October 3, 1983

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE TO BE HEARD ON JOINT INTERVENORS' CONTENTION II AND EDDLEMAN'S CONTENTION 37B

Pursuant to 10 C.F.R. §2.749(a), Applicants state, in support of their Motion for Summary Disposition of Joint Intervenors' Contention II and Eddleman's Contention 37B in this proceeding, that there is no genuine issue to be heard with respect to the following material facts:

A. General Facts.

1. The long-term somatic and genetic health effects of radiation releases from the Shearon Harris Nuclear Power Plant ("SHNPP") during normal operations have been properly estimated, and have not been seriously underestimated.

2. The BEIR III Report correctly understood the latency periods for cancer.

3. The BEIR III Report properly considered genetic defects, including recessive genetic effects.

4. The BEIR III Report in estimating health effects correctly rejected the supralinear model.

5. In the estimate of health effects for SHNPP, sufficient consideration has been given to internal emitters.

6. In the estimate of health effects for SHNPP, sufficient consideration has been given to modeling of internal absorption of radionuclides.

7. In the estimate of health effects for SHNPP, sufficient consideration has been given to effects of alpha, beta and neutron radiation on DNA, cell membrane and enzyme activity.

8. The NRC has not erroneously examined health effects of low level radiation over an arbitrarily short period of time.

9. Substantial increases in cancer mortality rates have not occurred in the vicinity of nuclear facilities, and no such observation has been made in any credible study.

10. Radionuclide concentration models used by Applicants and the NRC Staff are adequate and do not lead to underestimates of health effects.

11. Incomplete mixing and dispersion of radionuclides, rainout of radionuclides, and hot spots have been appropriately treated in the modeling of Applicants and the NRC Staff.

12. Radionuclides absorbed in or attached to fly ash from coal plants have been appropriately treated in the Applicants' and NRC Staff's modeling.

13. Applicants and NRC Staff do not consider relative reactivity of radionuclides in their computation, and health effects underestimates, accordingly, cannot arise from such consideration.

14. Serious underestimates in health effects do not arise from Applicants' and NRC Staff's ignoring certain radionuclides in the computation.

15. Releases from SHNPP in routine operation, at most, may increase the risk of cancer and genetic defects; such releases will not increase the risk of any other diseases.

16. The estimates of victims from radiation exposure, as made by Bross, Bertell, and others referenced by Eddleman and Joint Intervenors, are not more accurate than the estimates of the NRC Staff and in the BEIR Committee Reports.

B. Detailed Facts.

17. In the Draft Environmental Statement ("DES") the NRC Staff concludes that the radiological impacts in terms of genetic and somatic health effects from routine operations of SHNPP will be very small. The particular estimates are set forth in the DES in § 5.9.3.

18. The DES health effects estimates are based on BEIR I and BEIR III, and this is appropriate.

19. Doses used in the DES estimate of health effects are calculated by using the modeling techniques and Regulatory Guides in 1.109, 1.111, 1.112 and 1.113.

20. Genetic risks from occupational exposure (outside the scope of Intervenors' Contentions) are included in the DES genetic effects estimate in § 5.9.3.

21. The DES properly estimates the potential cancer effects from occupational exposure at SHNPP (which is outside the scope of Intervenors' Contentions).

22. The BEIR Reports constitute the most scientifically reliable estimates presently available for the potential radiation risks of somatic and genetic health effects in populations exposed to low levels of ionizing radiation released from a nuclear power plant in routine operation.

23. For routine releases from a nuclear power plant such as SHNPP, the pertinent health effects issue is the potential effect from low doses of low-LET radiation.

24. The pertinent dose will be low-LET because substantially all the releases from SHNPP will be low-LET emissions of gamma and beta radiation.

25. The amount of high-LET radiation released from SHNPP in routine operation is irrelevant to health effects estimates.

26. The BEIR Committees, which prepared BEIR I and BEIR III, were composed of the nation's leading medical doctors, scientists, epidemiologists, geneticists and other specialists in radiological health effects.

27. From routine operations at SHNPP, the health effects of potential concern are limited to cancers and genetic effects.

28. All diseases other than cancer and genetic effects have threshold doses well above levels permitted by NRC regulation from routine nuclear power plant operation.

29. Genetic effects from radiation have never been observed in humans even after high level exposure.

30. Genetic effects, to the extent occurring, are proportional to dose.

31. Potential genetic effects from SHNPP routine operation are insignificant.

32. Cancer effects have not been observed in human beings at low levels of radiation, but have been observed at high levels.

33. BEIR III selected the linear quadratic model as its preferred model to chart the dose-response effect between low-level radiation and cancer.

34. BEIR I utilized a linear relationship for cancer dose-response effects.

35. The DES relies upon the linear relationship of BEIR I for cancer risk estimates, and this is more conservative than the preferred BEIR III model.

36. The BEIR Committee unanimously rejected the supralinear model.

37. The BEIR Reports are confirmed by and consistent with the reports of all leading national and international committees concerned with radiation.

38. Mancuso, Stewart and Kneale, Bross, Bertell, Gofman and Morgan, as referenced by Joint Intervenors and Eddleman, have claimed that health effects estimates properly are higher than in the BEIR Reports. These claims have been repeatedly critiqued and rejected. They do not serve as a basis for questioning the BEIR analyses.

39. Cancer has a latency period as do other diseases, and authorities are not questioning the applicability of latency period to cancer.

40. The most current and complete data were made available to the BEIR Committee, including prepublication articles.

41. Note j of Table V-14 in BEIR III does not support Joint Intervenors' Contention.

42. Pages 278-279 of the BEIR Report are a part of the BEIR Report, not a part of any dissent.

43. Rossi does not mention latency period in his dissent. Rossi believes the BEIR III preferred dose-response relationship for low-LET, low level radiation is too high and overestimates health effects.

44. BEIR III exhaustively reviews genetic effects. Genetic effects from radiation are insignificant compared to naturally occurring effects.

45. The 5 to 50% mutational component for irregularly inherited disorders, as adopted by BEIR III, is not arbitrary.

46. Gofman proposes a mutational component of 100%. This cannot occur under governing scientific principles.

47. The BEIR Committee considered mild mutations and properly did not include a risk estimate in humans for such mutations.

48. Supralinearity has been rejected by the BEIR Committee, ICRP, NCRP, and UNSCEAR. No recognized scientific body has adopted supralinearity and the scientific evidence does not warrant its adoption.

49. The general scientific consensus is that a linear assumption is conservative and overestimates health effects.

50. Mancuso/Stewart/Kneale, Gofman, Bross, Bertell, and Morgan are wrong in favoring supralinearity.

51. Rossi and Radford do not support supralinearity.

52. ICRP risk estimates for low-LET, low-level radiation are quite consistent with the BEIR Reports. ICRP Publication 18 addresses high-LET radiation.

53. Potten, as referenced by Joint Intervenors, does not address the issue of supralinearity.

54. The BEIR Reports consider and utilize information on DNA, cellular membrane and enzyme activity where appropriate.

55. The effect of alpha and neutron radiation, which is high-LET radiation, is considered where appropriate in the BEIR Reports.

56. The references cited by Joint Intervenors in support of Contention II(b) do not support it.

57. No credible studies have shown substantial radiation-related increases in cancer mortality rates around nuclear facilities.

58. Dr. Sternglass has made this contention for more than a decade, but his conclusions and unscientific methodology have been universally discredited.

59. The United States Public Health Service has not observed substantial increases in cancer mortality around nuclear facilities. Their most recent study indicates the exact opposite.

60. Carl Johnson's work has been reviewed, discredited and rejected as not reliable.

61. Pain and suffering (which is outside the scope of Contention 37B) is a condition common to all illnesses from whatever cause and could not conceivably be differentially related to diseases potentially caused from routine nuclear power plant operation.

62. Error factors that can be derived from works referenced by Joint Intervenors and Eddleman do not significantly increase the health effects estimates in BEIR and the DES.

63. Of the authors referenced by Joint Intervenors, only Gofman has attempted to calculate risk coefficients and risk factors for whole-body radiation as developed in the BEIR Reports for cancer risk estimates and used in the DES.

64. Gofman's estimates are 40% greater than the BEIR estimates.

65. Among authors referenced by Joint Intervenors, only Gofman in his book purports to generate a risk estimate for genetic effects. His estimate of genetic disorders is 7.58 times greater than in the BEIR Reports.

66. For both cancer and genetic effects, whether the BEIR Reports or Gofman's estimates are used, the differences are arithmetically insignificant in comparison with spontaneously occurring effects; they fall well within probability uncertainties; they are infinitesimal and neither calculation excludes a zero effect.

67. The DES does not consider health effects over an arbitrarily short period of time. Contrary to Intervenors' contention, health effects need not be considered over thousands and millions of years.

68. In the DES health effects are estimated on an annualized basis from the person/rems delivered for each year of projected plant operation.

69. Much lower levels of person/rems will continue after operation has ceased. It is quite appropriate not to calculate expressly the health effects therefrom.

70. The NRC Staff has selected for comparison the period in which the comparative proportion of dose and health effects would be greatest for SHNPP.

71. The comparison by the Staff represents the highest comparative impact for any year following plant shutdown or for any period of time beyond the period of SHNPP's operation.

72. Gofman in his book, Caldicott in her book, and Pigford in the January 1982 issue of Nuclear Safety magazine do not address matters covered by Contention II(c). Kepford's testimony, as referenced by Joint Intervenors, was rejected by the pertinent Appeal Board, and Kepford was determined not to be qualified as an expert.

73. The modeling procedure used by Applicants and NRC Staff involves three steps--calculating the Source Term, calculating dispersion and dilution, and calculating doses. The last step

includes 14 equations and over 4,000 calculational parameters, including hundreds of dose-conversion factors.

74. The modeling approach followed by Applicants and Staff can be expected to lead to dose calculations greater than the doses actually delivered in routine operation.

75. Some radionuclides are omitted from the calculations of Applicants and NRC Staff. No dose underestimate results because (a) radionuclides omitted account for less than 1% in curies of the total releases, and (b) releases calculated for radionuclides included in the calculation are greater than would be expected, based on experience in actual operation of other nuclear power plants.

76. In modeling done by Applicants and the NRC Staff, relative reactivity of radionuclides is irrelevant.

77. Environmental and biological transfer rates and other parameters used in the models of NRC Staff and Applicants are based on measured values obtained by direct observation from laboratory and field studies.

78. In questioning the modeling of internal absorption of radionuclides, Joint Intervenors are questioning the dose conversion factors used in the modeling.

79. At any one time, particular factors may be marginally high or low, but these balance each other.

80. The LEAF Study adopts the dose-conversion factors found in Reg. Guide 1.109.

81. Translation 520, including the sections on dose-conversion factors, has been thoroughly discredited by the scientific community.

82. The atmospheric dispersion models in Reg. Guide 1.111 take into account those factors which could result in incomplete mixing and already predict values for plume concentrations that are conservatively high.

83. Because of the random and infrequent contribution of wet deposition at any one location, rainout will have an insignificant effect on annual radioactivity concentrations.

84. Rainout could make a significant contribution to radioactivity concentrations only if the area in the vicinity of a nuclear power plant had a pronounced rainy season corresponding to the local grazing season. Such is not the case at SHNPP.

85. Magnitude of projected somatic and genetic health effects from routine operation at SHNPP is related to the radiation dose an individual received for each year of exposure. Hot spots, etc. will occur randomly and infrequently and will be averaged out over the period of a year.

86. Incomplete mixing, incomplete dispersion, rainout and hot spots do not affect modeling doses and health effects for SHNPP.

87. Fly ash was not considered in modeling by the NRC Staff and Applicants. Had it been, the dose to humans would be reduced.

88. Larger particles are less likely to penetrate deep into the lung and remain there than small particles. If radionuclides combine with fly ash, they will become less likely to enter and remain in the deep lung.

89. Fly ash particles tend to be highly insoluble and combination therewith of radioactive materials will make the latter less soluble and therefore less likely to irradiate humans.

Dated: October 3, 1983

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