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NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

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

Dockets 50-400 OL
50-401 OL
ASLBP No. 82-168-01
OL

Wells Eddleman's Interrogatories to NRC Staff
(2d Set)

Wells Eddleman hereby requests the NRC Staff to answer the following interrogatories before Sept 19, 1983 or such other date as counsel for the Staff and I agree on. These interrogatories are submitted under 10 CFR 2.720(h)(ii) and inquire into the studies, information, and knowledge of NRC staff with respect to my contentions on which discovery is now open. Since I cannot read the minds of the staff, and this information is not contained in documents which the staff has provided to me, I am unable to obtain this information by other means. Where the information is contained in a document I can obtain from NRC (Public Document Room, etc), I still need the identification of the document in order to obtain the information. The staff has resources and information which exceed what I have, and as a party, their position and information are necessary to making my case in this proceeding. These interrogatories are continuing in nature and should be supplemented when answers change.

GENERAL INTERROGATORIES (FIRST SET)

For each of contentions Eddleman contentions 8F1, 8F2
15A4 + 132
please provide the following information by answering each of these questions.

1. What is NRC Staff's understanding of the subject matter of this contention?
2. Has NRC Staff made any analysis, inquiry, study or investigation into, (a) this contention (b) the subject matter of this contention (c) the allegation(s) in this contention (d) the basis of this contention (e) the information relied upon by intervenor(s) in support of this contention?
3. For all parts of your response to Interrogatory 2 above for which your answer is affirmative, please provide the following information: who made the analysis, inquiry, study or investigation; what was being considered in such analysis, inquiry, study or investigation ("AISI"); the content of the AISI, the results of the AISI, whether the AISI has been completed, whether a date for completing the AISI has been established if it is not complete, what that date is, all documents used in the AISI, all persons consulted

in the course of the AISI, all documents containing information discovered or analysis or study or information developed during or as a result of the AISI (identify each such document and state what information or results it contains), whether staff believes additional analysis is warranted, or further AISI needs or may need to be undertaken on this contention, and whether any persons participating in the AISI are to be called as witnesses for the Staff in this case, and what questions the staff AISI is intended to answer and what information it seeks to develop if it is not complete.

4. For all responses to parts of (2) above for which NRC staff's answer is other than affirmative, please state (a) whether NRC staff plans to perform any AISI on this contention, (b) whether anyone on NRC Staff has stated that AISI of any kind is warranted for this contention (even though it has not been made) (c) whether NRC Staff plans for AISI on this contention include a date for beginning or for ending such AISI, (d) those dates, for all affirmative answers to (c) above, (e) what AISI NRC staff will undertake on this contention (f) what AISI NRC staff desires to undertake on this contention (g) all reasons why no AISI is planned on this contention if none is planned (h) all reasons why no AISI has been done yet on this contention if none has been done (i) what the responsibilities of NRC staff with respect to this contention are.

5. Identify all documents the Staff relied on in opposing the admission of this contention, and any specific facts not stated in the Staff's opposition to admission of such contention (already filed in this case) upon which Staff relied in making such opposition.

6. Identify all documents not identified in Staff's interrogatories to Wells Eddleman or to Joint Intervenors (to present -- a continuing interrogatory) upon which the Staff relied in making each such interrogatory.

7. Identify by name, personal or business address, NRC staff position or title (if any), and telephone number (if known) each person on NRC staff or consultant to NRC staff or known to NRC Staff or consulted by NRC staff in the staff's analysis of the subject matter of this contention prior to (a) its filing (b) its admission; state for each such person what analysis was performed by that person.

8. State all professional qualifications of each person identified in response to interrogatories 7., 3,4,

9. Provide any statements of the analysis made by persons identified in response to interrogatories 3,4, or 7x above, and identify all documents containing such information or statements not previously identified.

10. Give the identifier number, date, source, and title of all documents identified in response to interrogatories above, which are available through NRC PDR (Public Document Room).

11. Will NRC Staff make available copies of documents identified in response to the above interrogatories to Wells Eddleman for inspection and copying, for documents not available through NRC's PDR?

12. Identify by name, NRC staff position if any, address and telephone number each person whom NRC staff intends to ~~use~~ use or call as a witness in this proceeding.

13. State fully the professional qualifications of each person identified in response to interrogatory 12 above.

14. Summarize the position (or planned testimony) with respect to each contention on which such person is expected to testify, for each person identified in response to interrogatory 12 above.

15. Has NRC Staff, any witness identified in response to interrogatory 12, or anyone acting in behalf of the Staff or such a witness or at their direction, made any calculation or analysis (not identified in response to interrogatories 1 through 4 above) with respect to this contention?

16. If the answer to interrogatory 15 above is yes in any case, provide the name, business or personal address, telephone number and professional qualifications of each person who has made such calculation or analysis, stating for each what contention it relates to, what person (or Staff) it was made for or at the direction of, and identifying all documents containing such calculation or analysis and all documents used in making such calculation or analysis or relied upon in it or supplying information used in it.

17. Provide a summary of each AISI, calculation or analysis ~~made~~ for which the answer to interrogatory 15, or interrogatory 2 above, is yes.

18. Please give the accession number, date and originator of each document identified in response to interrogatory 16, which is available at the NRC PDR.

19. Will NRC Staff make available to Wells Eddleman for inspection and copying all documents identified in response to interrogatory 16 above which are not available through the PDR?

20. Identify each person, including telephone number, address, and field of expertise and qualifications (complete) (if any) ~~is~~ who answered interrogatories with respect to this contention; if more than one person contributed to an answer, identify each such person, providing the information requested above in this interrogatory for each such person, and state what each such person's contribution to the answer was, for each answer.

21. Identify all documents which the Staff proposes or intends to use as exhibits with respect to this contention during this proceeding, including exhibits of Staff witnesses (identifying the witness for each, if such a witness has been designated), and exhibits to be used during cross-examination of witnesses of any party (stating for each which witness it is to be used in cross-examination of), and identifying for each the particular pages or chapters to be used as exhibits.

22. Identify all documents which NRC staff relied upon in answering interrogatories with respect to this contention, which have not been identified in response to interrogatories 1 through 21 above, stating for each which answer(s) re which contention(s) it was used for, and each specific fact and page number therein on which NRC staff relied or which NRC staff used in answering such interrogatory.

23. Please give the accession number, date, and originator of each document identified in response to interrogatories 21 or 22 above which is available through the NRC PDR.

24. Will NRC Staff provide Wells Eddleman with copies of the documents identified in response to interrogatory 21 or 22 above which are not available at the PDR, for inspection and copying?

25. Identify any other information or source of information not identified in response to the above interrogatories (1 through 24) upon which NRC staff relied, or which NRC staff used, in answering interrogatories with respect to this contention, and the contention and response in which it was used, and the location of the relied upon information in such source.

26. Does the staff now agree with (a) the contention (b) any part of the contention?

27 If response to 26(b) above is affirmative, which part(s)?

INTERROGATORIES RE EDDLEMAN CONTENTION 15A A

Note: These, like the ones I sent to Applicants in January 1983, can be held up for response until the Board rules on Eddleman 15 and its revisions and additional contentions re EF Amendment 5. if the Staff desires.
Now, these are relevant, except 30.

28 Has the staff predicted or estimated or projected any capacity factor (MDC, DER or other basis, gross or net) for any power reactor now licensed to operate in the US?

29 Has the Staff estimated, projected or predicted the additional net capacity to be delivered by any reactor now licensed to operate in the US? (megawatts electric, for electric power generating reactors only)

30 Has the Staff estimated, projected or predicted any fuel savings (a) versus coal fueled power plants (b) versus oil fired power plants (c) versus hydroelectric power plants, in its DEIS or FES or ES or FEIS for any nuclear power reactor now licensed to operate in the US?

31. If the answer to any part (or all) of 28,29 or 30 above is affirmative, please list each such reactor and each estimate, projection or prediction made for it.

32. For each reactor listed in response to 31 above or ~~not~~ for which the answer to 28 or 29 or any part of 30 above is affirmative, please state whether information on the actual operating capacity factor (b) actual operating capacity at the time of summer or winter peak demand (or both) on the grid to which such reactor is connected or serves, (c) actual operating fuel savings (d) O&M costs (e) repair costs (f) number of LERS (g) time of shutdowns and length of and reason for shutdowns (h) time, length and reason for deratings, of such reactor is available (i) in the NRC PDR (ii) otherwise within the NRC.

33. Please identify all documents containing the above information, giving the accession number and date for each that is at the PDR.

34. Exactly how did the Staff estimate Harris' capacity factor at 55% for the DES? Please state (1) what plant specific data for Harris the Staff examined (a) in preparing analysis or material for the DES (b) in making its analysis, (both parts, re Harris capacity factor); (2) what data, if any, on the performance of (a) other Westinghouse PWRs (b) VC Summer nuclear station (c) North Anna nuclear units 1 or 2 or 1 and 2 (d) other PWRs whether designed by Westinghouse or not (for Nuclear Steam Supply System) (e) other reactors whether PWRs or BWRs, the Staff (i) examined or reviewed (ii) used in its analysis of Harris capacity factor (3) state any equations, and reference or describe fully in detail any statistical or other models used by the Staff in preparing its estimate of Harris capacity factor (4) info to identify all documents containing any of the above information (5) whether the Staff relied on anyone's opinion(s) re the likely capacity factor of Harris, and if so, whose and what qualifications they have for estimating likely capacity factor (6) any other method or information the Staff used in preparing its estimate of Harris capacity factor, identifying all documents containing such method(s) or information that the Staff possesses.

35. Did the Staff use any information on performance of Westinghouse PWRs outside the USA in making its estimate of Harris capacity factor?

36. If answer to 35 is affirmative, please identify all data used, all documents containing it, and explain exactly how it was used, including all models, equations and methods used, in assessing likely Harris capacity factor.

37. Did the Staff ^{use} its own track record (estimates made by the Staff for nuclear plant capacity factors, as compared with actual performance of those plants (i) to date (ii) for any period, please specify the period, e.g. 1st 5 years of commercial operation, etc) with actual performance of any nuclear plants for which the Staff has estimated capacity factors in the past, in any way in preparing its estimate of Harris capacity factor which is in the DES?

38. If answer to 37 is affirmative, please explain what track record was used, list all plants, estimates and actual performance used, and explain exactly how this data was used in making the Staff's DES estimate or projection of Harris nuclear CF of 55%.

39. If answer to 37 is negative, explain why not.

40. If answer to 37 is not explained fully in response to 38 or 39 above, please give a fully explanatory statement why your answer to 37 is as it is.

41. Did the Staff review any estimates by anyone else of Harris CF in preparing or making its estimate of Harris CF of 55%?

42. If answer to 41 is ~~affirmative~~ affirmative, please list all such estimates and state for each the nature and results of staff review of it.

43. Is the Staff capacity factor based on the Design Electrical Rating for Harris of 900 MWe?

44. If answer to 43 is other than affirmative, please state the basis (plant output) on which the 55% Staff Capacity Factor (CF) is made.

45. Does the Staff agree that (plant output) x (CF) x 8760 hours (1 year) equals expected annual output of a power plant, given an expected value of CF (Capacity Factor)?

46. If response to 45 is other than affirmative, please state what definition of CF Staff was using in the DES and give all reasons why Staff used that definition.

47. Did the Staff examine or include any (i) effect (ii) estimate, of (a) additional regulations by NRC (b) de-regulation by NRC or federal govt (c) fewer regulations by NRC (d) need for power (e) load forecasts (f) **likelihood of nuclear accidents** (g) repairs at Harris (h) shutdowns at Harris (j) performance of other CP&L nuclear units (k) performance of Robinson #2 (l) performance of Brunswick nuclear station or Brunswick units (m) CP&L's fines from NRC (n) shutdowns of CP&L units ordered by NRC (o) shutdowns of CP&L nuclear units resulting from any other cause (p) estimated time of Harris refueling and (q) length of refueling cycles for Harris units (r) effect of nuclear accidents elsewhere on operation of Harris, e.g. thru backfit requirements such as resulted from TMI-2 accident for units in operation or under construction at the time of that accident or later (s) CP&L's estimate of Harris capacity factor (t) any info supplied by CP&L supporting its estimate of Harris capacity factor (u) any analysis by Charles Komanoff of nuclear capacity factors (v) any analysis by David Dinsmore Comey of nuclear capacity factors (w) NUREG-0020 reports of nuclear capacity factors (x) relative stringency of (aa) NRC regulations (bb) plant technical specifications, for Harris; (y) availability of nuclear fuel (z) LERs, in making its estimate of Harris capacity factor for the DES?
48. For each part of 47 for which your answer is affirmative, please identify the effect or estimate, identify all documents containing it, and state how you used or included it in making your estimate.
49. Does the Staff believe Harris 1's capacity factor can be less than 55%?
50. Does the Staff agree that neither it nor CP&L guarantees the level of C.F. % from Harris to be 55% or above?
- 51 (a) If your answer to 49 is other than affirmative (b) If your answer to 50 is other than affirmative, please state all reasons for each such answer.
- 52 If not stated above, please give all reasons for your responses to (a) 49 and (b) 50, above
53. Does the Staff believe that Harris would be environmentally superior as a form of generation of power at (a) 55% CF (b) under 50% CF (c) under 40% CF (d) under 30% CF (e) under 20% CF (f) under 10% CF (g) under 4% CF (h) at zero CF compared to any other method of generating power used by CP&L?
- 54 Does the Staff believe that the benefits of Harris power outweigh its environmental costs at or above any specific capacity factor(s)?
55. If answer to 54 is affirmative, please state that level. If it is zero, please so state.
56. Do any costs or economic factors enter in any way into the Staff's estimate of Harris capacity factor?
- 57 If answer to 56 is affirmative, please state all such costs and how they affect that estimate
- 58 Does the Staff believe that Harris' capacity factor depends in any way upon (i) NRC regulations during its period of operation (ii) CP&L's management of Harris (iii) repairs to Harris during its period of commercial operation, if any (iv) availability of low-level waste disposal sites for Harris (v) availability of disposal for Harris spent fuel (vi) availability of storage for Harris spent fuel (vii) corbicula in the condensers at Harris (viii) corbicula in the RHR heat exchangers at Harris?

59 If answer to any part of 58 is affirmative, please state what the dependency is and whether Staff has estimated or calculated it numerically. If you have calculated please give the calculation. If you have estimated or otherwise considered it, please identify all documents ~~or~~ (work papers etc) in which you do so. Please state this for each part separately if the answer to each or any such part is affirmative

60 Will the presence or absence of nuclear intervenors be expected to affect Harris capacity factor in any way? If so, what way, and to what extent if you know?

INTERROGATORIES ON 8F1

61 Why didn't the Staff include health effects of the coal pollutants (given in NRC's Table S-3) in its DES for Harris?

62 Does the Staff know anything about the health effects of coal pollutants?

63 Has the Staff estimated the effects on health of coal (i) emissions as given in Table S-3 (ii) emissions in any way (iii) particulate emissions (iv) gaseous emissions (v) sulfur oxide emissions (vi) nitrogen oxide emissions (vii) actinide emissions (viii) metal emissions (ix) mercury emissions (x) POM (polycyclic organic matter) emissions (xi) PAH (polycyclic aromatic hydrocarbon) emissions (xii) metal emissions coating fine particulates (xiii) particulate emissions in the 0.2 to 2 micron range, which tend to stay in human lungs (xiv) gas aerosol complex (xv) any combination of any of (iii) through (xiv) above (xvi) any other coal cycle emissions, including leached selenium, liquid effluents, etc, at any time in the past?

In particular, have you made any such estimates in connection with (A) the DES (b) the FES (c) the hearings (d) your analysis of health effects, for (aa) the VC Summer nuclear plant (bb) the Catawba nuclear plant (cc) the Seabrook nuclear plant (dd) the North Anna nuclear plant (ee) the McGuire nuclear plant (ff) the Robinson 2 nuclear plant (gg) the Brunswick nuclear plant (hh) any other nuclear plant?

64 Does the Staff have any estimate of the health effects of the coal particulate emissions given in Table S-3? If so, what is that estimate?

65 Does the Staff have any current estimate of the health effects of the coal cycle emissions given in Table S-3? If so, what is that estimate? Please detail additional (i) deaths (ii) illnesses (iii) work days or person days lost to illness (iv) immune system damage (v) cancers (vi) other health effects- please specify -- which are included in that estimate; if your analysis is not current or not complete for any of these effects, please say so.

66 Will coal pollutant health effects be discussed in the FES? If so, where?

67 Will coal pollutant health effects enter into the cost benefit analysis in the FES? If so, where and how and to what extent?

68 Has the NRC Staff examined or obtained any data on actual emissions from CP&L coal-fired power plants? If so, do you plan to use any of this data in estimating health effects of effluents in Table S-3 for Harris?

69 Does the Staff challenge in any way the effluent numbers for coal pollutants given in Table S-3?

70 Please state in detail any disagreements the Staff has with any of the coal emissions stated in Table S-3, giving in full any basis therefor and citing specifically (including page numbers of chapters) all authorities and documents you rely on in having such disagreement, for each disagreement.

71. Does the Staff believe the health effects of coal emissions are more serious than the health effects of the emissions from a nuclear plant (assuming both the coal plant and the nuclear plant generate the same energy and the emissions from the coal plant are as given in Table S-3)?
72. Please explain in detail your answer to 71 and cite any authorities and identify any documents on which you rely.
73. Are the health effects of coal pollutants (for a 45 MWe coal fired plant as given in Table S-3) considered to be as much as (a) 10 times (b) 20 times (c) 30 times (d) 100 times (e) any other number of times, worse than the health effects of producing the same energy (45 MWe for a year) by nuclear energy, in the Staff's opinion? If answer to (e) is affirmative, please state the number of times.
74. Does the Staff believe it can challenge the coal emissions values of Table S-3 under NRC rules?
75. What are the ~~health~~ health effects of coal emissions as given in Table S-3 of 10 CFR 51.20, in the Staff's view, if not already stated above in response to other interrogatories?
76. Does the Staff believe that coal particulates (i) can be coated with cancer-causing metals or POMs or PAHs? (ii) can cause cancer (iii) can contribute to development of cancer (iv) can cause lung cancer (v) can kill macrophages in the lung (vi) can reduce immune system response in the lung by killing white blood cells?
77. Please give all reasons and identify all documents or authorities which you rely on in your answer to each part of 76.
78. Has NRC Staff ever accepted any coal-fired plant as an environmentally superior alternative to a nuclear plant? If so, what health effects of coal emissions were included in the NEPA analysis of alternatives that supported that conclusion? Please identify all documents containing such.
79. Has NRC Staff estimated health effects of any coal plants larger than 45 MWe?
80. If answer to 79 is affirmative, please identify all documents containing each such estimate made (i) in the year 1978 (ii) in the year 1979 (iii) in the year 1980 (iv) in the year 1981 (v) in the year 1982 (vi) in the year 1983. If none in any year, please so state.
81. Do the Staff agree that the amount of effluents from a coal plant is proportional (at least to a decent approximation) to the amount of coal it consumes (burns)?
82. If answer to 81 is other than affirmative, please state all basis for your response
83. Do the Staff agree that the 118,000 metric tons of coal consumed in Table S-3 is the coal consumed by the 45 MWe coal plant referred to in that table?
84. If answer to 83 is other than affirmative, please state all reasons for your answer.

INTERROGATORIES ON 8F2

85. Please state your assessment of the health effects of the radiological effluents given in Table S-3.
86. Has NRC Staff given any consideration to any of the reasons (i) thru (iv) of contention 8F2 in preparing for the FES on Harris?
87. If answer to 86 is affirmative, for each such reason (i)(ii) ~~III~~ (iii) or (iv) please state what consideration you have given.
88. Does the Staff make a separate analysis of the health effects of the effluents listed in Table S-3 for radiological emissions (effluents) in the DES? If so where?
89. If not in the DES, does the Staff plan to include an analysis of health effects of effluents listed in Table S-3 (radiological effluents) in the FES?
90. What consideration to contamination of water supplies as a result of the uranium fuel cycle in the Western US (where water is scarcer) is given in the DES for effluents (radiological) in Table S-3?
91. If answer to 90 is, none, does Staff think such consideration is appropriate in (i) the DES (ii) the FES
92. Did the Staff take into account the arid environments and windier conditions near uranium mining and milling operations (compared to the Eastern US or US average) in figuring health effects of the Table S-3 radiological effluents?
93. If answer to 92 is not affirmative, why not?
94. If no such consideration as inquired about in 92 ~~is~~ above has been given, does Staff believe it is appropriate for FES?
95. Please fully explain all reasons for your answer to 94.
96. Please identify all documents in which the NRC Staff assesses the health effects of the radiological emissions in ^{NRC} Table S-3. Please describe or cite fully the methods, models and calculations, if any, used in making such assessment.
97. Are the models used by NRC Staff in assessing health effects of radiological emissions given in Table S-3 the same as used for assessing health effects of nuclear power plants' radiological emissions?
98. If answer to 97 is other than affirmative, please explain and fully give the reasons for each difference or use of a different model.
99. Please state whether Staff has actually monitored emissions of radionuclides from the nuclear fuel cycle other than at nuclear power plants.
100. Please state what monitoring data Staff has on emissions of radionuclides from the nuclear fuel cycle other than from nuclear power plants operating.
101. Are the emissions from the nuclear fuel cycle actually greater than those given in Table S-3 for any radionuclide(s)? Which?

PRODUCTION OF DOCUMENTS

Wells Eddleman requests that all documents containing information inquired about above, including those containing monitoring data on nuclear fuel cycle emissions, be identified and produced for inspection and copying by NRC Staff.

This 31 day of August 1983

Wells Eddleman
Wells Eddleman