harris Plant", "SHNPP", or "plant" where not specified otherwise, all mean the Shearon Harris Nuclear Power Plant.

"Applicants" means all of the persons, employees, consultants, contractors and corporations as listed in the first sentence of the second paragraph on page 1 of this document, above.

"FSAR" means the Harris Final Safety Analysis Report.

"ER" means the Harris Environmental Report.

"Document(s)" means all writings and records of every type, including electronic and computer records, in the possession, control or custody of Applicants or any individual(s) acting on Applicants' behalf, including, but not limited to: reports, books, memoranda, correspondence, notes, minutes, pamphlets, leaflets, magazines, articles, surveys, maps, bulletins, photographs, speeches, transcripts,

voice recordings, computer printouts, information stored in computers or computer peripheral devices such as disks, drums, etc., voice recordings, microfilm, microfiche and all other writings or recordings of any kind(s); and copies of any of the preceding even though the original(s) are not in the possession of Applicants or in their custody or control. Document(s) shall be deemed to be within the control of Applicants or ^{any} individual(s) acting on their behalf if they have ownership, possession, or custody of the document(s) or a copy thereof, or have the right to secure the document(s) or a copy thereof, from any person or public or private entity having physical possession thereof.

Each definition given above applies within all other definitions above.

GENERAL INTERROGATORIES

* G1 (a) Which contentions of Wells Eddleman do Applicants agree are now admitted in this proceeding, NDC Dockets 50-400/401 O.L.?

(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:

(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.

(d) please identify all facts concerning which each such person identified in response to G1(c)(1) above has first-hand knowledge.

(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.

(f) Please identify any other document(s) used ^{or relied upon} by Applicants in responding to the interrogatory.

(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.

(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.

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.

(b). Please identify each contention regarding which each such person is expected to testify.

(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.

(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.

(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.

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.

(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.

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} ~~intend~~ to use such document in cross-examination.

(b) please identify any undocumented information Applicants intend to use in cross-examination of each such witness for me.

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.

(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.

G-6(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 the 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, if any, upon which Applicants rely of the document,
 - (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 such person for each document.
 - (xii) state whether Applicants have ever employed any author(s) of the document, identifying each such person for each document.
 - (xiii) identify all sources of data used in the document.
- Answers to all the above may be tabulated or grouped for efficiency.

G-7(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.

(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 G-7(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.

(c) Please identify which of the documents identified in response to (b) above 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.

and/or specific interrogatories below,
G-10(a) Where the above general interrogatories, 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 G-10(a)(ii) is other than affirmative, please state all reasons for your answer. (iv) If your answer to G-10(a)(i) above is other than affirmative, please state all reasons for your answer.

(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.

G-11 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, (1) in whole (11) in part (please identify each such part for each item of information identified); (b) casts doubt on your answer (1) in whole (11) 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.

Interrogatories on Eddleman 9

9-1. Please provide a copy of the current 10 CFR 50.49. If you believe it is different from that cited in my responses, please state whether it is being further amended or changed in any way to your present knowledge, or if such changes have been proposed, so state.

92-2. Please identify each and every item of electrical equipment at Harris that you believe (a) is fully environmentally qualified under 10 CFR 50 Appendix A General Design Criterion 1 and/or GDC 4 and/or 10 CFR 50.49 and/or NUREG-0588 (0588), stating under which you believe it is fully qualified (you may say "all" if you so believe);

(b) is required to be environmentally qualified for accident conditions by NRC rule, regulation or regulatory position (specify which), but has not been fully qualified.

(c) For each item identified under either (a) or (b) above, please state exactly what accident conditions are postulated for that item, and all reasons why those conditions and not any more severe ones are postulated, and

(d) state what exact tests were done on (i) that item (ii) a similar item (iii) anything, which tests' results were used to establish, in your view, that the item is environmentally qualified. Include all test conditions in your response, or reference them precisely.

(e) identify all documents containing the results of any tests identified in response to (d) above. Please note all tests which any item (or any item similar to an item used at Harris) failed.

(f) Have there been any failures, in tests you know of, of (i) items to be used at Harris (ii) items similar to those to be used at Harris, in or under environmental conditions (aa) as severe (bb) more severe (cc) less severe (dd) different, than the conditions you believe the item (or similar item) to be used at Harris must be environmentally qualified under? Please identify all documents relating to each such failure not already identified above. Please also (ee) state for each such failure any rationale, reasoning or argument or information which you believe means such failure would not be a reason to environmentally disqualify the item or similar item at Harris, based on the failure of each such item or similar item in the test(s).

9-3(a) State (or state where it is stated) all actions Applicants have taken to comply with the criteria of 10 CFR 50.49 for each item of electrical equipment located in a harsh environment at Harris. (b) define the term "harsh environment" as you use it in your interrogatory 9.5(a). State whether this is the same definition used (i) in 10 CFR 50.49 as presently promulgated (ii) in NUREG-0588 (iii) in 10 CFR 50 Appendix A. (c) State which equipment at Harris has been qualified under NUREG-0588 in your opinion, and to the extent not already set forth above (in other responses to the above), state for each item all reasons why you think it is qualified under NUREG-0588 and identify all documents concerning its qualification and/or testing.

9-4(a) State when, if ever, CP&L plans to complete environmental qualification for the Harris 1 plant. (b) What work needs to be done between now and your completion date (or November 30, 1985 if you think this date applies regardless of your completion date) to qualify all the electrical equipment at Harris that must be qualified. Please identify all documents, including work schedules, test programs and/or schedules, critical path studies or diagrams, and/or plans, which relate to the completion of the environmental qualification of electrical equipment at Harris. If a schedule only applies to some equipment, identify all equipment for which that schedule applies.

9-5(a) Please provide a copy of FSAR Amendment 4. (b) Please state why you believe compliance with the format requirements of 10 CFR 50.49 (if any -- see your interrogatory 9-7(a)) would be relevant to this contention. (c) Please state why you believe compliance with the format requirements of 10 CFR 50.49 (if any -- see your interrogatory 9-8(a)) would be relevant to this contention. (d) please explain why I should tell you what changes you need to make in a figure (3.11.1-2) in your FSAR, in order to comply with 10 CFR 50.49. Please also state whether you believe that figure and the information in it does comply (or demonstrate compliance with) 10 CFR 50.49, and if so, why (state all reasons) and please also state whether NRC staff agrees with your view. (CF, your interrogatory 9-8(c))

9-6(a) State what criteria of NUREG-0588 you believe you have (i) completely (ii) partially complied with. Give all basis for each answer. Identify all documents you believe support your answer to the above parts, and all documents you believe support your answers to (b) through (d) of 9-5 above.

9-7(a) Do you believe there are inadequacies in SER section 3.11? (b) If so, please detail each such inadequacy. Identify all documents and/or expert opinions supporting your opinion that each is an inadequacy in fact.

9-8(a) What information requested in EX SER pp 3-49 through 3-51 has CP&L (i) already provided to NRC Staff (ii) committed to provide to NRC Staff (iii) refused or otherwise declined to provide to NRC Staff (iv) not yet provided to NRC Staff? Please identify all items of equipment for which you have not yet provided information requested by the Staff, either information requested as detailed in the SER pp 3-49 through 3-51, or any other information requested (specify).

9-9(a) Is there any equipment in your (i) Brunswick (ii) Robinson 2 nuclear plants which is not environmentally qualified and which should be or must be environmentally qualified under 10 CFR 50.49, NUREG-0588, or other applicable NRC rule, requirement or regulation (please specify)? If so, when do you plan to qualify each such item of equipment (list all -- if no date, say "no date to qualify")? (b) Do you believe that operating either plant with such equipment (i) has (ii) will (iii) might compromise safety of that plant? Please give all reasons for your answer and identify all documents you believe support your answer, including any documents submitted to NRC to justify continued operation of either Robinson 2 or either or both Brunswick units with unqualified electrical equipment.

9-10 (a) What flooding analysis have you done for equipment inside the Harris containment? Please identify all documents containing such analysis. (b) Do you have any Anaconda flexible conduit in use anywhere at Harris? If so, is it in a place or use that you believe should require it to be environmentally qualified under 10 CFR 50.49, NUREG-0588 or other applicable regulation, rule or position of NRC (please specify)? Please identify all such uses and/or locations of Anaconda flexible conduit. (c) Are any of the items mentioned in Union of Concerned Scientists' February 7, 1984 petition to NRC re environmental qualification of electrical equipment, in use or planned to be used or installed at Harris? (d) What equipment in use at Harris, if any, can perform its required functions while submerged? What equipment at Harris has submergence included in its environmental qualification requirements (i.e. has a qualification environment that includes being submerged)? (e) Please list all equipment at Harris which you think (i) is electrical equipment that could be submerged during an accident, e.g. a TMI-type accident or small-break LOCA where coolant overflows or flows out into containment, but cannot be removed from containment either (aa) because it is too radioactive, or (bb) because containment is isolated; (ii) is electrical equipment that has to be environmentally qualified for being submerged in (aa) water (bb) highly contaminated water, e.g. a high radiation field with water. Please identify all bases for your answers and all documents concerning these matters. (f) Have you analyzed the effects of plateout of radioiodines etc on the radiation fields to which electrical equipment at Harris may be exposed during an accident? Please identify all documents concerning such analysis by you or by anyone else. Identify also any documents analyzing this question in general (plateout effects on radiation fields in nuclear plant accidents as this affects electrical equipment or may affect it) or for other nuclear plants or for military nuclear systems, which you know of.

9-11(a) What maintenance procedures for Harris assure that environmentally qualified electrical equipment at Harris is always kept in the same condition or state of repair and/or readiness it was qualified under? Please identify all documents concerning such maintenance, or maintenance programs for environmentally qualified electrical equipment at Harris. (b) Are there any items that must be environmentally qualified for several conditions (e.g. radiation, steam spray and impact) which were not tested under all those conditions at once? Please identify each such item or describe which items were not so tested. (c) Have radiation fields in the auxiliary building at Harris under (i) MSLB (ii) high energy line break outside containment (iii) EFW failure (iv) AFW failure (v) break in steam line to steam - driven pump (vi) fire in the auxiliary building, been analyzed for determining conditions under which electrical equipment in the Harris auxiliary building must be environmentally qualified? Please identify all documents concerning (aa) such analysis (bb) any reasons for not doing such an analysis for any or all of the situations inquired about above.

9-12(a) Please provide copies of (i) actual test data (ii) analysis, used or submitted by CP&L to show electrical equipment at Harris is or will be environmentally qualified, for all items of electrical equipment at Harris which (aa) you believe must be environmentally qualified (bb) such tests or analysis have been done and you have a copy of the test results or analysis. Please provide copies of all procedures used in each such test and all documents giving data or basis ~~xxx~~ used

in each such analysis.

Interrogatories on Eddleman 11

11-1(a) What information do you possess concerning the effects on (i) polyethylene (ii) polyethylene copolymer (iii) neoprene (iv) any other insulation used on (aa) cable (bb) wiring (cc) other equipment, at Harris, of (cc) radiation delivered at a dose rate of (cc-a) under 1 rad per hour (cc-b) 1 rad per hour to 5 rads/hour (cc-c) 5 rads/hour to 20 rads/hour (cc-d) 20 rads/hour to 100 rads/hour (cc-e) 100 rads/hour to 500 rads/hour (cc-f) 500 rads/hour to 2000 rads/hour (cc-g) 2000 rads/hour to 10,000 rads/hour (cc-h) 10,000 rads/hour to 50,000 rads/hour (cc-i) 50,000 rads/hour to 200,000 rads/hour (cc-j) 200,000 rads/hour to 1 megarad per hour (cc-k) 1 megarad/hour to 5 megarads/hour (cc-l) over 5 megarads per hour? Please identify all documents containing such information which you know of.

(b) Do any of the documents identified in response to the above interrogatory also discuss the effects of (i) heat (ii) pressure (iii) steam (iv) oxygen (v) surface area (vi) nitrogen (vii) particulates (e.g. soot from fires, radioactive particulates) (viii) conduit (ix) cable configuration (x) insulator position or configuration (xi) other materials used in conjunction with insulation (xii) insulation stripped from conductors (xiii) mechanical stress (xiv) fire (xv) submergence (xvi) impact of objects (e.g. shrapnel from exploding pump, line break, etc) (xvii) pipe whip (xviii) vibration (xix) seismic forces (xx) explosions (xxi) hydrogen burns or rapid deflagrations (xxii) other factors, in combination with radiation, on the (aa) insulating ability (bb) integrity (cc) properties (specify) (dd) resistivity (ee) strength (ff) tensile strength (gg) volume (hh) elasticity (ii) bulk modulus (kk) other characteristics (please specify) of the insulation or of polyethylene, polyethylene copolymer (PE co-P), neoprene, or other insulating material used or to be used at Harris for cable or wiring or other electrical equipment insulation? Please identify what of the above is discussed in each document, and identify all documents not identified in response to the above which discuss any of the above factors or properties under conditions of radiation exposure combined with any of items (i) thru (xxii) above.

(c) Please identify any documents or other information which you believe indicates that insulation in a conduit (specify what the conduit is made of) is (i) shielded from, or (ii) not subject to, degradation effects such as those alleged in Eddleman contention 11.

(d) Please state the lowest (i) gamma (ii) total, radiation dose rate at which you believe the effects alleged in Eddleman contention 11 (i.e. accelerated degradation of insulation) (aa) cannot occur (bb) will not occur (cc) probably will not occur (dd) might not occur. Please give all bases for each of your answers and identify any and all documents containing information you believe supports your answer.

(e) Please state the highest (i) gamma (ii) total, radiation dose rate at which you believe the accelerated degradation of insulation described (e.g.) in Eddleman 11, NUREG/CR 2763, NUREG/CR 2877, etc. (aa) cannot (bb) does not (cc) probably will not (dd) might not, occur. Please give all basis for your answer, including identification of all documents containing information you believe supports your answer.

(f) Please state if there is any radiation dose ~~rate~~ or total integrated radiation dose (specify which, and what dose or dose rate) above which insulation (e.g. polyethylene, neoprene) cannot be degraded or is not degraded in such a way that its function or the safety function of energy or signals insulated by it will not be impaired. Please state all such doses or dose rates and all bases for your conclusion that they exist and/or are at the level(s) stated, stating which type(s) of insulation (e.g. polyethylene, PE-co-P, neoprene) each such dose rate applies to, and identifying all documents containing information you believe supports each such total dose or dose rate or answer you have made.

(g) state which, if any, total integrated (i) gamma (ii) total, radiation dose rate exists below which degradation of the type alleged in Eddleman 11 and/or described in NUREG/CR 2156, 2157, 2763 or 2877 (specify which one(s)) (aa) does not occur (bb) cannot occur. Please state all basis for each of your answers, including identification of all documents containing any information you believe supports your answer(s) or any of them (specify which).

(h) Please identify all radiation dose rate levels which you believe (i) exist in normal operation of Harris, or would exist in normal operation of Harris, in any zone or area through which insulated cables or wiring or other insulated equipment insulated with polyethylene or PE-co-P, pass (ii) exist or would exist during normal shutdowns at Harris in any such area (iii) exist or would exist during refueling or other prolonged outages at Harris in any such area (iv) exist or could exist during any accident (specify the accident) in any such area. Please also provide (v) maps, drawings or diagrams showing the areas of given radiation dose levels for Harris (vi) all assumptions and calculations, including computer runs and programs and assumptions and input data for each such run (and a listing of the source code for each program so used), used to figure those radiation dose levels, specifying for which zone(s) or area(s) ~~xxxx~~ each was used. Please provide this information for the auxiliary building and all other areas in which cables or wiring insulated with Polyethylene, PE-co-P or neoprene, or other equipment so insulated, could be exposed to radiation.

(j) Have you, or anyone else, performed any analysis of the ability of (i) all (ii) any (specify) wiring, cable or other electrical equipment insulated with (aa) polyethylene, (bb) PE-co-P (cc) neoprene (dd) other insulation, to perform its safety-related functions and/or to avoid spurious signals or short circuits, under the degradation effects described in (ee) Eddleman contention 11 (ff) NUREG-CR-2156 (gg) NUREG/CR-2157 (hh) NUREG/CR 2763 (jj) NUREG/CR 2877 (kk) other studies of radiation effects or synergistic effects of conditions including radiation, on such insulation? Please identify all such studies you (ll) possess (mm) know of.

(k) Are you able to analyze all instances in which (i) cable (ii) wiring (iii) other electrical equipment at Harris, might fail under the influence of degradation effects such as are discussed in any of the documents or contention 11 listed in (j)(ee) through (j)(kk) above? If so present and identify any such analysis you have done for equipment at Harris which is insulated with (aa) polyethylene (bb) PE-co-P (cc) neoprene (dd) other insulating material.

(1) Please state all features, procedures, or requirements of your Harris (aa) inspection (bb) maintenance (cc) test program(s) which provides or provide for (i) inspection (ii) testing (iii) replacement, of cable or wiring insulation which may have become degraded. Please specify (dd) how you plan to inspect insulation inside conduit (ee) how you plan to inspect insulation inside bundled wiring or cables (ff) how you plan to inspect multiconductor cables or wires (gg) how you plan to test the insulation on wiring or cable inside conduit (hh) how you plan to test insulation inside bundled wiring or cables (jj) how you plan to test insulation inside multiconductor cables or wires. Please identify all documents relating to each of the above subparts or the matters or items inquired about in each.

(m) Identify each specific property or property you believe (i) always (ii) usually (iii) sometimes necessary for wiring or cable insulation to perform its safety function. Define the safety function of (iv) wiring (v) cable (vi) other electrical, insulation at Harris. Specify the level or range of each property identified in response to (i), (ii) or (iii) above which is necessary in your opinion for the insulation to perform its safety function. State all basis for each of your answers and identify all documents containing information used in your answers or which you believe supports any of your answers (specify which you believe it supports).

(n) Are there any performance-based acceptance criteria for insulation at Harris to perform its safety function? If so, specify each such criterion for each application (e.g. ECCS power supply wiring) for which insulation is used at Harris. Identify all documents giving descriptions of or basis for or information relating to such acceptance criteria.

(o) Are there any other acceptance criteria for insulation to be used in areas at Harris where it can or will be exposed to radiation? Please identify each such criterion and give all basis for it and state to what insulation or what areas or what items it applies. Identify all documents listing or describing the areas or items where each such acceptance criterion applies, and also identify any documents listing or describing areas or items for which each acceptance criterion identified in response to any part of (1)(m) or (n) above applies or why it applies to that area or item.

(p) If not already stated, give the radiation levels in each radiation zone (and a description or drawings locating each such zone) at Harris in full-power "normal" operation (as you define "normal"), including (i) gamma dose (ii) neutron dose (iii) total radiation dose including alpha, beta, gamma, neutrons, etc.

(q) Can neutrons or other radiation at Harris create activation products (radioactive atoms) in (i) insulation (ii) conductors (iii) other components of wiring or cables (iv) electrical equipment (v) electrical equipment holders, boxes or cabinets (vi) conduit (vii) air (viii) water (ix) steam, at Harris? Have radiation doses or dose rates to insulation on ~~xxxx~~ (aa) cable (bb) wiring (cc) other electrical equipment, due to such activation products, been analysed for (x) Harris (xi) any other nuclear plant you know of? Identify all documents you know of containing such analysis. Please give all reasons for not doing such analysis if you haven't done it or it hasn't been done.

(r) state the number of hours per year of "normal operation" (an average or typical year will do) in which the level of radiation in each radiation zone at Harris is greater than or equal to
 (i) 0.001 R/hr (ii) 0.10 R/hr (iii) \pm 0.01 R/hr (iv) 1.0 R/hr
 (v) 5 R/hr (vi) 10 R/hr (vii) 20 R/hr (viii) 50 R/hr (ix) 100 R/hr
 (x) 200 R/hr (xi) 500 R/hr (xii) 1000 R/hr (xiii) 2000 R/hr
 (xiv) 5000 R/hr (xv) 10,000 R/hr (xvi) 20,000 R/hr (xvii) 50,000 R/hr
 (xix) 100,000 R/hr (xx) 200,000 R/hr (xxi) 500,000 R/hr (xxii)
 1 megarad/hr (xxiii) 2 MR/hr (xxiv) 5 MR/hr (xxv) 10 MR/hr (xxvi) 100 MR/hr

Please also state or give a radiation level profile of each radiation zone at Harris showing typical radiation levels, location of all wiring or cables in that zone, stating what cables or wiring are in conduit (and what the conduit is made of and how thick it is and all its dimensions), the hours per year at each radiation level, and the total integrated radiation dose received by each wire, cable or electrical insulator in the zone for which you have thus far (or ever) computed a total integrated radiation dose. Also give the radiation dose rate at each wire, cable or other electrical insulator for which you have computed a radiation dose rate. If this dose rate varies, specify how it varies and what levels you expect it to be at for what fractions of the time, hours per year, etc.

(s) specify all "unacceptance criteria" by which degraded cables or wiring at Harris will be removed from service and/or replaced when they meet the "unacceptance criteria" or any of them.

(t) explain how you will replace wiring or cable with degraded insulation at Harris. Please discuss in detail the relevance, if any, to this of the cable pulling problems identified by Paul Bemis NRC Region II to the ACRS subcommittee on Harris, Jan 3 and 4 1984 at Apex NC. Please give all details including replacement procedures, acceptance criteria, splicing or connection criteria and/or procedures, and identify all documents containing information discussed or asked about in each part of this subsection (s).

Please also identify all documents in your possession concerning cable pulling problems at Harris thus far. Please explain how cable pulling would differ when the plant is "hot" (radioactive) or under operating conditions, compared to conditions under which CP&L has so far tried cable pulling at Harris. Please state all reasons why CP&L has stopped cable pulling at Harris each time you stopped, and state which reasons would apply in the event of cable or wiring replacement at Harris.

(u) Please identify all studies or documentation or information which you have re wiring, cable or electrical insulation at Harris which accounts for radiation dose-rate effects (see your interrogatory 11-12(a))
 (i) Please identify all NRC staff "evaluation"s of Applicants' program for environmental qualification of electrical equipment with respect to radiation dose rate effects on insulation. (cf. your interrogatory 11-12(b)). (ii) Please identify any other studies of radiation dose-rate effects on insulation you know of that have not been identified in response to above interrogatories.

11-2. Please identify all cables or wiring at Harris which you believe (i) is environmentally qualified (ii) must be environmentally qualified, with respect to radiation dose-rate effects on insulation. Please state what radiation zone each is in. Please also state which

such cables, wiring, etc. have been accepted specifically by NRC staff as environmentally qualified for Harris. Please identify all documents related to each such qualification, testing, analysis, or acceptance, as regards radiation dose-rate effects.

11-3. Please identify all electrical equipment at Harris that is exposed to radiation and which is insulated with polyethylene or polyethylene copolymer (specify which). State which is exposed to low dose rates of radiation. State which is exposed to any radiation dose rate or total dose (specify) at which you believe dose-rate-related degradation effects can occur. State and identify all documents in which you make or report all analysis of radiation dose-rate effects on the insulation of each such item of electrical equipment. If you consider this irrelevant to Eddleman 11 please answer it as an interrogatory re Eddleman 9.

Interrogatories on Eddleman 41, *not based on welder info.*

41-20. Please answer the interrogatories numbered 184 through 195 (copy attached) which were posed to NRC staff re Eddleman 41. Please consider that "you" means CP&L or Applicants in formulating your answers. Where an interrogatory asks re NRC/NRC staff only, please answer as if the question read "NRC, NRC Staff, or CP&L or Applicants" instead of "NRC Staff" or "NRC".

41-21. Please provide access to all weld inspection reports completed since May 1, 1983, for Harris.

41-22. Please identify each change or improvement to Applicants' QA/QC program at Harris which has been made (i) wholly (ii) partly in response to problems with pipe hanger inspection. Please identify all documents requesting or approving or describing each such change.

41-23. Please state all reasons for each other change in Applicants' QA/QC program at Harris as it relates to pipe hangers.

41-24. Please identify all persons who are involved in the 100% reinspection of pipe hangers at Harris. State the qualifications of each to (a) reinspect pipe hangers (b) perform any other work she or he performs in this reinspection.

41-25. How many defects in pipe hangers have been identified so far at Harris? Of these, how many remain unrepaired? When do you anticipate that the last pipe hanger needing repair to make it fully acceptable, will be repaired?

41-26. Provide copies of all Field Change Requests, Permanent Waivers, or other changes in pipe hanger acceptance criteria, used or made since 6/1/83. Provide also copies of all analyses or approval documents related to each such FCR, PW, etc.

41-27. When do Applicants anticipate finishing reinspecting all pipe hangers at Harris?

41-28. Will NRC Staff be inspecting pipe hangers at Harris after Applicants finish your 100% reinspection? If so, do you expect them to find any defective hangers?

41-29. How many pipe hangers remain to be (i) welded (ii) installed at

at Harris? When will these be completed?
When will the last of these be completed?

41-29. Are any pipe hangers being welded or installed at Harris now? If so, are the welds repairs/replacement only?

41-30. Is pipe hanger welding going on at Harris at the present time or the recent past? If so, is it repair/replacement welding, or are new hangers being welded?

41-31. Has any additional training been required or set forth for pipe hanger welders at Harris since the retraining Applicants (or their contractor(s)) did prior to 1983? If so, what training (identify all documents including texts and handouts concerning it) and who is required to take it?

41-32. Have welding inspectors at Harris received any additional training since 9/3/1980? If so, which training was related to problems in inspecting pipe hangers at Harris? Please state the names of persons (i) required (ii) invited to take such training, identify all documents concerning it including course outlines or syllabus, text(s), handouts, or materials used in teaching it. Please state the grade(s) or result(s) for each person taking such additional training.

41-33. Are there any text(s), handouts or information which was not verbal and was supplied to (a) welders (b) inspectors at Harris who were taking any retraining since 9/3/80, which has not been identified in response to above interrogatories or previous interrogatories on this contention? If so, please identify all such text(s), handouts or information, telling to whom it was provided and when.

41-34. Please provide copies of any analyses of the clarity of blueprints and specifications of welds on pipe hangers at Harris, which you possess.

41-35. Please provide any studies of the blueprint reading ability of (i) engineers working with pipe hanger blueprints (ii) welders welding pipe hangers (iii) welding inspectors inspecting pipe hangers, at Harris. Please identify each person whose blueprint-reading ability (a) was studied (b) has been checked, at Harris, and the results of each such check or study for that person.

41-36. Please state how many pipe hangers have been OK'd (a) once (b) twice (c) three times (d) more than three times, and then been found to be defective, at Harris. Please identify all welding inspectors who inspected each such hanger, and all welders who welded each such hanger.

INTERROGATORIES ON EDDLEMAN 45.

45-19 Please answer ^{each of the} the interrogatories posed ^{today} to NRC Staff on Eddleman 45, substituting in each the words "CP&L and/or NRC Staff" for "NPC Staff" or "staff" or "STaff" in each.

45-20. Explain all reasons why you believe the Maine Yankee water hammer event of 1983 would not have any relevance to Harris. Document your answer where you rely on information that is documented.

Interrogatories on Eddleman 116.

116-1(a) Please list all the updates to the FSAR and all other responses to NRC which relate to fire protection, which CP&L has made since 5-14-82. (b) Please state which items re fire protection at Harris the NRC considers open items, to your knowledge. (c) please identify all NRC regulatory guides, regulations, publications, standards, staff positions, or other standards (including fire protection standards) you believe Harris must comply with concerning fire protection. (d) Do you believe that Harris should be able to fight fires during nuclear accidents? If so, do you believe this ability should be present even when containment is isolated? Please give all bases for your answers in detail.

116-2(a) Under what conditions can (i) control (ii) power, fail to any (aa) firefighting (bb) safety (cc) fire suppression, equipment at Harris? Please give all reasons for your answer(s) in detail and identify all documents relating to such failures or their possibility, probability, improbability, etc. at Harris.

(b) What is the last FSAR amendment that affected section 9.5.1.1.1?
(c) what other amendments have changed section 9.5.1.1.1?

(d) What analysis, test or other information is used to support the ratings of each fire barrier at Harris? Please provide copies of all such analysis, test(s) or information that is not in the FSAR at present. Please state where in the FSAR such information is found. Please provide copies of the actual test results, and copies of the test procedures, for each fire barrier tested for Harris.

(e) Please provide copies of all actual test results re "fire resistant" or "fire resistive" materials used at Harris. Please also provide copies of all test procedures actually used in each such test. Please identify each material and the test(s) applied to it.

(f) If any analysis of fire resistance of any material used at Harris was made, provide all workpapers and documents underlying each such analysis, stating what material the analysis is for and where in the Harris plant such material is used.

(g) (cf your interrogatory 116-5(f)) Please identify and make available all information underlying or supporting each belief CP&L has that in any fire area(s) at Harris, it is "not feasible to use such fire barriers or other means of separation of safety related cable."

(h) Please identify all tests of flame spread (i) in (ii) between cables of the type(s) used in any of the areas referred to in your interrogatory 116-5(f), and all other tests involving fires in such cables, that have been done to your knowledge. Please identify all documents referring to such tests or giving the methods or result(s) of any such test(s).

116-2(a) define "maximum credible fire" as you use the term (i) in your Harris fire analyses (ii) in your interrogatory 116-7.

- (b) explain exactly how the "maximum credible fire" for each fire area at Harris was "postulated".
- (c) what consideration of combustible materials was made in postulating each such "maximum credible fire".
- (d) what consideration have you made of simultaneous fires at Harris and/or your ability to fight them. Please identify all documents concerning simultaneous fires at Harris, stating on what page(s) or in which section(s) they deal with simultaneous fires.

116-3(a) Do you believe Harris 1 is required to (i) have (ii) maintain safe shutdown capability in the event of a fire? (b) is this requirement waived in any way by any NRC rule or regulation during a nuclear accident? Please provide all bases for your answers.

116-4(a) When do you expect to finish providing NRC Staff with the additional information it has requested concerning fire hazard analyses? (b) When do you expect to be able to test the fire control system at Harris? (c) Please identify all startup test procedures for fire control and/or fire detection at Harris. Please identify all documents containing such procedures and/or schedules for each or any or all of them.

Interrogatories on 132(c)(2).

Please answer the interrogatories posed to NRC Staff on 132(c)(2). Where the word "staff" occurs in the interrogatory, answer as if it read "CP&L or NRC Staff" at that point.

132-c-2-20(a) What analysis, if any, have you made of the number of operators who can or should be present in the Harris control room during nuclear accidents, and what task(s) each will have to perform? (b) What information must be identified from each panel numbered 1 thru 15 in each accident sequence you have analyzed for human factors and adequate procedures at Harris. (c) Please identify all documents in which information ~~is~~ inquired about in (a) or (b) above can be found. Please state where it is in each such document, for which information, if you know.

132-c-2-21(a) Please provide actual locations of all dials, readouts, indicators or lights on each panel numbered 1,2,3,...through 15 in the Harris control room, stating what information or thing each indicates. (Cf your interrogatory 6(b) on this contention).

132-c-2-22(a) What signal density analyses have been made for Harris other than those "reported" in the DCRDR. (b) What ~~studies~~ studies or experience with lighting in nuclear plant control rooms under emergency conditions are you aware of? (d) what studies of depth perception of Harris plant operators (i) have been made (ii) will be required? (c) What are the acceptance criteria for (i) near vision (ii) far vision (iii) depth perception (iv) field discrimination, for Harris operators?

132-c-2-23(a) What is your understanding of how GDC 1 applies to the Harris control room? Specifically, also state what role GDC 1 played in your Harris DCRDR. (b) What is your understanding of how GDC 19 applies to the Harris control room? (c) What role did GDC 19 play in ~~your~~ Harris DCRDR? (d) Did you misidentify interrogatory 132-c-II-6 in your interrogatory no. 14 on 132-c-2, or are there two 132-c-II-6's?

Production of documents: Wells Eddleman requests applicants to produce for inspection and copying all documents identified in response to these interrogatories and interrogatories incorporated by reference herein.

Interrogatories on Eddleman 41 (not relating to welder info just received)

184. Has CP&L completed its 100% reinspection of pipe hangers at Harris? If not, when does CP&L tell you they expect to complete it?

185. Have you inspected any more pipe hangers at Harris since you last answered interrogatories? If so, which ones, with what results?

186. Please identify all documents pertaining to the matters and inspections inquired about in interrogatories 184 and 185 above.

187. Has any (i) welder (ii) welding inspector, ever been fired or discharged or asked to resign from Harris because of (aa) making (bb) approving, defective welds or defective pipe hangers? If so, please identify each such person.

188. Has any (i) welder (ii) welding inspector (iii) other person, ever been (aa) disciplined (bb) laid off (cc) sent for retraining (dd) required to be betraigned or to take further training, because of (A) making (B) approving, defective (iv) welds (v) pipe hangers, at Harris? If so, please identify each such person.

189. Have you identified any defective pipe hangers at Harris which have not yet been repaired? If so, which ones?

190. Have you written any evaluation or recommendations for improvement (or has anyone working for NRC Staff or CP&L done so) for CP&L Harris QA or QC concerning their inspection of pipe hangers (a) ever (b) since 9/1/1980? If so, please identify each document containing each such evaluation and/or recommendation.

191. Have you contacted any of the welders identified to Wells Eddleman by CP&L in response to his interrogatories served in 1983? If so, please describe the nature of each such contact and the information (a) you gave to (b) you received from, each such welder. Please identify or state any statements, questions, or other things you have communicated orally or in writing to each such welder, and all response(s) you have received to each.

192. Please identify all documents concerning reinspection of pipe hangers at Harris which have occurred since June 1, 1983.

193. Please identify all documents concerning defects in pipe hangers at Harris found since 1 June, 1983, which (a) you possess (b) you know someone else possesses (please identify who possesses it, if you know)

194. Has (a) CP&L (b) Daniel International (c) anyone else including employees of CP&L or Daniel, who worked at the Harris site, ever (i) made any false statement to NRC concerning pipe hangers at Harris (ii) made any statement to NRC concerning pipe hangers at Harris, which was later shown to be false (iii) made any statement to NRC concerning the ~~ini~~ pipe hangers or any pipe hanger at Harris, which was later shown to be inaccurate, misleading or incorrect? Please give all details and identify all documents concerning each such statement.

195. How serious do you believe "OK" tagging of defective pipe hangers is (a) as a breach of faith with NRC (b) as a violation of NRC regulations (c) as a threat to safety of the Harris plant? Please give all reasons for each of your answers.

Interrogatories on Eddleman 45

196. Please identify all water hammer incidents in PWRs since 1-1-83 that (a) caused damage (b) caused a safety problem (c) were reported by NRC to Congress as significant events (d) were required to be reported to Congress by the NRC. Please state the relevance of each

such incident to Harris and all information supporting your answer. 197. Have you evaluated the complete start-up test program for Harris 1 as it involves water hammer in the systems mentioned in Eddleman 45? If not, why not? If so, please identify all documents which (a) are drafts of your evaluation (b) contain your evaluation (c) contain information which would contradict or cast doubt on your evaluation. If CP&L has not submitted a complete start-up test program for Harris concerning water hammer in the systems mentioned in Eddleman 45, when will they do so?

198. Identify all open items re Harris that relate to (a) water hammer (b) effects of water hammers (c) detection of water hammers (d) detection of situations in which water hammers could occur or are likely to occur (e.g. formation of voids, leaking pipes, etc). Please identify all documents relating to each such open item.

199. If there are any (a) confirmatory items (b) concerns expressed or held by any member of NRC Staff, re water hammer or its effects (e.g. as inquired about in items (a) thru (d) in 198 above) at Harris, please state each and identify all documents concerning each. Please state if the person(s) who hold the concerns stated will appear as witnesses if Eddleman 45 goes to hearing.

Interrogatories on Eddleman 67

200. Has the Congress ratified the Southeast Interstate Low-Level Radioactive Waste Compact? (Hereinafter, "the Compact")

201. Has South Carolina or any other state attempted to withdraw from the Compact?

202. Has any state attempted to withdraw from any other LLRW compact?

203. Identify all states for which the answer to 202 or 203 above is affirmative and identify all documents concern'g each such withdrawal attempt.

204. Has the Staff or anyone else conducted any review of violations of LLRW shipping regulations by CP&L? If so, who did, when, and with what results? Identify all documents used in this review or containing statements of this review.

205. Are you aware of any legislation proposed or passed in South Carolina concerning prohibition of disposal of wastes in S.C. from states which have no disposal site for hazardous wastes?

205-B. Do you know that NC has no operating landfills for hazardous waste disposal?

206. Does NRC possess copies of any CP&L contingency plans for (a) storage (b) alternate disposal (c) alternate treatment of LLRW in the event that the SE compact is not ratified, or NC or SC withdraws from it, or offsite disposal of Harris LLRW is otherwise not allowed?

222. Has NRC Staff or anyone else done an analysis of what could happen if fires initiated at Harris actually spread? If so, please identify all documents concerning such analysis, and/or the influence control of combustible materials could have on fire spreading at Harris. Please also identify all documents concerning control of combustible materials at Harris, and all information concerning improper control of combustible materials at CP&L's Robinson 2 and/or Brunswick plants (or any other nuclear power plant) in your possession and/or of which you know.

222-A. Identify all documents concerning Harris' ability to fight simultaneous fires, that you know of.
Interrogatories on 132(c)(2)

223. Do you possess readable documents or drawings which show what instrumentation is on the front of control room panels 1,2,3,4,5,6,7, 8,9,10,11,12,13,14, and/or 15 at Harris? If so, will you provide copies of same?

224. Has the Staff completed its DCRDR for Harris 1? If not, when do you expect to complete it? Please identify all documents and work papers you have so far generated in this review.

225. Has the Staff analyzed the uses that must be made during any (or all) credible Harris accidents, of the information appearing on any panel listed in Eddleman contention 132(c)(2)? If so, which accidents, and which information on which panels? Please identify all documents concerning each such analysis.

226. Has the Staff any opinion concerning the qualifications of the people who did the DCRDR for CP&L (the "human factors experts")? Does your opinion of the adequacy of these persons' qualifications incorporate the views of the Licensing Board in Byron (1984)? Please state your view of the adequacy of these persons' qualifications if you have one.

227. What HEDs and HERSs for Harris has the Staff reviewed? Please identify all documents giving the results of your review of each.

228. What information needed by operators in accidents at Harris, which appears on any of the panels contention 132(c)(2) says cannot be seen from each other (or by persons standing near each, whose view may be blocked by other panels), can be seen from a distance of (a) 5 feet (b) 10 feet (c) more than 10 feet (d) more than 2 feet, with sufficient reliability for accurate interpretation and reading under high stress conditions such as would prevail in an accident, in your opinion?

229. Has the Staff made any review of the visual blockages possible in the Harris control room layout? If so, what documents contain the results or your review? Please identify all work papers used in your review.

230. Does the Staff believe CP&L was (a) right (b) responsible, when it set into concrete in the Harris 1 control room floor the positions of the cabinets recommended by its DCRDR consultants, prior to Staff completing its control room design review for Harris 1? Please give all reasons for your answer and identify all documents information from which was used to make or support your answer.

PRODUCTION OF DOCUMENTS

Wells Eddleman and Joint Intervenor hereby request NRC staff to make available for inspection and copying all documents identified in response to any of the above interrogatories. WE PLEASE & for Joint Intervenor

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of CAROLINA POWER & LIGHT CO. Et al.)
Shearon Harris Nuclear Power Plant, Units 1 and 2)

Docket 50-400
O.L.

CERTIFICATE OF SERVICE

↓ motion for License Conditions

I hereby certify that copies of W.E. Response to Summ Disp on 83/84BA
WE & JI Ints to NRC Staff; WE Ints to
Applicants on Contentions 9, 11, 45, 116, 132(c)(2); JI Clarification re
Dr. John Gofman; WE Response to Apps Interrogatories on Eddleman 116
HAVE been served this 23 day of March 1984, by deposit in

the US Mail, first-class postage prepaid, upon all parties whose
names are listed below, except those whose names are marked with

an asterisk, for whom service was accomplished by

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Judges James Kelley, Glenn Bright and James Carpenter (1 copy each) / termed
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