UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION '83 MAR 25 P12:04

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)	Dockets 50-400 OL 50-401 OL

Wells Eddleman's General Interrogatories and Interrogatories on Contentions 22A, 22B, 41, 45, 65, 75, 80 and 83-84
to Applicants Carolina Power & Light et al.
(First Set)

Under 10 CFR 2.740, 2.741 and the Board's 9-22-82 Memorandum and Order, 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 general interrogatories. (where "Them" refers to the preceding listing(s)) 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

DS03

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, NRC 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 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-7. Please identify all documents which Applicants plan, expect or intend to offer as exhibits (other than for cross-examination) with respect to each Eddleman contention admitted which is included in your current response to G-1(a), in this proceeding.

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

G-8. Please identify all other information, not identified in response to the above general interrogatories, that Applicants rely on or use or plan or expect to use in preparing testimony, or in conducting cross-examination, or in preparing exhibits, for this proceeding, with respect to each Eddleman contention and Joint contention which is admitted in this proceeding and on which discovery is currently open or on which discovery has been open under the schedule laid out by the Board 3-10-83.

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

Wells Eddleman's First set

Interrogatories to Applicants on contentions they are conducting discovery of me on : specific interrogatories on contentions as listed below:

22A-1 (a) Have applicants made any study or calculation of nuclear fuel transport costs, uranium yellowcake transport costs, UF_6 transport costs, or other transport costs in connection with the delivery of nuclear fuel to (1) their existing nuclear plants; or (2) the Shearon Harris nuclear plant?

(b) Have Applicants any information as to the cost of transporting spent fuel (1) from Brunswick to Harris; (2) from Robinson To Harris; (3) from Robinson to Brunswick?

(c) If the answers to any parts of (a) and (b) above is yes or affirmative, please state for each such part, the cost and the basis on which it is estimated or known (e.g. accounting records) and list all cost components included in that cost and the source (s) of information for each such component.

(d) How do Applicants calculate the average fuel cost for Harris in Table 8.1.1-2 of ER Amendment 5? Please state the discount rate used, the nominal dollar amounts for fuel in each of the ten years 1986-95, and all sources and calculations used to derive the annual nominal dollar amounts, and how these were used. Please identify all pages of such data sources used, & what info's on them.

(e) Was an escalation rate used in the calculation requested in (d) above? If so, what was that rate? Please also state all assumptions, calculations and data sources used in deriving that rate. Please identify pages of all such data sources which were relied upon and what information comes from them.

(f) Has CP&L estimated cost of transporting any spent fuel from Harris to any other reactor site, or to an AFR?

(g) If the answer to (f) above is affirmative, state what cost was estimated, how the estimate was made (including all data sources used), and state the cost per assembly transported, or per reactor-year of operation.

(h) How does CP&L compute the cost of nuclear fuel (or its component costs) to which carrying charges are applied? Please show the calculation used for ER Amendment 5 and identify alll data sources used in making it.

(i) If any assumption, calculation or data source in (h) above differs from the computation of nuclear fuel costs to which carrying charges apply that is used in rate cases before (a) FERC; (b) the NC Utilities commission (NCUC); or (c) the South Carolina Public Service Commission, or any of these, please state for each such difference (1) what the difference is; (2) how it is com puted; (3) the dollar amount of such difference if not given earlier; (4) the amount of this difference for 1 year's operation of Harris 1.

(j) What carrying charge rate did CP&L use in computing nuclear fuel carrying charges in the Environmental Report? If this charge rate differs from the fixed charge rates used by CP&L (a) in its latest rate increase applications to FERC, the NCUC, and the SCPSC; or (B) in the rates approved for CP&L by FERC, the NCUC or the SCPSC in CP&L's last rate case before each such body, please state those rates also.

(k) what number of kilowatt-hours (per year, or plant lifetime) is used by CP&L to convert costs of nuclear fuel into costs per kWh in the ER, particularly Tables 8.1.1-2 and 8.2.1-2? If the conversion is made in any other way, state how the costs are converted into mills per kWh and all basis and calculations from which such costs were derived.

22A-1 continued

(l) Are there any expenses or costs associated with nuclear fuel that are not included in ER Amendment 5 and (e.g. in the Tables in part k above) which are charged to ratepayers under CP&L*s current rates as set by the NCUC? by FERC? by SCPSC? If so, for each Commission, state what those costs are, and give equivalence in mills/kwh for each such cost.

(m) How does CP&L charge co-Applicant NCEMPA for nuclear fuel?
(n) How does CP&L charge co-Applicant NCEMPA for carrying charges on nuclear fuel?
(o) How does CP&L plank to charge NCEMPA for nuclear waste disposal?

(p) for each response to m,n, and o above, please state how the method differs (if at all) from the method used to compute the costs in the ER of these items. Please state further the derivation of all differences in the method, if any, for each item.

(q) Have Applicants included any costs of low-level waste disposal in the computations of ER Table 8.2.1-2? If so, what costs?

(r) Have Applicants included any costs of low-level waste disposal in the computations underlying ER Table 8.1.1-2? If so, what costs, and how are they included, please state this including all basis and calculations.
(s) are there other costs of low-level waste disposal not included in the ER for either Table referred to in q and r above? If so, please state what costs, from sources derived, and why they were not included.

(t) Are there any low-level waste disposal costs not included in the tables referred tp in q and r above, which are being charged by CP&L or NCEMPA or both to their ratepayers in any jurisdictions? If so, please state which costs, which Table their are not included in (or Tables), the amount of the costs, and their equivalent in mills/kWh. This applies to costs from existing CP&L nuclear plants, and all cost components of nuclear waste disposal for low-level waste, which are not included in the above Tables.

(u) Has the methodx of nuclear waste disposal contemplated under the NUCLEAR WASTE POLICY ACT of 1982, which CP&L references in the ER, been utilized on an industrial scale (e.g. for as much as one reactor-year's worth of waste at a burnump equal or greater than that expected by Applicants for Harris fuel, MW-days per metric ton heavy metal or metric torn uranium (MTU) anywhere in the United States so far? If so, what was the cost of such disposal per metric ton of heavy metal?

(v) please state or identify the MTHM of high-level waste Harris units are expected to produce at (1) 80% capacity factor DER (2) 70% capacity factor DER (3) 60% capacity factor DER (4) 50% capacity factor DER (5) 40% capacity factor DER (6) 30% CF DER (7) 20% CF DER (8) 10% CF DER. If this amount varies between Harris 1 and Harris 2, please give it for each unit at each capacity factor stated immediately above.

(w) Are Applicants familiar with the costs of compliance with 40 CFR 191 Environmental Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes, as contained in EPA's DEIS on such, dated December 1982?

(x) If not, do Applicants plan to comply with such regulations?
(y) If answer to (w) above is affirmative, do Applicants know the cost of compliance with such regulations for each Harris unit for each year of operation? What is that cost?

22A-2

(a) Please state exactly what estimates and values of what variables were used in the study of system operating costs referred to in ER section 8.1. For each such variable, state all assumptions and calculations used in producing the values of that variable for each year 1986-1995.

(b) was a PROMOD computer program used in making the study referred to in (a) above? If so, please provide a copy of each run used in the study.

(c) Please state concisely exactly how the computer runs used in that study computes system operating costs from the inputs.

(d) are the assumptions about variables xx other than Harris capacity factor and system load identical in each such run? If not, state exxactly which variables values differ in each run.

(e) are the variables and assumptions identified in parts a, b, c, and d above different from those CP&L used in Docket E-100 sub 41 testimony filed in November 1982 before the NC Utilities Commission (or underlying such testimony)? If so, state all differences and give any reasons known to CP&L for each such difference.

(f) was a computer program other than PROMOD used in making the study referred to in ER Amendment 5 section 8.1 and part a above? If so, please identify the program or porgrams and provide listings of them and copies of actual runs used for the ER amendment.

(g) were any computer runs made by Applicants with respect to sensitivity studies for ER Amendment 5 which were not used in preparing that amendment? IF so, please identify all such runs, provide copies, and state why they were not used.

(h) if any part(s) of the results of any computer runs identified above (parts b,c,f, and g) were not used in ER Amendment 5, please identify those parts. The reason for g and h herein is that Duke Power Co. did reject runs and omit parts of runs in computations of avoided energy costs (system operating costs) in Docket E-100 sub 41, and I want to be sure CP&L did not do likewise in preparing ER Amendment 5.

(i) What reason, if any, did CP&L have for omitting any parts of computer results identified in h above from ER Amendment 5's analysis and summary? or from xx either?

(j) Has CP&L analyzed negative growth in sales on its system? Negative growth in peak demands?

(k) Do Applicants agree that system fuel savings cannot be computed without (1) a system load forecast giving hourly loads or total loads; (2) fuel cost estimates for units on CP&L's system ; (3) O&M costs, both fixed and variablex for such units ;(4) other costs as indentified in PROMOD; by the method they used in ER Amendment 5 section 8.1?

(l) If answer to k above is other than affirmative, please state exactly how such calculation can be made without each such data item (input to PROMOD or not).

(m) Do Applicants agree that carrying charges on fuel inventories for both coal and nuclear fuel should be included in comparing system operating costs with and without the Harris units?

(n) If answer to m above is other than affirmative, state why.

(o) Are any escalation rates used in estimating costs of coal or of nuclear fuel as inputs to any calculations or computer programs identified above on Interrogatory 22A-2? If so, what are those rates, state the basis for each such rate, state where it is used and how, and state any data or sources or calculations relied upon in setting that escalation rate, for each such rate.

(p) was the Discount rate used in ER Table 8.1.1-2 about 10.88% What was that rate? Was the discount rate used in Table 8.2.1-2 different? If so, what was it?

22A-3 (a) identify any index or indices used by Applicants in computing fuel costs for the Harris plant used in the ER either in (1) section 8.1; or (2) Section 8.2; or (3) elsewhere in the ER.

(b) for each index identified in a above, please state the compiler or source of such index, the data sources used in compiling such index, and the actual value of the index for each year 1965 through 1982, and each year thereafter which has transpired. (c) state, for each index identified in a above, whether the index includes predictions of future prices or costs of any items, and if so, which items. (d) state all predictions made in each such index after 1974 for uranium costs, yellowcake costs, enrichment costs, tailings disposal cost at uranium mines or mills or both, radioactive waste disposal costs for uranium mining, milling, enrichment, UF_6 production, and fuel fabrication, giving for each prediction the year in which it was made and the predicted values of each such cost for all future years predicted. (e) if any index identified under a above does not include predictions, please so state. (f) identify precisely what portions of what indexes have been used by Applicants in preparing the estimates in each portion of the ER identified in response to (a)(1) through (a)(3) above, explaining exactly how each such index or portion thereof was used in preparing estimates or figures which either support figures in the ER, or ~~xxxxxxxx~~ figures which appear in the ER, stating which figure(s) each such index or portion thereof was used to compute, verify, or support.

22A-4 (a) Do Applicants rely on anything beyond the basis of NUREG/CR 0672 itself of NUREG/CR 0672 (which is for a BWR) in preparing their decommissioning cost estimates for Harris in the ER? (b) If answer to (a) above is affirmative, state all such basis and how it is included in each such estimate for which any other basis is included. (c) If answer to (a) above is other than affirmative, do Applicants possess any information indicating higher decommissioning costs for a PWR than for BWRs? (d) If answer to c above is affirmative, what is the information, identify all documents containing it, and please state whether or not such information is applicable to Harris. (e) If answer to (c) above is other than affirmative state whether Applicants believe any information such as is requested in c above exists.

22A-5 (a) Have Applicants established any reserve fund to pay their $5 million retrospective premiums for any existing CP&L or CP&L co-owned reactor in the event of a nuclear accident elsewhere in the US? (b) If answer to a above is affirmative, please state each reactor's reserve fund, and the amount in it at the end of each year from 1971 through present (c) If answer to a above is other than affirmative, how does CP&L and its co-Applicants plan to make such payment if it is required under the NRC's implementation of the Price-Anderson Act, and a nuclear accident occurs at any other US power reactor which makes such payment necessary? (d) Have Applicants paid premiums for replacement power insurance for any existing reactors owned or co-owned by CP&L? (e) If answer to (d) above is other than affirmative, state whether any such insurance payments have been approved by the NC Utilities Commission in CP&L"s NC retail rates and charges. (f) If answer to d above is affirmative, state the amount of each such premium in each year any premium for such insurance was paid, listing premium by reactor or unit and by year. (g) Do Applicants agree that nuclear plant replacement power insurance is a cost of operating a nuclear unit? (h) If answer to g above is other than affirmative, explain consistency of this answer with answer to (i) below: (i) what charges for nuclear plant replacement power insurance are now included in CP&L's expenses allowed to be recovered in rates by (1) FERC (2) NCUC (3) SCPSC?

10

22A-6(a) ER section 5.8 states that site specific decommissioning estimates suggest CP&L reactors may have decommissioning costs higher than those shown in that section of the ER. Do Applicants still agree this may be true? (b) Do Applicants agree with the ER statement that these costs for Harris are "certainly within an order of magnitude" of those shown? (c) Do Applicants understand "an order of magnitude" as used in the ER and in b above, to mean "a factor of 10"? (d) If not, what do Applicants say it means (that phrase quoted first in c above). (e) Identify all site-specific studies of decommissioning CP&L's (1) Robinson 2 unit (2) Brunswick 1 unit (3) Brunswick 2 unit (4) Harris 1 unit (5) Harris 2 units (6) Harris 3 or 4 unit or both, of which Applicants are aware. (f) State which of the studies identified under e above, Applicants possess a copy of. (g) State the total cost of decommissioning (1) Harris 1 (2) Harris 2 (3) Harris 3 or 4 or both, as shown in each such study for which a cost for decommissioning any of these units is given. (h) State the total cost of decommissioning (1) Robinson 2, (2) Brunswick 1 (3) Brunswick 2 given in each site specific study identified in response to the above interrogatories. (i) If not stated above, give all years of constant dollars, inflation rates, discount rates, and cost escalation rates used in preparing each reactor decommissioning estimate given in response to the above interrogatories, particularly g and h above, stating also any contingency amounts or percentage included in each such estimate.

22A-7(a) Do Applicants believe that if radiation exposure limits for internal or external radiation exposure were lowered from their presently allowed values, that O&M costs for the Harris plant would increase as a consequence? (b) If answer to a above is other than affirmative, state in detail the basis for your answer. (c) If answer to a above is affirmative, has CP&L done any study of such cost increases for (1) a 50% reduction in external exposure limits (2) a 90% reduction in external exposure limits, (3) a 50% reduction in internal exposure limits (4) a 90% reduction in internal exposure limits or (5) any other specific or unspecified reduction in either or both such limits? (d) If answer to c above is affirmative, please identify each such study, its basis including all documents it is based upon (or which were used in prepating it), name the preparer(s) of the study, state their qualifications to make such study, and state what increase (percentage, dollar, mills/kWh, or other) in O&M costs for Harris or other nuclear plant (specify which). (e) Are Applicants in possession of any study or studies or documents on the matters inquired into under (c) above, which was not a study performed by CP&L? (f) If answer to e above is affirmative, please state the information requested in both c and d above, inclusive, for each such study or document.

22-A-8(a) Identify all indices by Data Resources International which Applicants use to estimate nuclear fuel carrying charges in the ER. (b) give the value of each such index for each year 1965-82 and to present; (c) give all predictions of future values of such index made after 1-1-70, for each such index. (d) If not already given above, give the values (list them) of each index for which a prediction was identified in response to c above, for each year 1971-82 and to present. (e) Explain in detail how each such index identified above in response to a, b, c, or d was or is used by Applicants to compute the carrying charge listed in the ER for nuclear fuel, including all other assumptions, levelization, discount, escalation, and other rates used in making such computation, and identify all work papers on which such computations were performed by Applicants for ER Amendment 5.

SPECIFIC INTERROGATORIES TO CP&L RE EDDLEMAN 83-84

83-84 (1) (a) Has CP&L or Applicants ever made or had made any study of (or studies of) or given any consideration to, the formation of carcinogenic chemicals as the result of discharges of chemicals from the Shearon Harris Nuclear Power Plant?

(b) If your answer to (a) above is yes, please identify those studies (all of them), the date of each, title, author(s), qualifications of the author(s), employer of the author(s) if other than CP&L, and, if the studies do not fully describe their methodology, concisely describe the methodology used in each.

(c) If there are no studies, state consisely what consideration CP&L has given to this issue, and on what date each such consideration was made. If dates are not known, please specify what is known, if anything, about when each such consideration was made.

(d) If your answer to (a) above is no, will CP&L admit that the SHNPP will discharge chemicals into its lake, where boating, swimming and fishing are planned to be allowed or encouraged, which chemicals can by themselves or through reactions, become carcinogenic or be carcinogenic?

(e) for each chemical CP&L plans to discharge from SHNPP into water, please state whether CP&L believes the chemical is a carcinogen.

(f) for each chemical CP&L plans to discharge from SHNPP into water, please state whether CP&L believes that chemical can react with other chemicals CP&L plans to discharge, to form carcinogens or a carcinogen.

(g) for each chemical CP&L plans to discharge from SHNPP into water, please state whether that chemical can react with other chemicals found in the Cape Fear River, or discharged

from industrial or other sources into the Cape Fear River, to form any carcinogen or carcinogens.

(h) If your answer, for any of the chemicals involved above, to any or all of the interrogatories (e), (f) and (g) above is No, please state for each such answer: (i) any specific studies of the chemical or reaction product; which CP&L relies upon in stating the chemical is not a carcinogen; (ii) (where applicable) all reaction products CP&L believes can be formed or will be formed by each such chemical once discharged; (iii) for each such reaction product, any specific study or studies of that chemical which CP&L relies on for the statement that each such chemical is not a carcinogen; (iv) why CP&L believes that the reaction products of (h)(ii) above are the only ones that can or will be formed.

(j) Is CP&L aware of any studies of organic chemicals found in the waters (i) of the Haw River? (ii) of the Jordan Lake? (iii) of the Cape Fear River above the Harris plant intake, or any other tributaries thereof? (iv) of Buckhorn Creek? (v) White Oak Creek?

(vi) please state for each such study identified in response to j(i),(ii),(iii) or (iv) or (v) above the date, author(s), method(s),chemicals searched or tested for, title, source, and whether the study is in CP&L's possession or Applicants' possession.

(k) is CP&L aware of any studies of metals and their salts found in the waters of (i) the Haw River? (ii) the Jordan Lake? (iii) the Cape Fear Riber above the Harris plant intake, or any other tributary thereof other than the Haw? (iv) Buckhorn Creek? (v) White Oak Creek?
(vI) please state for each such study identified in responde to k(i) or (ii) or (iii) or (iv) or (v) above the date, author(s), method(s), chemicals searched or tested for, title, source, and whether the study is in Applicants' possession.

(l) for each and every carcinogen identified above by CP&L, please state (i) the maximum concentration factor thereof in algae, in bacteria, in benthic organisms, in each predator feeding on any of the preceding, in fish, crabs, shrimp, oysters, and other commercial species; and in any species of fish caught for sport or food in either the Cape Fear River, the Harris lake (when it is opened for fishing, assuming it is), or fishing/shellfishing areas near the mouth of the Cape Fear, i.e. within 50 to 75 miles thereof.

(ii) ~~for each such carcinogen identified above, please state~~ what dose(s) in which organisms have been found to increase rates of cancer, specifying the cancer(s) the rate of which is increased, if known.

(iii) ~~Xxx~~ whether CP&L believes there is any level or concentration of such carcinogen below which it cannot induce cancer.

(iv) if any answer to 1(iii) above is Yes, please state in full the basis for such belief, identifying any study (chapter and pages), expert(s), publication(s) (chapter and pages) or other persons or anything else relied upon to support that belief by Applicants.

(m) Do Applicants agree that chemicals discharged from the SHNPP, either individually, in interaction with each other forming reaction products, or in reaction with other chemicals in the Cape Fear River, can cause cancer?

(n) If your answer to (m) above is No, (or other than affirmative) please state fully any basis for your answer not already stated ~~xxx~~ in response to the above interrogatories, and identify which of the above responses, if any, are part of the basis of such answer.

(o) if your answer to (m) above is Yes, or some affirmation that the answer may be yes, has CP&L studied the magnitude of such carcinogenic effects over the expected lifetime of SHNPP?

(p) please state the date, type of study, author(s) or persons who made the study, method(s) of the study, all facts and authorities which the study or those who made it relied upon (citing specific facts, pages of books, etc), and whether the study is in CP&L's possession.

(q) If your answer to (o) above is other than affirmative, please state whether CP&L or Applicants presently plan to make any study whatsoever of this matter, and state when such study is expected to be made.

(r) ~~Is CP&L or~~ are Applicants aware of any NRC staff studies of the carcinogenicity of discharges of chemicals from nuclear plants or any nuclear plant? Please list all such studies of which Applicants are aware.

(s) Are Applicants aware of any contention(s) concerning carcinogenic effects of non-radioactive chemicals emitted from any nuclear plant into water, in any other proceeding(s) before the NRC ~~in~~ at present? If so, please identify such proceeding and state whether ~~CP&L~~ Applicants possess the wording of the contention, or any document stating the contention(s).

(t) other than the chemicals listed in the ER for discharge from the Harris plant into water, are all other chemicals to be used at the Harris site identified in the ER? Where?

(u) If any chemical to be used at the Harris site is not identified in the ER, please identify each such chemical ~~it~~ and state the maximum quantity thereof which (i) is expected to be at the site at any time, and (ii) will be allowed on the site at any time, if there is a limit, for each.

(v) Do Applicants believe that other chemicals, listed in the ER of identified in response to (u) above, can be spilled or leak into or be washed into the Harris lake?

(w) If your answer to (v) above is other than affirmative, please state in full the basis for your answer.

22B-1(a) Who prepared ER Amendment 2's section dealing with Harris costs and benefits for only 2 units as opposed to 2 units? P Please list all such preparers and which sections they prepared, most particularly the preparer of the estimate of Harris operating payroll (or preparers).

(b) Is there any other amendment or update to the Harris ER in which CP&L has estimated that the operating payroll for 2 Harris units would be different than the payroll estimated for 4 units in the original ER? If so, please identify each such update or amendment, and where such different estimate appears, and state who prepared each such estimate.

(c) Describe in detail any calculations or computations done for 2 units as opposed to 4 units in computing operating payroll for Harris in each amendment identified in response to a and/or b above.

(d) Explain why the same number was used for Harris operating payroll for 2 units as was used for 4 units in the earlier ER, in ER Amendment 2. State every basis for such explanation.

(e) identify the numbers of personnel to be employed at the Harris site to operate 2 units, and how this number differs from the number needed to operate 4 units in the original ER.

(f) identify the number of personnel at CP&L headquarters required to cover 2 units at Harris, and explain why this number is the same or different (if it is) from the number of CP&L general office personnel required for 4 units

(g) identify the numbers of contract laborers needed to maintain and take care of outages on 2 Harris units, and the number required for 4 units.

(h) state whether the salaries of any personnel enumerated under e,f, or g above will be different because there are 2 units at Harris, and not 4.

(i) State exactly how many additional personnel are required to operate 2 Harris units under new regulatory requirements enacted by the NRC since the Harris CP was issued. For each such regulation which Applicants believe adds required personnel, state which regulation, and how many personnel per unit are added under it, and why such number of personnel is required, and why a larger number is not required, and why no smaller number is adequate to comply with each such NRC regulation. If the number of personnel needed to comply with each or any such regulation is not specified in that regulation, please state all bases not previously identified upon which CP&L bases the number of persons required at each Harris unit to comply with that regulation.

(j) For each NRC regulation identified under i above, state exactly how many additional personnel at CP&L's general offices or other sites not including the Harris plant, will be required to comply with that regulation. State all bases for such number, including reasons why any less personnel would not be enough, and why any larger number is not required, with respect to each such regulation.

(k) how many additional contract laborers are required at Harris for each regulation identified under i above? How did CP&L compute this number for each regulation, to achieve compliance with it? For each reg, why is any lesser number not enough? ?

(l) Are there any other NRC regulations not identified above which add to the number of personnel required for Harris operation in any way? If so, state which regulation(for each such) and exactly how many personnel each requires, and why any lesser number is insufficient and why any more are not required.

22-B-2: Please state all estimates of Harris operating payroll Applicants have prepared since January 1, 1977, stating for each the date thereof, the numbers of Harris site, central office, other non-Harris site (CP&L) and (non-CP&L) contract labroers required, and how the total payroll estimate is computed from these numbers, including any cost escalation rates, salary escalation rates, wage escalation rates, or discount rates used therein, and whether the estimate was incorporated into the FSAR or the PSAR or filed with the NRC or any other regulatory body (identify any such body for each x estimate). Please state for each such estimate whether 2 or 4 units or some other number of units were used in preparing the estimate, and how the number of units affects the number of personnel required.

22-B-3: Please state any estimates of Harris operating payroll filed in NC Utilities Commission docket E-x2 sub 203, which requires annual reports on the Harris plant, and when such estimates were filed therein.

22-b-4: If the same indices used by Applicants to estimate future payroll costs for Harris in the current ER had been used to estimate those costs based only on data pre-1977, how accurately would each such index have predicted CP&L's actual labor costs or unit labor costs for contract laborers, for salared Harris site personnel, for Brunswick plant operating personnel, and for non-nuclear plant support personnel (central office and non-central-office) for the Company's Brunswick and Robinson plants as of (a) 1980 (b) 1981 and (c) 1982 (using data on annual unit labor or salary costs, as appropriate, for each such category of personnel during ~~the previous indicated~~ each year indicated.

22-B-5 Supply the actual values of all indices used by Applicants in estimating future Harris payroll for each year 1960 through 1982, for all years for which each such index is available.

22-B-6 Has any requirement of NRC resulted in a need for higher salaries, or for more higher-salaried personnel, or for better trained personnel who can be expected to require higher salaries, at the Harris plants since the Contstruction permit was issued for Harris on 1-27-78?

22-B-7 If answer to 22-B-6 is affirmative, state for each such requirement the additional personnel, higher salaries, number of higher salaried personnel, number of better qualified personnel, and total impact on operating payroll (as estimated or actual) for (a) 4 Harris units; and (b) 2 Harris units, for each such requirement identified under B-6 above.

RE Eddleman 45

45-1(a) What NRC reports, regulatory guides, or staff technical positions, or rules have Applicants used in preparing their analysis of water hammer with respect to the Harris plant? Please list each such report and its NRC identifying number and date, and what pages or sections Applicants used, ~~xxdx~~.

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

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

1. Whether it was used in the design of the plant originally, and if so how.
2. Whether it was used in redesign or updating the design of the plant, and if so when and how.
3. Exactly what reports, guides, NRC rules, and staff positions Applicants believe they are in full compliance with with respect to water hammer at Harris?
4. Exactly what information in each such rule, report, guide or position identified in c3 above is what Applicants contend they comply fully with?
5. For each such compliance claimed in c4 above, please state succinctly all facts, analysis, or expert opinion (identifying the expert(s) whose opinion it is) that Applicants contend support their position.
6. ~~x~~exactly what items or parts of anything identified in a above ~~xx~~ do Applicants believe they are not yet in full compliance with?
7. Is NRC still to issue further guidance on Task A-1 Water Hammer under its schedule in NUREG-0606? If so, state what guidance and when it is due. State for each such guidance whether Applicants are assured they have complied with all its requirements.
8. For every noncompliance or less than full compliance identified under c6 or c7 above, state the extent of the noncompliance and what CP&L is doing to comply (if nothing, please say so) with applicable guidance, rules, etc (per a above) and when, if ever, Applicants expect to achieve full compliance.
9. For each noncompliance in 8 above where Applicants expect to achieve full compliance in the future, please state all significant factors or occurrences now known to Applicants which would or could delay such full compliance.
10. To the extent that noncompliances are identified in respect to water hammer above, do Applicants concede that Eddleman 45 is correct in its claims? Please so state for each noncompliance if not all are included in your answer to the preceding sentence.

(d) Describe specifically what leaks, shutdowns and/or transients Applicants believe can cause water hammers in the Shearon Harris Nuclear Power Plant, and where those water hammers can occur (which sections of piping, etc.) and the location of such.

~~xx~~For each such, please state:

1. Exactly how leaks in such section(s) will be detected on a continuous basis or otherwise inspected for, and how assurance is had that all such leaks willl be promptly identified, for each such section or location where a water~~xxxxxx~~ hammer can occur.
2. Will the Harris plant be shut down if a leak or other evidence indicates a water hammer is possible in this section or sections of pipe or other area? If not, please state why not.
3. What tests will detect steam voids or slugs inside the pipes, at all times?
4. ~~x~~Are there instruments in these section(s) and each such section to detect steam voids or condensate buildup or water slugs continuously?
5. If answer to ~~x~~ d4 is affirmative, identify all such and their reliability and testing.
6. if Answer to d4 is not affirmative for all places a water~~xxxxxx~~ hammer can occur, please state what damage a water hammer there could do , at maximum (worst case analysis) if Applicants have performed such analysis. If applicants have not performed such analysis, please so state.

45-1 d continued

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

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

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

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

(e) Describe any means used in Harris design to isolate the shock wave of a water hammer from air and water lines used in control systems fo safety-related equipment, feedwater and AFW systems, etc.

(f) Have Applicants analyzed or studied the effect of water hammer on other systems such as air and water control lines at all? If so, what have they studied, with what results, based on what information?

(g) Have Applicants analyzed the water hammer resulting at McGuire nuclear station on restart after a shutdown on or about December 2 or 3, 1981, which caused that plant's electrical generator to be flooded? If so, what were the results of this study or analysis as to whether such an event could occur at Harris?

(h) Have Applicants analyzed water hammer events at other Westinghouse PWRs at all? If so, identify all such analyses and make copies available.

(i) Have Applicants in their possession any other studies of water hammer not identified above? If so, please identify each such and make all those not from NRC available for inspection and copying.

(j) Exactly how do Applicants propose to keep all systems abutting or feeding the ECCS full of water at all times? Please state a succinct but full reply to this.

(k)Exactly how do Applicants verify that all such systems in j above are full of water at all times? Please state for each means of verification whether or not it is automatic, continuous, or requires manual or visual effort. If it is not automatic, state what human effort is required to do it and when and at what frequency it will be done. If it is not continuous, state when it is done and how often. State also all procedures requiring any of the preceding at Harris.

INTERROGATORIES TO APPLICANTS RE EDDLEMAN 41

41-1(a) Please identify every person who has ever inspected at least one pipe hanger weld at the Harris plant, to Applicants' knowledge. If privacy considerations would in your view preclude disclosure of the identification of any such person, list each person by a unique number (E.G. Weld inspector #1, Pipe Hanger Inspector #13).

(b) for each person identified in a above, state what qualifications if any that person had as a weld inspector when hired, what tests in welding inspection she or he passed before or after hiring for the Harris plant, the time between passing any such test and the date of hiring, whether Applicants possess the results of such test, the requirements of such test (or questions on it), any other content or nature of such test or tests, and any other information Applicants have about the qualification of such person to inspec t welds.

(c) for each person identified in a above, state whether the person was able to read welding blueprints, including size, type, width, penetration, side, length, method, and other welding blueprint symbols. For any person for whom ~~that~~ the answer to any of the preceding matters in this part c or all of them is yes, state exactly how and when Applicants verified each such fact or ability, and whether a record of such verification is still in Applicants' possession.

(d) State exactly how the welding symbols, blueprints, and specifications for pipe hanger welds as put together by Applicants' design personnel were checked before the pipe hangers were welded. State also if anyone on-site checked these matters, and if so, who checked each such welding specification and when, identifying the qualifications of all persons who checked these welding specifications, blueprints and symbols, and whether they were adjudged by such person to be correct or not.

(e) for each such symbol, welding bludprint or specification judged incorrect , state when corrective action was taken and what corrective action was taken. State also if this was before or after the welding was done.

(f) State what percentage of pipe hangers were required to be inspected under Applicants QA program prior to the NRC inspector's identification of the defective welds on 3 September 1980. If there was no percentage required, how was the number or percentage of welds to be inspected determined?

(g) What percentage of pipe hangers were required to be inspected by Applicants' QA program prior to 9/3/1980?

(h) what percentage of pipe hangers actually had been inspected, of those installed prior to 9/3/80, as of 9/3/80? What percentage of pipe hangers in stalled had been inspected prior to 1-1-80? Prior to 1-1-79? If none, so satate.

(i) What percentage of pipe hanger welds had actually been inspected at Harris prior to 9/3/80, of those installed and welded by that date? Of those welded by 9/30/80 but not installed? Of those installed by 1-1-80, what percentage or number had been inspected by 1-180?

(j) what percentage defedtive welds had been identified as of (1) 9/3/80; (2) 1-1-80; (3) 1-1-79 among the welds on pipe hangers (a) installed by that date, for each date; (b) welded by that date, for each date, but not installed.

(k) do Applicants possess the records of weld inspections for all welds at the Harris plant on pipe hangers? Will they make these available for inspection and copying?

(l) identify every person who welded a pipe hanger that has been installed at the Shearon Harris plant at any time.

(m) for each such person, state the date hired, the date discharged if the person has been discharged, the date of resignation or leaving work if resigned or laid off, and the qualifications in welding Applicants established each such person had when hired. State any additional training each such person received in welding while employed by Applicants (including their contractors and subcontractors, etc) and what welding tests or welding qualification tests each such person passed, and when, identifying all such tests passed and any tests

41-1 continued
m continued
the person failed, and when. State whether Applicants or their contractors or subcontractors possess records of such tests passed or failed. Will Applicants make the results of each such test available for inspection and copying? Did Applicants, including contractors and subcontractors, retain the specimens or test pieces welded by this person in each welding test that person took? If not, why not? If yes, will Applicants make the specimens and test pieces available for inspection or further testing?

(n) For each welder identified in m above, state whether Applicants know if this person could read welding blueprints, including symbols for size, length, position, penetration, groove preparation, heat treatment, undercut allowable, type of electrode required, current setting and type (DC or AC). If yes, how do Applicants know this and when did they first know it. If no, please so state.

(o) Have Applicants established who made the defective welds identified on pipe hangers at Harris? If so, list for each welder identified in m above, the total number of welds s/he has welded as of (1) 1-1-79 (2) 1 -1-80 (3) 9-3-80 (4) 1-1-81 (5) 1-1-82 and as of the end of each calendar year after 1982, on pipe hangers; the number of such pipe hanger welds which had been inspected as of each date (1-1-79 etc); the number of such welds which had been found defective (a) as of each such date (b) in any reinspections after 9-3-80

(q) (p is above, handwritten in) : If Applicants don"t know who made the defective pipe hanger welds, will they admit their QA program is inadequate in that respect?

(r) where any welders discharged due to making defective pipe hanger welds at Harris prior to 9/3/80? Identify each such welder.

(s) were any welders discharged due to making defective pipe hanger welds at Harris after 9/3/80? Identify each such welder.

(t) were any weld inspectors other than those identified in the report (Revision 1, dated 11 June 1981 on Weld symbol errors and misapplication of weld on Bergen-Paterson pipe hangers) discharged by CP&L due to failure to catch defective pipe hanger welds after 9/3/80?

(u) were any inspectors discharged for failing to catch errors in pipe hange r welds at Harris prior to 9/3/80;

(v) Identify all such inspectors who are included under items t and u above, discharged for failure to detect pipe hanger weld defects.

(w) were any persons discharged who had checked the weld specifications on pipe hangers at Harris prior to 9/3/80, for failure to detect errors in such? Identify all such persons.

(x) Were any persons discharged or disciplined who had checked the weld specifications on pipe hangers at Harris, if such discharge or discipline occurred after 9/3/80 or on that date? Identify all such persons.

(y) Do Applicants possess information detailing every error in pipe hanger welds which they have so far detected at Harris? If yes, will they make this information available for inspection and copying?

(z) Do Applicants possess any information detailing errors in weld specifications, inspection of welds, or welding of pipe hangers at Harris which is not included in their June 11, 1981 revision 1 final report to NRC? Will they make that information available for inspection and copying?

41-2 Please answer parts a through z of 41-1 above, limiting your answers to welds on Bergen Paterson pipe hangers of Seismic Class I, i.e. interpreting the word "welds" in each part of 41-1 interrogatory to mean "welds on Bergen-Paterson pipe hangers for Seismic Category I"

41-3
(a) were all pipe hangers at Harris reinspected after 9/3/80? If not, how many weren't? (b) For every pipe hanger rejected as a result of reinspection please identify the exact defect(s) it had in its welds, where these defects were located, and how they were identified. (c) were any such defects, for each hanger, unable to be seen on previous inspections? (d) for each such hanger, state who reinspected it, how long they took to reinspect it, and whether they stated all defects in writing (e) for each such rejection of a hanger in b above, identify and produce all field change requests, requests for permanent waiver, and field rework orders issued with respect to it. (f) for each hanger in e above, state what review of the field work orders, field change request, or request for permanent waiver was done, and the date of each such field work order, field change request (FCR) or permanent waiver request(PW) and the date each such was approved. If any such FCR or PW request was denied, or any field work order modified for this hanger, so state, and explain fully, for each hanger covered by this interrogatory.

41-4(a) Did CP&L QA or QC inspect any drawings of pipe hanger welds, as sent out by Bergen-Patterson or otherwise, before the welding was done according to those drawings, before 9/3/80? (b) If answer to a above is affirmative, what fraction of the drawings received at the Harris site were inspected? Of those inspected, how many were found to have errors, unclear details or missing details? (c) does Applicants' QA/QC retain records of any such inspections made, listed in response to a or b above, of pipe hanger weld drawings received at Harris prior to 9/3/80? If so, will Applicants make all such records available for inspection and copying?
(d) Does Applicants' QA/QC program now inspect every drawing for pipe hanger welds received from Bergen Patterson? (e) If answer to d is affirmative, when was this begun? Is it a formal policy? Does it apply to drawings of other safety-related welding, e.g. that on embeds? (f) If answer to d above is other than affirmative, state how many or what percentage of drawings of pipe hanger welds received have been inspected since 9/3/80, and the total number of such drawings received at the Harris site since 9/3/80; (g) list all persons who reviewed pipe hanger drawings at Harris prior to 9/3/80 and state each's qualifications for such work; (h) list all persons not listed above who reviewed pipe hanger drawings at Harris after or on 9/3/80, and the qualifications of each for such work; (i) list all persons under g above who are no longer at Harris, giving last known address for each; (j) are weld drawing reviews for pipe hangers independently checked at Harris now on a routine basis by two or more persons? (k) If answer to j above is other than affirmative, state what additional review, if any, is being made to check the review of pipe hanger weld drawings received at Harris, or to see how well the review is done. If none, so state. If there is a procedure or QA/QC requirement for how many such drawings will be rechecked, state it and when it was established, and state how if at all it was changed after 9/3/80; (l) if answer to j above is affirmative, state how many drawings have been reinspected, and identify all such drawings of pipe hanger welds on which missing, unclear or wrong symbols or instruction were found upon review, and the total number of such drawings found to contain errors upon reinspection. (m) state the qualifications for inspecting such drawings, and the identity of, each person at the Harris site who re-inspects or checks initial inspection of pipe hanger weld drawings received at Harris. (n) provide the information requested in m above for all persons who have reinspected at least one drawing at Harris of pipe hanger welds, after 9/3/80, if not already given above. (o) state when pipe hanger weld drawings were first double-checked at Harris and when such drawings were first triple checked at Harris, if ever; and the percentage of errors found in such drawings upon double-checking and upon triple checking during any periods when such checking was done, identifying each such time period.

41-5(a) State whether welders working at Harris had any instructions, prior to 9.3.80, on what to do if a weld drawing was unclear, unreadable, or in obvious error? (b) If answer to a above is affirmative, state the exact instructions, whether written or oral, and the dates in effect. State also whether Applicants know if each welder working on pipe hangers knew of each such instruction. (c) If answer to a above is other than affirmative, did QA/QC know of the non-existence of such instructions? (d) Name every welder who worked on pipe hangers at Harris who identified an unclear or missing detail or instruction on a pipe hanger weld blueprint to a superior (foreman, etc) or QA/QC person at Harris prior to 9/3/80, and state the date on which s/he did it, and what action was taken with respect to such blueprint, for each such blueprint. (e) If no action was taken under (d) above for any report, or if CP&L cannot document the action, so state; otherwise, provide all documentation of actions taken on such identification of unclear or missing detail or instruction on a pipe hanger weld blueprint prior to 9/3/80, for inspection and copying. (f) state whether any welders at Harris made defective pipe hanger welds after going through Applicants' welder training program. (g) if answer to f above is affirmative, state name of each such welder, and number of defective pipe hanger welds s/he made; state also if such welder has been discharged for making defective welds. (g) identify all welders, inspectors, and QA/QC personnel who worked on pipe hanger welds or inspected same or blueprints for same at Harris prior to 9/3/80 and state for each whether CP&L had verified that person's ability to read weld blueprints properly prior to 9/3/80. (h) state whether the 12.7% failure rate for pipe hanger welds shown on Exhibit 1 to CP&L's 6-11-81 letter to NRC re pipe hanger welds is acceptable to CP&L QA/QC at Harris; (i) state exactly how many weld drawings have been returned to the Site Mechanical Unit under the policy of returning such when it is not possible to weld the hanger exactly as drawn due to physical limitations or drawing errors; (j) for each weld drawing which was returned due to the reasons set forth in i above, since 9/3/80, state exactly what was done to resolve the problem and document all such resolution by identifying all documents which show or contribute to such resolution or approve such resolution; (k) state whether any permanent waivers have been granted for any weld for which a drawing has been returned to the Site Mechanical Unit for the reason(s) set forth in i above or any of them, and for each such permanent waiver, state the basis therefor and any engineering rationale underlying it, and state who granted the waiver or approved it. (l) identify any drawings pointed out to the Site Mechanical engineering unit by QA or QC personnel due to such defects as identified or listed in i above; state for each the resolution of the problem.

41-6 Answer all questions and all parts of Interrogatories 41-3, 41-4, 41-5 above, inclusive, with respect to (a) Bergen-Patterson pipe hangers only (b) HVAC hangers only (c) Cable tray and electrical conduit hangers only (d) has any such analysis been done for non-seismic-category-I hangers of any kind at Harris, as is asked about in 41-3, 41-4, or 41-5 above, or any such reinspections made?

41-7 Identify all persons retrained in welding, blueprint reading, or inspection re pipe hangers or other supports by CP&L since 9/3/80 and when each such person was retrained, for how long, using what curriculum and materials (produce same for inspection and copying), and state what tests if any were given to each such person during or after such training to determine the effect of such training (or for any other purpose) and what the results of those tests were for that person, for each such person.

41-8 Identify all welds made by persons listed in 41-7 above (response) which have been found to be defective in any way since the person was retrained, listing for each such person all such defective welds.

41-9 Identify any inspections made by any person identified in response to 41-7 above which have been reinspected since 9-3-80 after such person was retrained in inspection. For each such re-inspection, state if any defects were found in any welds inspected. State also the number of such defective welds found upon reinspection, and the total number of welds reinspected, for each such person who has been retrained in inspection since 9-3-80.

41-10 State exactly what was taught re blueprint reading and weld symbol identificatio, to whom, since 9/3/80 as described in item 2 on page 2 under "corrective action" in CP&L's 6-11-81 ~~letter~~ to NRC re pipe hanger defects and the report attached to such letter, at p.2 also of this report attached to the 6-11-81 letter.

PLEASE NOTE: Where 6-11-81 letter is referred to above, the report attached to it is meant, in all interrogatories on Eddleman 41.

41-11 Please list each pipe hanger defect, HVAC hanger defect, or cable tray or conduit hanger defect identified since CP&L made its rev. 1 report on pipe hanger defects on 6-11-81, at the Harris plant. For each such, please state when it was found, by whom, and whether it is mentioned in any NRC inspection reports, and if so, which reports, of what date, by whom.

INTERROGATORIES re Eddleman 65

(SHNPP) Harris

65-1(a) Please state how the quality of concrete for each pour in the base mat, containment walls, and auxiliary building and fuel building (spent fuel pool) was assessed by Applicants and whether samples of the mix have been retained by Applicants for each such pour. (b) For each pour ~~xxxx~~ in each area identified in a above (or listed by me in that interrogatory) please state the date(s) of the pour, the supervisor(s) of that pour, the time(s) in which the pour took place, and whether a concrete placement report, or equivalent, exists for such pour, and whether a sample or samples of such pour was retained by Applicants, and identify each such sample. (c) state for each such pour the nature and extent of all inspections made during and after the pour to detect voids or honeycombing in the pour; (d) state for each such pour or for the area of concrete that pour emplaced, whether Applicants, Daniel or anyone else has conducted ultrasonic inspection to assess the extent of voids or honeycombing in the pour. (e) whenever an answer to (d) above is affirmative for any pour or area, state the results of such inspection, and identify all documents and records of such ultrasonic inspection. (f) identify all documents describing the information requested in (c) above. (g) for all inspections listed in d or e above, state what measures, if any, were taken to distinguish the passage of sound through concrete from the passage of sound through rebar or other metal emplaced in the concrete, including trumplates and embeds. (h) identify any instances of honeycombing or voids in any pour in the Harris (1) base mat (2) containment wall (3) auxiliary building walls (3) containment ceiling (4) fuel building or spent fuel pool walls which Applicants have so far identified. (i) state for each such instance identified in response to h above when the honeycombing or void was discovered, exactly what corrective actions if any were taken for it, what the results of such corrective measures were, how those results were established, who verified the results, who took the corrective measures, and identify all documents showing how the corrective measures were planned, carried out, and inspected or tested for results. (j) for each instance of honeycombing or voids identified above in response to any part of this interrogatory, state (1) the weakening effect of the honeycombing or voids before correction, if known, and (2) the weakening effect of such honeycommbing or voids after correction, if known, and how such effect was calculated and

65-1(j) continued

what the weakening effect is in terms of the strength of the wall or base mat involved, the gripping of concrete on the rebar in such portion or area or pour, the strength and integrity of embeds and trumplates placed in such portion, area or pour, and how such weakening effect was calculated and whether it has been verified by actual physical or mechanical test on that portion, pour or area in which the honeycombing or void(s) were found.

65-2(a) To knowledge of Applicants, including their contractor Daniel International, is it true that (1 the base mat poured in December 1977 at Wolf Creek has approximately 50 percent of its concrete test containers for the base mat pour failing (of having failed) to meet strength of 5000 psi, (2) that 5000 psi is the specified strength for test containers from this pour, (3) that the concrete used in the pour was purchased from a company that supplied Daniel with a mix formulated intended for use in ditch linings and box culverts on highways, (4) that such concrete was used in the base mat pour at Wolf Creek, and/or (5) that such concrete is not approved for a highway surface, but only for non-safety-related mud slabs and fill concrete only. (b) Identify all Daniel documents, and all other documents in Applicants' possession, which relate to the facts inquired about in (a) above.

65-3(a) At the Wolf Creek, Callaway, and Farley plants, state (1) what modifications to design and structures at each were required by (a) NRC (b) Daniel (c) the utility, after discovery of defects in concrete emplaced in the base mat or in other parts of the plant structure including the spent fuel and auxiliary buildings, whevever defects in concrete have so far been discovered; (2) the identity of all documents requesting such modifications, whether the modifications were made or not, which came to Daniel International; (3) any response Daniel made to any documents requesting such modifications as asked for in (2) preceding this subsection of this interrogatory; (4) any documents Daniel Daniel used, or created, in response to such requests, other than responses, including design of modifications, and all work papers relating to such design, please identify, and state whether Daniel still possesses same; (5) identify all reports of work done in such modifications made as identified in a(1) above, and state whether Daniel possesses same; (6) identify any defects found in modification work done as stated in response to a(1) above.

(b) Identify all repairs made to concrete in the base mat, and containment walls, at each plant: Callaway, Wolf Creek, and Farley, after discovery of and defects therein, whether such defects were found by Daniel or others, identifying who found the defects, when they were found, and when the concrete found defective was originally poured, and stating when repairs were begun, and when completed.

(c) answer every item in 65-1(a) through (j) above with respect to (1) the Callaway plant (2) the Wolf Creek Plant (3) the Farley plant, substituting the name of each plant listed here for "(SHNPP) Harris" in my interrogatory 65-1 wherever it occurs, and substituting Daniel for "Applicants" wherever the word "Applicants" appears in my interrogatory 65-1, throughout.

65-4 (a) Identify all documents in which the rebar design of the Harris base mat as it was when the base mate concrete was poured, are given. (b) If answer to (a) is none, identify all documents partially describing the Harris base mat rebard structure before the base mat was poured; (c) Identify all docu-

ments showing the location of embeds or trumplates in the base mat of the Harris plant before the concrete of the base mat was poured; (d) identify the location (state it) of any embeds or trumplates added to the Harris base mat after the initial concrete pour, and state for each how additional concrete or other anchoring for it was accomplished and when this was done. (e) State the minimum clearance between rebars (1) side to side on the same level (2) top to bottom of one on the next higher level and (3) between all layers of rebar in the base mat, as viewed from the top (i.e. the smallest open space visible from the top of the rebar layers if one looked straight down before the concrete was poured, or inspected a blueprint showing all overlays of rebar from above the basemat in top view) in the Harris base mat. (f) state the average clearance between rebar in the Harris base mat for each dimension/clearance for which the minimum is requested in (e) above. (g) state the viscosity of concrete used in each part of the pour of the Harris base mat, if such was measured at or before the time of pouring. (h) state if any voids were observed in the Harris base mat during or after conrete was poured in it. (i) identify all voids so observed, stating how each was observed and when it was first observed. (j) state all corrective action taken, if any, for each such void.

65-5(a) State whether any concrete has ever been rejected at the Harris plant site and not re-used; (b) state whether any concrete not meeting applicable standards has ever been poured in the base mat or safety related structures at Harris to Applicants' knowledge (includes contractors and employees' knowledge). (c) state the date and reason for each instance of rejection of concrete at Harris if the answer to (a) above is affirmative. (d) state when any pour of concrete not meeting applicable standards was observed or noted, by whom, and when it was reported, at Harris. (e) for each such pour or portion thereof, identify all corrective action taken, including analyses that Applicants contend would indicate the concrete is able to perform what the design of the plant requires it to in terms of strength, stability, holding rebar, etc, in place (e.g. trumplates and embeds),,and when such correction or analysis was performed and by whom, and by whom it was then inspected or approved or both; if it has not been inspected or approved, so state.

65-6. Define precisely the function(s) Applicants mean, and the performance levels expected, with respect to each requirement for strength, integrity, not cracking, etc which is required of base mats and containment walls containing concrete, when they refer in their interrogatories on Eddleman 65 (first set) to "prevent that structure from performing its intended function". What does this phrase mean precisely and in detail? If it means different things in the different Eddleman 65 interrogatories Applicants sent 1-31-83, please define if for each such interrogatory, identifying to which interrogatory each definition applies.

65-7. State concisely the NRC requirements, rules, and guidance for the function and properties and capabilities of base mats and containments of nuclear power plants applicable to Harris at present, as Applicants understand same, identifying all relevant numerical and other properties required expicitly or implicitly.

75-1(a) Please list every instance of Asiatic clams (corbicula sp or others) living in condensers or cooling water systems at nuclear power plants, of which Applicants are aware, giving for each the date of discovery of such clams, the extent of fouling by such clams if any for (1) condenser (2) RHR heat exchanger (3) other systems needed to shut down a reactor safely, by dissipating heat therefrom. (b) Identify each such instance in the response to a above in which clams were found in (1) intake water boxes (2) traveling screens (3) cooling towers (4) condensers (5) other heat exchangers, specifying the type of other heat exchanger involved, and identifying each such instance with the nuclear plant at which it occurred. (c) Are any of the instances listed in response to a above outside the United States? (d) If answer to c is other than affirmative, have Applicants any information on such instances of corbicula or other asiatic clams living in nuclear plants outside the USA? (e) please list every instance in which dead asiatic clams were found in condensers or cooling water systems at nuclear power plants, of which Applicants are aware, and give for each such instance all information requested in a, b, c, and d above.

75-2(a) Do Applicants have any means to detect corbucila sp or other clams or mollusks in the Harris cooling lake and auxiliary cooling lake? (b) If your answer to a above is affirmative, list and fully describe each such means including where and with what frequency it will be used, who will do it, what the means is, how it works, and the minimum size of clam it (1) can detect and (2) will be 99% or more assured of detecting. (c) Is any means identified above able to identify corbicula larvae? (d) If answer to c above is affirmative, state how each such means does so and the sampling frequency and sample size used to do so.

75-3(a) Describe completely any systems and measures Applicants use to protect the main condenser at Harris from corrosion by (1) chemical means and/or (2) chemical and biochemical means in connection with organisms living in the condenser, including but not limited to corbicula sp. (species). (b) identify exactly the aluminum bronze alloy used in the Harris main condenser. If more than one such alloy is used, specify each; and give the manufacturer of all materials made from each aluminum bronze alloy in the Harris condensers (c) identify all points at which each aluminum bronze alloy identified in (b) above touches any other metal, and state precisely what grounding arrangements, and where located, are made for the aluminum bronze alloy, and the other metal it touches, for each such location where aluminum bronze in the Harris condenser touches any other metal. (d) If not stated in response to c above, describe particularly the ground contact of each grounding arrangement or system or device identified in c above; (e) Has CP&L or any of its subcontractors for Harris analyzed deterioration of ground contact for any ground contact identified in response to d above? (f) If answer to (e) is affirmative, describe each such analysis and identify all documents used in preparing such analysis, identify any document containing the analysis, the preparer(s) and their qualifications for making such analysis, the date such analysis was made, and why the results of such analysis were not included in the FSAR or ER.

75-4(a) Do Applicants believe that corbicula sp living in the Harris condenser would cause noticeable pressure changes on the water side of that condenser? (b) If answer to a above is affirmative, describe any such changes and the minimum number of corbicula required to make such a change at the minimum detectable level, and how such minimum detectable pressure change is noted, and how if at all Harris procedures will alert personnel seeing such a pressure change to the possible presence of corbicula. (c) If there are any other things that can cause pressur changes of the same magnitude identified in part a or b above, other than corbicula in the condenser, list all such things or conditions and explain how each is distinguished from corbicula

75-34(c) continued
and how this will be done at Harris.
(d) What measures precisely have Applicants taken with respect to pressure changes, air leaks, or other events that could damage the Harris condenser?
(e) For each such measure, identified in d above, state how the presence of corbicula in the condenser could affect it, particularly if the condenser were fouled with very large numbers of living or dead corbicula.
For purposes of this question, a very large number of corbicula is a number that could affect the (1) efficiency of the condenser in condensing steam at full load, or (2) the integrity of the condenser, or (3) a partial blockage or total blockage of the condenser or a part of it, or (4) any of the measures identified in (d) above.

80-1(a) Are Applicants aware of any studies of mixing of air or water in the lee of nuclear plant structures or other power plant structures?
(b) If answer to (a) above is affirmative, identify each such study, stating when it was done, by whom, what their qualifications were, and whether Applicants possess a copy of such study. (c) Are Applicants aware of any other studies of mixing and dispersion of radionuclides in the environment besides those identified in b above and those used in preparing the Harris ER? (d) If answer to c above is affirmative, identify each such study and provide for each such study all the information requested in (b) above. (e) Was rainout treated in any study identified in response to the above interrogatories a,b,c, or d?
(f) If answer to e is affirmative, state how it was treated in each study in which it was treated, identifying the study for which each answer applies.
(g) Have Applicants conducted any studies of dispersion of radionuclides in the environment not identified above, or are any reports or documents not identified above, which treat dispersion of radionuclides from nuclear power plants in air or water, in Applicants" possession? (h) if answer to g above is affirmative, identify each such study, report or document and give for each the information requested under (b) above, and state when Applicants acquired the document or report (if known) if they didn*t do the study., stating not known or "prior to (date)" in response if the date is not known, giving accurately each date requested to the best of Applicants' knowledge.

80-2(a) Do Applicants believe their models used in the ER can model rainout?
(b) If answer to (a) above is affirmative, explain how in detail; (c) if answer to a above is affirmative, state whether the model has been applied to each situation described in page 42 of Eddleman response to Applcants' first set of interrogatories. (d) If answer to c is affirmative for any such situation or scenario, describe whether that scenario used the most limiting assumptions possible for the area around the Harris plant, if so, what those assumptions were, what the radiological health and environmental effects were, and what radiation doses would be delivered, stating also what release (source term at release point for each radionuclide released into the air) and of what duration was assumed in making the application of the model to each such scenario or situation identified in (c) above.

80-3(a) What is the regulatory Guide 1.XXX referred to in the ER section 6.1?
(b) Is this the same as either Regulatory Guide 1.109 or Regulatory Guide 1.113?
(c) How, if at all, were any of the above-identified regulatory guides used in preparing the ER,by whom, and when, for Applicants. (d) what studies, including computer runs, were done in preparing the ER (5.2 and etc) using dispersion models described in ER 6.1, by whom, when, and what were their individual qualifications to do such study, computer runs, or modeling? (e) Do Applicants possess copies of each study, computer run, or model identified in d above?
(f) If answer to e above is affirmative, identify each such study, run or model of which a copy is retained, stating who did it and when if not stated above.
(g) If answer to e above is negative for any such study or run or model, so state.

132-1(a) What points in the reactor vessel does the RVLIS purport to measure pressure at in order to compute its pressure differential? Show these in plan and side view if possible. (b) how many such points are directly measured by RVLIS? (c) How does RVLIS compute the differential pressure between each pair of points identified in response to a above? (d) what is the minimu, maximum, and average error of this computation if known. (e) what are the effects, if any, of transients on the pressures measured by the RVLIS which Westinghouse or Applicants have so far analyzed? (f) What does the RVLIS use to measure pressure directly at each point identified in response to (a) above? Describe such pressure measuring device in detail.

132-2 (a) what is the average error of the RVLIS under (1) normal operating conditions; (2) Class 8 accident conditions (most limiting Class 8 accident); (3) Class 9 accident conditions, for any reactor in which RVLIS is now installed? How was each such error measured? Please give each such error in percent, and in feet of water. (b) If RVLIS is not installed in any reactor now, state when it will be first installed in an operating power reactor, or when it has been installed in one if it already has. (c) specify all transients which have occurred in any reactor (power reactor) for which a RVLIS has been installed, since the installation of the RVLIS, and what effect each transient had on the RVLIS readings.

132-3(a) What does a RVLIS for Harris cost, installed? (b) Are there any means of directly measuring water levels in the core of a reactor such as Harris which would cost more than RVLIS? (c) If answer to b above is affirmative, state the cost and nature of each such means, and give for each the accuracy of measuring achieved or expected to be achieved by such system, the number of points or lines vertically through the core or around it on which such measuring is done by the system, or describe any way not previously identified in which such system measures directly the water level in a reactor (PWR).

X83/84-1(a) Please list every chemical to be discharged from the Harris plant into the cocling tower CWS; give for each the amount in pounds per year, gram moles per year, and the maximum concentration of each which will be found (1) at injection (2) at any other time or place in the CWS. (b) Please list every chemical to be discharged from the CWS into the Harris cooling lake at any time, to Applicants' knowledge, giving for each the maximum amount to be discharged in pounds per year and gram moles per year. (c) Please state the maximum concentration at whichchlorine is injected or will be injected into the CWS at Harris; (d) please state any restrictions on time of day applied to such chlorine injections; (e) please identify the exact point at which chlorine will be injected into the Harris CWS; (f) if there is more than one such point, identify each and state the maximum concentration at which chlorine will be injected at each; (g) if not already given above, state the maximum concentration of the chlorine before injection at each such point identified in response to e or f above; (h) please state the maximum concentration of hydrazine kept in storage for Harris, as now planned; (i) please state the maximum and average concentration of hydrazine before injection into the CWS, RCS, and secondary water at Harris; please state the form in which ammonia is held for use in the Harris water systems, for each such system; (j) please state the maximum concentration of ammonia before injection and at injection into each such system at Harris, as now planned; please identify all points at which ammonia will be injected into water at Harris, or otherwise introduced into water at Harris, as now planned. (k) If not already stated above, will any chemical identified above be introduced into water at Harris other than by injection, and, if so, please list for each such chemical the concentration before, and immediately after, such introduction, stating which water system, cooling lake, etc it is planned to be introduced into, or will be introduced into.

83/84-2(a) Have Applicants made any studies of the formation of nonradioactive carcinogenic compounds in the chemical or water systems at Harris? (b) If answer to a above is affirmative, please list each such study, identify all documents used in preparing it, the date of preparation, the name(s) of the preparer(s), the qualifications of each preparer to do such study, and state whether Applicants possess a copy of the study. (c) Are Applicants aware of any other studies of formation of carcinogenic chemicals in the water systems of nuclear power plants? (d) If answer to c above is affirmative, please supply for each such study the information requested in b above, inclusive. (e) Have Applicants undertaken any study of carcinogenic chemicals being formed or made more carcinogenic as a result of interaction with chemicals discharged or to be discharged from Harris? (f) If answer to (e) above is other than affirmative, do Applicants agree such chemicals scheduled to be discharged from Harris, including chemicals identified in response to 83/84-1(a),(b),(c) above or any other part of 83/84-1 above, can cause cancer themselves, or can interact to form carcinogenic chemicals, or can form compounds which are more carcinogenic than the precursors to such compounds, e.g. by chlorination of organic or phenyl or dioxin or dye chemicals?

83/84-3(a) Have Applicants any information as to the concentration in Cape Fear River water of (1) dioxins (2) biphenyls (3) PCBs (4) PBBs (5) other EPA priority pollutants (6) other known carcinogens (7) textile dyes or other dyes (8) phenolic compounds other than those inquired about above? (b) If answer to a above is affirmative, state for each the maximum known concentration in such water; (c) Answer each part of question a above with respect to Harris cooling lake water instead of Cape Fear River water; (d) answer (b) above with respect to any affirmative answer to c above, giving for each the information requested in b above. (e) identify all documents giving information requested in a,b,c, or d above.

83/84-4(a) What metals are present in the Jordan Lake water? In the sediment? (b) What is the maximum concentration of each such metal so far observed? (c) what is the amount or concentration of organic matter in Jordan Lake water on average? at maximum? for observations made so far. (d) Have Applicants any information on the matters asked about in a,b, or c above other than that already stated in response to those interrogatories? (e) If answer to d is affirmative, state in detail all such information and identify all documents which contain such information (f) identify all documents containing information requested in a,b, or c above, telling for each what information it contains.

83/84(5)-(a) Do Applicants believe that (1) NCl_3 (2) $NHCl_2$ (3) NH_2Cl is a carcinogen? (b) If answer to any part of a above is other than affirmative, state whether Applicants believe each such compound may be a carcinogen.

83/84-6(a) If not stated in answer to any other interrogatory on 83/84 in this set (3-21-83), please state whether Applicants have determined or can determine how much urea will be released into the Harris lake from the Harris plant? (b) If answer to a above is affirmative or Applicants have determined such amount of urea, what is it in pounds per year? (c) Do Applicants believe urea can get into the circulating water system (1) directly (2) from makeup from the lake (3) from any other source? (d) for each affirmative answer to a part (1,2, or 3) of c above, please state how much urea can get into the CWS from such source, at maximum, in pounds per year, for each such source. (e) Have Applicants analyzed the potential for forming carcinogens from urea in (1) the Harris lake, or (2) the Harris CWS? (f) If answer to e above is affirmative, please identify each such analysis, any documents used in making such analysis, the makers of the analysis, their qualifications to make it, the date it was made, and identify any documents in which such analysis is set forth and state whether each such document is in Applicants' possession.

X 83/84-7(a) Had Applicants made any analysis of the effects of toxic metals or metals as carcinogens, in Cape Fear River water, as impacted by operation of the Shearon Harris plant, (1) prior to 5-14-82 (2) prior to 7-15-82; (3) to the present time, if after 7-15-82? (b) If answer to any part(s) of (a) above is affirmative, please state for each such analysis the maker(s) of such analysis, the nature and method of such analysis, the qualifications of the makers to prepare such analysis (for each maker), all documents relied upon in preparing each such analysis, and identify all documents containing such analysis or parts of it, stating also whether Applicants possess a copy of each document identified in response to each part of this interrogatory, for each such document.

(c) For each analysis identified in response to (b) above, please state exactly what analysis was made for each metal analyzed therein, as to the effects on people through (1) drinking water (2) washing water (3) bathing water (4) food and/or (5) any other means.

(d) If not already stated in response to (c) above, state whether each such analysis included the effects of open cuts, bio-concentration in food webs or chains, or unusually sensitive individuals, or further mobilization of metals in food or water due to other chemicals in such (which other chemicals do not derive from the Shearon Harris plant).

(e) Give the information requested in (d) above for each metal in each analysis identified in (b) above if this information has not already been given.

Please note there are two sets of 83/84 interrogatories, regular and X. Where the two overlap, reference to the other will suffice if it is clear and specific as to which part of which response (or which specific response to which part of another interrogatory) answers the question asked in another interrogatory.

REQUEST FOR PRODUCTION OF DOCUMENTS

I hereby request that Applicants make available to me within 30 days of the date hereof (3-22-83) for inspection and copying copies of ~~all~~ documents identified in response to the above interrogatories (identified before that date), and that the conditions I get them under be similar to those I am supplying them documents under, i.e. that I be allowed to take documents from CP&L's offices by signing a receipt for same, and have them copied within 24 to 48 hours at my expense, rather than use their copying services, at my option.

Interrogatories (general, and on Eddleman 22A, 22B, 41, 45, 65, 75, 80, and 83-84) and the above request have been served on Applicants and all other parties, properly addressed, US postage prepaid, this ~~22nd~~ 21st day of March 1983.

Wells Eddleman

Wells Eddleman
pro se

UNITED STATES OF AMERICA
NUCLEAR REGULATOFY COMMISSION

In the matter of CAROLINA POWER & LIGHT CO. Et al.)	Dockets 50-400
Shearon Harris Nuclear Power Plant, Units 1 and 2)	and 50-401 O.L.

CERTIFICATEOF SERVICE

I hereby certify that copies of Wells Eddleman's General Interrogatories and Interrogatories re Eddleman 22A, 22B, 41, 45, 65, 75, 80, and 83-84 and request for production of documents and request for admission (first set) HAVE been served this 21st day of March 1983, 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 _____

Judges James Kelley, Glenn Bright and James Carpenter (1 copy each)
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US Nuclear Regulatory Commission
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