

## A. Joint Contention I: Management Capability

### Introduction

1. Applicant Carolina Power & Light Company (CP&L) received authorization to construct the Shearon Harris Nuclear Power Plant (the Harris plant) in 1978. See Initial Decision (Construction Permit), LBP-78-4, 7 N.R.C. 92 (1978)<sup>1</sup>. That initial decision was affirmed by the Appeal Board. See Decision, ALAB-490, 8 N.R.C. 234 (1978).

2. By order dated September 5, 1978, the Commission remanded the matter to the Licensing Board which presided over the construction permit hearing for a further hearing on "the management capabilities of CP&L to construct and operate the proposed Shearon Harris facility without undue risk to the health and safety of the public." Order, CLI-78-18, 8 N.R.C. 293 (1978).

3. On remand, the Licensing Board conducted such a hearing (the remand hearing) and upon consideration of all of the evidence presented, held that CP&L had the management capability to construct the Harris plant properly. Supplemental Initial Decision (Construction Permit), LBP-79-19, 10 N.R.C. 37 (1979). That decision was affirmed on the merits by the Appeal Board in ALAB-577, 11 N.R.C. 18 (1980).

4. Resolving some disagreement between the Licensing Board and the Appeal Board concerning what further assessment the NRC Staff should perform of CP&L's management capability to operate the Harris plant, the Commission directed the staff to perform a preliminary assessment of CP&L's management capability to operate the Harris plant prior to issuing a public notice of opportunity for hearing under 10 C.F.R. § 2.105 and to make the results of that assessment publicly available. Memorandum and Order, CLI-80-12, N.R.C. 514 (1980).

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<sup>1</sup>Originally designed as a four unit plant, the Harris plant now consists of one 900 megawatt pressurized water reactor.

5. The NRC did perform such a preliminary assessment and concluded that CP&L's "proposed organization and management for operation of Shearon Harris, at both the corporate and plant levels, are acceptable." "Preliminary Assessment of the Organization and Management of Carolina Power & Light Company for Operation of the Shearon Harris Nuclear Power Plant," at 15.<sup>2</sup> The Staff further stated its intention to review the final organization and management of CP&L and the Harris plant as part of its detailed staff review in preparation of the Safety Evaluation Report (SER) on the Harris plant operating license application. Id.

6. Joint Contention I concerning Applicants' management capability to operate the Harris plant, which was admitted on September 22, 1982, was arrived at by stipulation among the Applicants, the sponsoring intervenors and the NRC Staff. As admitted by the Board, Joint Contention I states:

The Applicants have not demonstrated the adequacy of their managing, engineering, operating and maintenance personnel to safely operate, maintain and manage the Shearon Harris Nuclear Power Plant as evidenced by their record of safety and performance at their other nuclear power facilities. A pattern of management inadequacies and unqualified and/or inadequate staff is likely to be reproduced at Shearon Harris Nuclear Power Plant and result in health and safety problems.<sup>3</sup>

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<sup>2</sup>The NRC Staff "Preliminary Assessment of the Organization and Management of Carolina Power & Light Company for Operation of the Shearon Harris Nuclear Power Plant" was admitted into evidence in this proceeding as J.I. Exhibit 38. While the date of publication of this report is not discernible on its face, none of the parties disputed the authenticity of the document or the fact of publication. Tr. 3671. The results of the Preliminary Assessment were furnished to the Commission in SECY 81-617 and were made publicly available in the NRC's Public Document Room and in the Local Public Document Room in Raleigh, North Carolina. NRC Staff Testimony of Paul R. Bemis on Joint Intervenor's Contention Number I, Management Qualifications ff. Tr. 3660 (hereinafter "Bemis"), at 29.

<sup>3</sup>North Carolina Municipal Power Agency (Power Agency) is the owner of a minority interest in the Harris plant and in the Brunswick plant. CP&L, however, is exclusively responsible for the design, construction and operation of the Harris plant, and for the operation of the Brunswick plant. See Amendment No. 2, Construction Permit Nos. CPPR-158-161, Docket Nos. 50-400 through 50-403 (November 3, 1981). See Amendment No. 42, License No. DPR-71, Docket No. 50-325, and Amendment No. 65, License No. DPR-62, Docket No. 50-324 (November 2, 1981).

7. On this contention, Applicants presented their case through the testimony of fourteen witnesses who appeared in several panels. These witnesses and their qualifications will be discussed more fully in the sections of these findings which address their particular testimony. President and Chairman of the Board of Directors of CP&L, Sherwood H. Smith, Jr. also testified in this proceeding. The Joint Intervenors sought to subpoena Mr. Smith to testify. Upon the Board's decision to grant the request, Applicants voluntarily produced Mr. Smith to testify. Tr. 3567-3572.

8. Appearing on behalf of the NRC Staff was Paul R. Bemis, Section Chief, Projects Section 1C, NRC Region II, and George Maxwell, Senior NRC operations resident inspector at the Harris plant. Although the NRC Staff had not originally proffered Mr. Maxwell as a witness, the Joint Intervenors requested the Board to issue a subpoena to require Mr. Maxwell's testimony. Joint Intervenors Request for Subpoenas at 2. In an unreported conference call among the Board and parties, NRC Staff counsel voluntarily agreed to produce Mr. Maxwell to testify.

9. The gravamen of the issue presented by Joint Contention I is whether CP&L's management is adequate to provide for the safe operation of the Harris plant. 10 C.F.R. § 50.40 provides in part:

"In determining that a license will be issued to an applicant, the Commission will be guided by the following considerations:

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(b) The applicant is technically . . . qualified to engage in the proposed activities in accordance with the regulations in this chapter . . . ."

The capability of an applicant's management is an important element in ensuring technical competence. There is no NRC regulation, however, which establishes a definitive standard by which to measure management capability; nor do the adjudicatory decisions of the Commission provide criteria. Nevertheless, two essential aspects of management capability are clear: (1) Management must be committed to the safe

operation of the facility; and (2) management must have the ability to translate that commitment into actions through the establishment of an effective organization and the utilization of management tools and techniques which are designed to ensure that management's commitment to safe operation is implemented. The evaluation of these factors is both subjective and objective. One must evaluate the qualifications of management, management's commitment to safe operation, and management's ability to implement that commitment. In the course of the hearing, the Board had an opportunity to observe key members of CP&L's senior management as well as the top managers of Applicants' three nuclear plants and to gauge first-hand their credibility and demeanor in expressing their commitment to ensuring the safe operation of Applicants' nuclear plants; the structure of CP&L's organization responsible for CP&L's nuclear activities at both the corporate and plant level; and the tools which CP&L uses to carry out management's commitment to nuclear safety.

Corporate Organization, Management Philosophy and  
Conduct of Applicants' Nuclear Operations in General

10. To testify about CP&L's management philosophy and commitment regarding nuclear safety, the structure of CP&L's organization responsible for nuclear activities and the management tools and programs in place at CP&L for carrying out their commitment to safe operations, Applicants presented a panel of CP&L management officials: E. E. Utley, Executive Vice President, Power Supply and Engineering; M. A. McDuffie, Senior Vice President, Nuclear Generation Group; Dr. Thomas S. Elleman, Vice President for Corporate Nuclear Safety & Research; and Harold R. Banks, Manager of Corporate Quality Assurance. See Applicants' Joint Testimony of E. E. Utley, M. A. McDuffie, Dr. Thomas S. Elleman and Harold R. Banks on Joint Intervenor's Contention I (Management Capability) ff. Tr. 2452 (hereinafter "Utley, et al."), at 1-5.

11. Each of the witnesses on this panel has had extensive experience in nuclear matters in general and in CP&L's nuclear activities in particular. Utley, et al. at 1-3.



12. Mr. Utley has been involved in the power supply aspects of CP&L's business for over 30 years and has been a member of CP&L's senior management since 1977. He is currently Chairman of the Institute of Nuclear Power Operations (INPO) Evaluation & Assistance Division - Industry Review Group. Utley et al. at 1.

13. Mr. McDuffie has 32 years of experience in the construction of power plants, including 17 years in nuclear plant construction. He has been a member of CP&L's senior management since 1976. Utley et al. at 2.

14. Dr. Elleman, a Ph.D in physical chemistry, has approximately 32 years of professional experience in the nuclear field including work as Assistant Chief of the Chemical Physics Division of Battelle Memorial Institute and several years as the head of the Nuclear Engineering Department at North Carolina State University. He joined CP&L in 1979. Utley et al. at 2-3.

15. Mr. Banks has nine years of experience with the U. S. Navy's nuclear program during which time he qualified as a senior reactor operator and as an instructor. He has been directly involved in CP&L's quality assurance program since he joined the Company in 1968. Utley et al. at 3.

16. Each of these witnesses was very knowledgeable about the conduct of CP&L's nuclear operations, both technically and from a management perspective. They demonstrated a deep commitment to ensuring that Applicants' nuclear facilities are constructed and operated prudently and safely. They were forthright and responsive in their answers on cross-examination and to the Board and were credible witnesses.

17. Applicant CP&L has substantial experience in the commercial nuclear industry. Unit No. 2 of CP&L's H. B. Robinson Plant (Robinson or Robinson plant), a 665 megawatt pressurized water reactor (PWR), began operation in 1971. Applicants' Brunswick Steam Electric Plant consists of two 790 megawatt boiling water reactors which began commercial operation in 1975 and 1977, respectively. CP&L began construction of the Shearon Harris Nuclear Power Plant in 1978. The Harris plant is of the same general design as the Robinson plant. Utley et al. at 4-6.

18. At the head of the CP&L organization is the Board of Directors. CP&L has retained outside consultants who are knowledgeable in nuclear matters to supplement the Board's experience in nuclear power activities and to keep the Board informed of nuclear programs. Utley et al. at 7.

19. Sherwood H. Smith, Jr. is the Chairman, President, and Chief Executive Officer of CP&L and as such oversees all of the Company's operations. Mr. Smith joined CP&L in 1965 and became a member of CP&L's senior management in 1971 when he was named Senior Vice President and General Counsel. Mr. Smith is closely involved in the management of CP&L's nuclear plants and is personally involved in the activities of the nuclear industry. Utley et al. at 7; Tr. 3906, 3919, 3924-3926 (Smith).

20. Reporting to Mr. Smith is the Executive Vice President for Power Supply, Engineering & Construction, Mr. Utley; and reporting to Mr. Utley are the five organizations which comprise CP&L's nuclear program. These are the Nuclear Generation Group; the Operations Support Group; the Brunswick Nuclear Project Department; the Corporate Nuclear Safety and Research Department; and the Corporate Quality Assurance Department. Utley et al. at 8, Attachment 1.

21. The Nuclear Generation Group is headed by Senior Vice President, M. A. McDuffie. The operation of the Robinson plant and the construction and operation of the Harris plant are under his direct control. In addition, the Nuclear Generation Group provides each of Applicants' three nuclear plants with resources necessary to carry out construction, operation and maintenance. Utley et al. at 9; Tr. 2518 (McDuffie).

22. The Operations Support Group provides technical support services to Applicants' nuclear plants. It ensures that the plants have uniform and high quality programs for nuclear operators and craft training, emergency planning, radiation control, environmental protection, and nuclear fuel procurement. Utley et al. at 11.

23. The Brunswick Nuclear Department, headed by Vice President Patrick W. Howe, is responsible for the safe operation, maintenance and modification of the Brunswick plant. Utley et al. at 8.

24. The Corporate Nuclear Safety and Research Department (CNS&R) and the Corporate Quality Assurance Department (CQA) function as CP&L's independent review branch. Utley et al. at 8.

25. Because of this important oversight function, these two organizations are particularly important to management's efforts to ensure the safe operation of Applicants' nuclear plants.

26. CNS&R, headed by Dr. Elleman, is responsible for ensuring that Applicants' nuclear programs are carried out safely and effectively; for establishing and monitoring a corporate health physics policy; for assessing the effectiveness of the health physics programs; and for directing a research and development program. CNS&R is composed of the Corporate Nuclear Safety Section, the Research Section, and the Corporate Health Physics Section. Utley et al. at 8-9, 19.

27. The Corporate Nuclear Safety Section (CNS) includes the Nuclear Safety Review Unit (NSR) which is located at CP&L's central office in Raleigh, North Carolina, and an On-site Nuclear Safety Unit (ONS) at each of Applicants' three nuclear plants. CNS employs 41 employees including experienced engineers who, among other things, evaluate challenges to safety systems; review and analyze operations personnel actions following plant scrams; conduct field surveillances of plant operations; review operating experience at other nuclear plants; initiate special investigations or evaluations of events at Applicants' plants having possible safety significance; conduct independent reviews of plant documents; and perform plant system assessments. Utley et al. at 19-20, Attachment 3.

28. The NSR Unit, located at CP&L's corporate office, carries out its responsibilities for CNS's independent review program by, among other things, reviewing procedure and plant design changes meeting 10 C.F.R. § 50.59 review criteria, Licensee Event Reports (LERs), NRC notices of violations, and Technical Specification changes. The NSR Unit also evaluates safety-related systems at each of Applicants' plants to

assess whether they perform safely in accordance with design criteria. Utley et al. at 20.

29. Applicants employ 11 people in ONS at the Brunswick plant, 7 at the Robinson plant and 6 at the Harris plant. These units fulfill the function of an Independent Safety Engineering Group as defined by the NRC in NUREG-0737, Clarification of TMI Action Plan Requirements, October 1, 1980, and NUREG-0800 which is the Standard Review Plan, Revision 2, July 1981. These units have a relatively high degree of flexibility in carrying out their tasks, which include administering an operating experience feedback program, evaluating transients and safety system challenges, and directly observing plant activities. Utley et al. at 21.

30. CNS&R has established specific mechanisms for bringing problems identified by its personnel to the attention of plant staff and plant and corporate management for prompt resolution. Its employees, through their managers, report to Dr. Elleman who, in turn, reports directly to Mr. Utley. In the event that a CNS&R section experiences difficulty in obtaining resolution of a problem through direct communication with plant staff, the matter can be taken directly to Mr. Utley for his personal attention. Utley et al. at 22.

31. The Corporate Quality Assurance Department (CQA) employs 283 people, 116 of whom are professionals. The Department is responsible for providing quality assurance (QA) and quality control (QC) for Applicants' nuclear activities. This Department is also responsible for performing QA audits. The objective of the CQA Department is to provide an effective program to ensure safe, efficient and reliable power plant engineering, construction and operation that will meet all regulatory requirements. As Manager of the Corporate Quality Assurance (CQA) Department, Mr. Banks is responsible for implementation of the Corporate QA Program. Mr. Banks testified that the managers of his staff have sufficient authority and organizational freedom to identify quality problems, to initiate solutions and to verify implementation

of solutions. Mr. Banks reports directly to Mr. Utley and has the authority to communicate directly with other corporate management, including the President and the Board of Directors, to resolve any quality assurance concerns which cannot be corrected satisfactorily at a lower management level. Mr. Banks testified that this organizational structure provides the CQA Department with the independence necessary to guarantee that quality assurance decisions are made free of cost and schedule considerations. Utley et al. at 24, 25, 28.

32. The CQA Department is composed of three sections: the QA/QC Brunswick and Robinson Plant Section, the QA/QC Harris Plant Section, and the Quality Assurance Services Section. The QA/QC Brunswick and Robinson Plant Section is responsible for assuring proper application of quality standards, practices and procedures at those plants which are operating plants. The manager of this section is located at CP&L's corporate office while a QA/QC Director and staff are stationed at each plant. Utley et al. at 25, Attachment 4.

33. CP&L's quality assurance program for its operating plants extends over many aspects of operations, maintenance, environmental and radiation control, and plant modifications. Among the activities performed by the QA/QC organization are the following: (a) reporting quality-related problems for correction; (b) stopping maintenance or modification work that does not meet requirements; (c) reviewing plant operating manuals and other plant procedures and instructions to assure that quality requirements are adequately prescribed; (d) verifying acceptability of items and conditions by means of inspections, examinations or tests; (e) performing surveillance of plant activities, and, where appropriate, reporting results to plant supervision to assure prompt corrective actions are taken; and (f) reviewing contracts and plant generated design specifications and procurement documents to ensure inclusion of QA/QC requirements. Utley et al. at 26.



34. Mr. Banks testified that the operations QA/QC program which Applicants anticipate implementing at the Harris plant will be substantially similar to the programs in place at the Brunswick and Robinson plants. Utley et al. at 25.

35. The Quality Assurance Services Section, located in CP&L's corporate office, provides QA engineering support activities for the Department, conducts vendor surveillances and qualification activities, conducts an independent corporate audit program and implements a training program for QA/QC personnel. This Section assures proper application of quality standards, practices, and procedures during engineering, construction, operation and modification of Applicants' nuclear plants. Utley et al. at 26-27.

36. CP&L's management has made substantial efforts to instill in all CP&L personnel a commitment to CP&L's quality assurance program, and places great importance on quality assurance at its nuclear plants. For example, in addition to providing its regular quality assurance program for identifying QA problems, CP&L has instituted a quality check program at the Harris plant which provides a mechanism for workers who have safety concerns to make them known to CP&L, and to do so anonymously if they wish. Forms are located throughout the plant site which can be filled out and dropped into boxes which are opened daily by quality check personnel. A telephone number is provided which the worker can call without identifying himself to obtain a report on CP&L's investigation of his concern. In addition, CP&L attempts to interview workers when they cease working at the Harris site, to determine if they had any concerns about safety at the plant. The quality check program is managed by a member of Mr. Banks' quality assurance staff who reports directly to Mr. Banks. He is independent of the quality assurance organization at the Harris site. Utley et al. at 28; Tr. 2685, 2701, 2712 (Banks).

37. Mr. Banks testified that it is management's responsibility to investigate all safety concerns which might be raised by workers at CP&L's facilities, and where there is substance to the concern, to take whatever action is necessary to correct the problem. Tr. 2709 (Banks).

38. Mr. Utley and Mr. McDuffie both testified that they are personally accessible to workers who wish to report safety concerns directly to them. Tr. 2700 (Utley), 3065-06, 3068 (McDuffie).

39. In the past several years, CP&L has made some significant changes in the organization which conducts its nuclear affairs. There has been a continuing evolution of CP&L's organization towards consolidation of all nuclear responsibilities within a single corporate group. Because of increased regulatory requirements and complex technical issues facing the nuclear industry in recent years, especially since the accident at Three Mile Island, the operating requirements and modification programs at Applicants' three nuclear plants have become increasingly more extensive. As this has occurred, the need for greater coordination of activities has increased. In 1979, therefore, CP&L separated its nuclear operations from its fossil operations and placed the nuclear operation under the direction of a corporate officer. Utley et al. at 12; Tr. 2550 (Utley).

40. In 1982 and 1983, further changes were made to respond to the increasing need for further consolidation of control of the Company's nuclear activities, and to correct certain perceived deficiencies in management controls at the Brunswick plant which will be addressed in the findings under the heading of the Brunswick Nuclear Project. One of the most significant of these changes was the assignment of a corporate officer or manager with the status of a department head to each of the three nuclear plant sites to manage the activities at that site. Patrick W. Howe, Vice President and Manager of the Brunswick Nuclear Project, was assigned to the Brunswick site in 1982. Because the assignment of Mr. Howe to Brunswick proved to have positive results, in 1983 R. A. Watson was assigned to the Harris plant as Vice President and Manager of the Harris Nuclear Project, and Guy Beatty was assigned to the Robinson plant as Manager of the Robinson Nuclear Project. These Project Managers direct all activities at the nuclear plants with the exception of corporate nuclear safety, quality and training, which are independent of the line organization. Utley et al. at 12, 31; Tr. 2537-2538 (Utley).

41. The purpose of consolidating plant activities under the leadership of a department head at the plant site was to provide firmer management control over, and greater accountability for, plant activities, thereby enhancing the safe operation of the plant. CP&L's management believed that the greatest coordination and control of plant activities could be achieved by a high level management person stationed at the plant site who would be in a position to make decisions on behalf of the Company in a short period of time. This arrangement also frees the plant general manager to concentrate more of his attention on day-to-day plant operation and performance. In making these organizational changes, CP&L consulted experts and outside consultants and studied the way in which other utilities are organized. Utley et al. at 12-14; Tr. 2536-2538, 2586-2587 (Utley).

42. Mr. Utley testified that the assignment of a Project Manager to each of the three nuclear sites and consolidation of all plant activities under his control is the single most important improvement which CP&L has made in the way in which it manages its nuclear program. He testified that under this organization there is a single individual who is accountable for virtually all plant activities, who is on-site to deal with problems as they arise, and who can make prompt decisions on behalf of the Company. Mr. Bemis also testified that this organizational change has been a major improvement. Utley et al. at 34; Tr. 3858 (Bemis).<sup>4</sup>

43. Beyond having a sound organization for conducting operations, it is also necessary that a company's management have a strong commitment to ensuring that its operations are conducted safely and prudently. The witnesses testified at length about the philosophy and commitment of CP&L's management to ensuring that Applicants'

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<sup>4</sup>At the Robinson plant, the good progress of the steam generator replacement project being performed there has been attributed, in part, to the presence on-site of an individual with authority over all plant activities. At the Harris plant, this factor is also credited for the smooth transition from the construction to the startup program. Utley et al. at 33; SALP IV at 3,7 ff. Tr. 3660; Tr. 3858.

nuclear plants are constructed and operated safely. On cross-examination, Mr. Utley stated that the safe operation of its nuclear plants is of primary importance to CP&L. This same priority was also expressed by Mr. Smith. Tr. at 3920-3921. The witnesses described various programs which CP&L has developed to carry out this commitment. Mr. Utley and Mr. McDuffie testified also about the way in which they personally assure themselves that the corporate philosophy and commitment to nuclear safety are being implemented. Utley et al. at 6-7, 15-19, 22-24; Tr. 2532 (Utley).

44. CP&L has a written policy which states CP&L's commitment to accomplishing the design, construction, and operation of its nuclear plants in accordance with NRC regulations; to carrying out commitments to NRC regulatory guides and engineering and construction codes; and to operating each plant in accordance with the terms and conditions of its operating license. Utley et al. at 6.

45. Beyond this commitment to operate in accordance with governing regulations, CP&L's management makes an effort to establish standards in excess of minimum requirements when in their judgment it is appropriate to do so. Utley et al. at 6; Bemis at 20; Tr. 3982 (Utley).

46. Areas where CP&L in fact has established practices that exceed the requirements of regulation include the use of six shifts for operations at Applicants' operating plants and its intention to use the six shift rotation at the Harris plant.<sup>5</sup> In addition, although there is no NRC requirement that a licensee own a simulator, CP&L has installed a simulator at its Brunswick and Harris plants and intends to install a simulator at the Robinson plant for the training of plant operators. CP&L has also established on-site nuclear training organizations at its operating plants as well as at the Harris plant. The NRC does not require that such organizations be provided at existing plants. Finally, CP&L participates in INPO's program for evaluating operating nuclear

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<sup>5</sup>See findings 104 and 158 *infra* for a description of the six shift rotation concept and its benefits.

plants against criteria established by INPO. The objective of the program is to establish a standard of excellence in operations which exceeds what is required by the NRC. Tr. 3082-3085 (Utley), 3701 (Bemis).

47. Both Mr. Utley and Mr. McDuffie testified as to the importance of communicating to the management and staff at Applicants' nuclear plants senior management's commitment to nuclear safety and to instill in these personnel the same commitment. Mr. Utley testified that the Company attempts to achieve this through its training programs and other communications and that personnel are held individually accountable for ensuring that procedures are followed accurately. Mr. McDuffie testified that he has communicated to the managers who report to him several standards of conduct designed to enable the Company to conduct its nuclear operations in the safest, most efficient manner possible. These standards include verbatim adherence to procedures, schedules, specifications, drawings, manuals, and operating instructions, and the identification and correction of the root causes of problems. Utley et al. at 17-18.

48. Mr. Bemis has seen a strong dedication on the part of all CP&L management to not merely meet NRC regulations but to exceed them when possible. Mr. Bemis has had frequent communication with Mr. Smith and Mr. Utley about CP&L's nuclear facilities. Recently, Mr. Bemis was asked by CP&L to address CP&L's Board of Directors. He found the Board to be knowledgeable about past difficulties and present improvement programs and clearly supportive of continued improvements in the Company's nuclear affairs. Bemis at 20.

49. Mr. Bemis testified that the NRC is convinced of the commitment of President Sherwood Smith and Executive Vice President Mr. Utley to nuclear safety, to improving CP&L's operations and to providing safe operation of CP&L's nuclear facilities. Tr. 3859, 3878.

50. The testimony of Mr. Bemis is particularly persuasive. Mr. Bemis is an extremely well qualified person with substantial knowledge of nuclear matters. Bemis at 1-8.



51. In November 1982, Mr. Bemis was assigned to observe first-hand CP&L's operation at its three nuclear facilities and at the corporate office. During the first six months of this assignment he spent approximately 85% of his total work time in fulfillment of this responsibility. He has followed closely the progress of CP&L's improvement programs, the results of the management reorganizations which took place in 1982 and 1983 and the various operation, maintenance and construction activities at the three plants. Bemis at 6-7; Tr. 3761 (Bemis).

52. For management to put into practice its expressed commitment to safe operations, it must use effective tools designed to achieve that purpose. Dr. Elleman testified as to some specific programs and mechanisms which CP&L has instituted to ensure that its nuclear facilities are being operated safely. These include a Plant Nuclear Safety Committee at each operating nuclear plant, consisting of the plant general manager and appropriate subordinate managers. This Committee reviews plant events and operational incidents of apparent safety significance. A Corporate Nuclear Safety Review Board, chaired by Dr. Elleman, meets quarterly to review issues of nuclear safety with potential importance for CP&L. This Review Board includes an outside consultant and representatives from CP&L's Plant Operations, Engineering, Corporate Quality Assurance, Licensing and Corporate Nuclear Safety organizations. Utley et al. at 22.

53. CP&L's senior management employs several review and monitoring techniques to maintain oversight of safety-related programs. These include monthly review meetings about each plant, and oral and written reports from Corporate Quality Assurance and Corporate Nuclear Safety as well as from the staff of the nuclear plants. In addition, in his capacity as Vice President for Corporate Nuclear Safety and Research, Dr. Elleman meets periodically with the nuclear plant personnel to gain their views on plant operations and any problems they might perceive. He also meets regularly with the President and Board of Directors of CP&L to review nuclear safety issues with them. Utley et al. at 23.

54. Mr. Utley engages in a variety of activities in order to stay aware of what is occurring at Applicants' nuclear plants and to satisfy himself that work is being performed in accordance with NRC regulations and Company policy and procedures. He conducts nine of CP&L's senior management monthly nuclear project meetings at Applicants' nuclear plant sites. At these meetings, the project managers share with each other and with senior management information about their plants in order that all three projects can benefit from the experience of the others. Mr. Utley also makes frequent visits to the three nuclear plants for site tours and presentations on plant conditions and activities. Mr. Howe, Brunswick Project Manager, reports directly to Mr. Utley. Mr. Utley testified that, normally, he and Mr. Howe communicate by telephone every morning before eight o'clock a.m. His visits to the Harris plant include tours to view construction and startup activities and presentations by plant staff on security, training and procedures preparation. He routinely reviews correspondence between the NRC and CP&L regarding the three nuclear plants and receives various formal reports from CP&L personnel on plant conditions. Utley et al. at 15-17.

55. As a member of INPO's Evaluation and Assistance Division - Industry Review Group (IRG) since 1979 and its Chairman since 1983, Mr. Utley participates in evaluations of other utilities' nuclear plants. Mr. Utley testified that this enables him to learn how other companies operate their plants and to direct CP&L's activities so that Applicants' plants can benefit from the good practices and experience of other utilities. Utley et al. at 16.

56. Mr. McDuffie also testified as to how he personally stays aware of activities at the Robinson and Harris plants, for which he is responsible, and satisfies himself that those activities are performed properly. He is in almost daily communication with the Harris Project Manager, Mr. Watson. He generally tours the Harris plant site at least weekly to observe construction and engineering work. He also attends a variety of regularly scheduled meetings at the Robinson and Harris plant sites and at the corporate

office in order to be kept advised of plant activities. In addition, he has numerous informal communications with the nuclear project managers and other managers under his supervision. Utley et al. at 18-19; Tr. 3063-3064 (McDuffie).

57. The testimony of these witnesses also demonstrates that members of CP&L's senior management engage in a substantial amount of communication among themselves in order to keep senior management informed of significant matters affecting CP&L's nuclear plants. Mr. Utley testified that generally he meets with CP&L's President, Mr. Smith, at least weekly. Similarly, Mr. McDuffie and Mr. Utley are in frequent communication to share information about the nuclear projects and to resolve problems. Dr. Elleman and Mr. Banks meet with Mr. Utley as often as daily if circumstances warrant it. Tr. 2471, 2488 (Utley), 3066-3067 (McDuffie).

58. In 1982, the firm of Cresap, McCormick & Paget was commissioned by the North Carolina Utilities Commission to perform an independent appraisal of CP&L's management of its operations. While making 55 recommendations for improvements, the firm found CP&L to be, in many respects, a well managed utility. The firm noted 53 strengths and accomplishments that are evidence of commendable performance. Cresap letter ff. Tr. 2792, at 1-2.

59. In addition, the NRC's Systematic Assessment of Licensee Performance (SALP) Report concerning CP&L and its three nuclear plants for the period February 1, 1983 through April 30, 1984 was quite favorable. The SALP Program is a formal assessment program conducted by the NRC, and is applicable to each operator of a power reactor or holder of a construction permit. In the SALP process, positive and negative attributes of licensee performance are considered by the NRC, with emphasis placed on: (1) understanding the reasons for a licensee's performance in important functional areas; and (2) sharing the NRC's understanding with the licensee. Each functional area is reviewed, and a rating is given. The ratings are: one, which may permit reduced NRC attention; two, which normally determines that NRC attention will remain at the same level; and

three, which indicates that both NRC and licensee attention need to be increased. All three of those ratings, however, are indicative of safe operation. The SALP reports received by CP&L will be referred to herein as: SALP I (evaluating the period of April 1, 1979 through August 31, 1980); SALP II (July 1, 1980 through December 31, 1981); SALP III (January 1, 1982 through January 31, 1983) and SALP IV (February 1, 1983 through April 30, 1984). In SALP IV, the CP&L organization as well as each of Applicants' nuclear plants received very positive comments and ratings in all functional areas. In every functional area evaluated, each of the nuclear plants received a rating of 1 or 2. Several major strengths were found at each plant while no significant weaknesses were identified. SALP IV at 2-8 ff. Tr. 3660. The specific findings will be discussed further infra under the headings of the particular nuclear projects. Tr. 2961, 2964 (Utley), 3653-54 (Bemis); Bemis at 41-42.

60. Mr. Utley testified that, given the managerial requirements associated with nuclear power today, in his opinion, CP&L has the right organization, in terms of staffing and structure, to manage Applicants' nuclear plants in a safe and prudent manner. He testified that CP&L will continually evaluate its organization and refine its structure further when it is appropriate to do so. Utley et al. at 35.

#### The Brunswick Nuclear Project

61. Considerable testimony was given concerning the past and present experience at the Brunswick plant by Applicants' panel of corporate management officials and NRC Staff witness Mr. Bemis. In addition, Applicants' witnesses Patrick W. Howe and C. R. Dietz also testified concerning the Brunswick Nuclear Project with emphasis on the current management of the plant and its recent operating experience. Mr. Howe is Vice President - Brunswick Nuclear Project. Mr. Dietz is General Manager - Brunswick Plant. Applicants' Joint Testimony of Patrick W. Howe and C. R. Dietz on Joint Intervenor's Contention 1 (Management Capability) ff. Tr. 3124 (hereinafter "Howe/Dietz"), at 1.



62. Both Mr. Howe and Mr. Dietz are experienced and knowledgeable in nuclear matters in general and in matters relating to the Brunswick plant.

63. Prior to joining CP&L, Mr. Howe served as Department Head at the Lawrence Radiation Laboratory, University of California at Berkeley and as Chief of the Site Environmental and Radiation Safety Group - Division of Reactor Licensing, with the United States Atomic Energy Commission. Mr. Howe joined CP&L in 1971. He assumed his present position as Vice President - Brunswick Nuclear Project in 1982. Howe/Dietz at 1-3.

64. Mr. Dietz has 21 years of experience in the nuclear industry. Mr. Dietz joined CP&L in 1981 as Plant General Manager of the Brunswick plant. Howe/Dietz at 1-3.

65. Mr. Howe and Mr. Dietz exhibited an excellent understanding of nuclear matters and significant competence in such matters. They have committed themselves and the other personnel of the Brunswick plant to a standard of excellent performance and are dedicated to achieving that standard. Mr. Howe and Mr. Dietz spoke from the basis of first-hand experience with all facets of the Brunswick plant and were credible in their testimony. Howe/Dietz at 13-14, 30-33.

66. Mr. Howe and Mr. Dietz gave detailed evidence concerning the organization of the Brunswick Nuclear Project. Howe/Dietz at 1-10.

67. The Brunswick Nuclear Project Department is headed by Mr. Howe as Project Vice President. He is stationed at the plant and coordinates all site activities. Reporting to him are the managers of the four major site sections, who are: the General Manager - Brunswick Steam Electric Plant; Manager - Engineering and Construction; Manager - Outages; and Manager - Site Planning & Control. Howe/Dietz at 4, Attachment 1.

68. Mr. Howe reports directly to CP&L's Executive Vice President - Power Supply, Engineering & Construction. Utley et al. at 12-13; Howe/Dietz at 5; Tr. 2535-38 (Utley).



69. The Plant Management Section has the primary responsibility for the day-to-day management and control of the plant facility. The Plant Management Section is responsible at all times for the safe operation and maintenance of the Brunswick facility. The Plant Manager has the authority to stop work on any project or activity at the plant that is not properly controlled or managed and which threatens the safety of personnel or the safety of the plant. Howe/Dietz at 6, 9.

70. Two of the units of the Plant Management Section are devoted entirely to safety related matters. The Regulatory Compliance Unit is responsible for assisting other plant organizations to ensure compliance with all regulatory requirements. The Environmental and Radiation Control Unit is responsible for ensuring that environmental limits established by federal and state regulation are maintained during plant operation, and that radiation exposure is controlled and maintained at as low as reasonably achievable (ALARA) levels. Howe/Dietz at 9-10.

71. The Engineering and Construction (E&C) Section is responsible for providing technical services and support and management direction to accomplish engineering and construction projects for the Brunswick plant. E&C has first-line responsibility for carrying out the modification projects required for the plant. Howe/Dietz at 6.

72. The Outage Management Section is responsible for the planning, preparation and execution of major scheduled outages and for maintaining lists of projects ready for implementation in unexpected, forced outages. Howe/Dietz at 7; Tr. 3287-89 (Howe).

73. The Site Planning and Control Section is responsible for monitoring and measuring the overall performance of the Brunswick Project and for developing and providing systems, methods and capabilities to facilitate such monitoring. Howe/Dietz at 7; Tr. 3289-90 (Howe).

74. In addition to the organizations that report directly to the Project Vice President, there are several other organizations that are represented on-site which are an integral part of the Brunswick Project. These are the on-site Corporate Nuclear

Safety, Corporate Quality Assurance, Nuclear Training and Employee Relations units. These units work closely with line organizations at the site to assist in ensuring safety of operations, quality of performance, coordination of operator and craft training, and recruiting and retention of qualified staff personnel. Howe/Dietz at 4.

75. The organization of the Brunswick Project is well suited to conduct the activities of the Project in a safe manner. The organization, which has evolved over time, is properly structured. Clear lines of authority, responsibility and communication have been established. Howe/Dietz at 4-7.

76. The management organization for the Brunswick Nuclear Project is staffed with well-qualified individuals with extensive experience in the nuclear industry. Howe/Dietz at 1-3, 7-9, Attachments 1 and 2.

77. In the past, CP&L has experienced some difficulties in the operation of the Brunswick plant. This fact was acknowledged and discussed candidly by Mr. Smith and Mr. Utley. NRC Staff Witness Paul R. Bemis also testified that in past years, performance at the Brunswick plant was less than desirable. Utley et al. at 4; Bemis at 15; Tr. 2551-2559 (Utley), 3780 (Bemis), 3928-29, 3932-35 (Smith).

78. Mr. Utley, Dr. Elleman, and Mr. Bemis all testified, however, that at no time has any of these difficulties posed a threat to the public health and safety. Bemis at 19; Tr. 2594 (Utley), 2683 (Elleman), 2933 (Utley), 3675, 3678, 3780 (Bemis), 3928-29, 3932-35 (Smith).

79. During the remand hearing in 1979, there was discussion of specific problems at the Brunswick plant including difficulty in maintaining staffing levels during startup and operation and a higher number of LERs than CP&L desired. Mr. Utley testified in this proceeding that there were some programmatic problems at that time and that management's focus and discipline and control of activities needed to be improved. Tr. 2551-2552 (Utley).

80. Beginning in 1979, CP&L instituted many improvement programs that entailed significant management changes at Brunswick to resolve those problems. Because of the magnitude of these projects, it could not be expected that results would be seen immediately, although positive results are now being seen. Tr. 2554-2558 (Utley).

81. In addition to its attempts to implement these improvement programs, CP&L was also faced with substantial changes in NRC regulations and was required to make numerous modifications to its nuclear plants as a result of the accident at Three Mile Island in 1979. NRC Staff witness Bemis testified that the regulatory requirements that the NRC imposed on the utilities after the Three Mile Island incident were "at least tenfold" greater than at any prior time. Tr. 2536 (Utley), 3856 (Bemis), 3932-3935 (Smith).

82. Prior to the reorganization of the Brunswick Project in 1982, problems were experienced at the plant in a number of areas, including staffing levels and personnel turnover, the number of LERs and NRC notices of violation issued, processing of radwaste, implementation of health physics programs, and performance of required surveillance testing. CP&L has taken appropriate corrective action to address those problems. Howe/Dietz at 14-15; Tr. 3928-29 (Smith).

83. In June 1982, CP&L discovered that a Technical Specification surveillance requirement had not been implemented. CP&L immediately established a team to review Technical Specification surveillance requirements to determine if any other required surveillances had not been fully implemented. That review revealed that three other surveillance requirements, out of some 2,000 total required surveillance tests, had not been implemented. Upon testing, the affected systems were found to perform satisfactorily, so no compromise of public safety had occurred. Howe/Dietz at 25-26.

84. The NRC and CP&L viewed the specific errors that occurred with regard to the surveillance requirements as evidence of programmatic deficiencies in the management controls over the Brunswick plant. Applicants were fined \$600,000 as a

result of the failure to comply with the Technical Specifications and the programmatic deficiencies which that failure evidenced. Effective actions including the initiation of a comprehensive, long range improvement program known as the Brunswick Improvement Program have been taken to remedy this problem and to ensure it does not reoccur. The NRC made compliance with this program a regulatory requirement pursuant to Confirmatory Order EA-82-106. Implementation of the program has been completed as recognized by the NRC in April 1984. Utley et al. at 29-30; Howe/Dietz at 6, 25-28; Tr. 3313 (Howe); Bemis at 15-16.

85. CP&L carried out an investigation at the Robinson and Harris plants to ensure that problems similar to those identified at Brunswick did not exist. Although no such problems were found, CP&L nevertheless instituted a formal program of stricter management controls at Robinson which CP&L submitted to the NRC. CP&L has already implemented many of the provisions of the program and is completing the remaining items. A similar program was developed for the Harris plant although it was not formally submitted to the NRC. Utley et al. at 30; Tr. 3464-66 (Willis).

86. As part of the Brunswick Improvement Program, CP&L retained an independent consultant, Management Analysis Company (MAC) to perform two studies. In one of these studies, conducted in the Fall of 1982, MAC reviewed outside demands on the Brunswick plant staff. Based on its analysis, MAC made various recommendations for reducing such demands in order to allow the staff more time to devote to operations and maintenance. CP&L has implemented or committed to implement all of MAC's recommendations except for those which the company believed were already being achieved through existing programs. In the second study, MAC reviewed CP&L's overall corporate quality assurance program and its implementation at Applicants' three nuclear plants. MAC did not make any adverse findings regarding CP&L's program but did make 167 recommendations for improvements including recommendations for organizational changes, improvements in procedure controls and in training. CP&L committed to

implement 164 of them and has completed implementation of all but 6 of the 164. Utley et al. at 27, 30-31; Tr. 2727-28 (Banks).

87. CP&L made several organizational changes at the Brunswick plant to provide for more direct management control over activities there and to enhance communications between management and the plant staff. The most significant of these was the assignment of Mr. Howe to the site as Project Manager in September 1982. Activities at the site have been closely monitored by CP&L's senior management. Utley et al. at 31.

88. NRC Staff witness Mr. Bemis testified that since the Brunswick Improvement Program was instituted: (a) NRC enforcement actions have greatly declined due to a responsive management organization; (b) many weak programs at Brunswick have been upgraded significantly and restructured to provide for rapid and permanent resolution of deficiencies; and (c) an adequate program for improvement has resulted and is expected to continue. Bemis at 16.

89. The Brunswick Improvement Program encompassed seven major objectives. They were: (a) ensure full and timely compliance with all surveillance requirements, regulatory commitments, and regulatory requirements; (b) ensure that all necessary procedures exist and are clear, unambiguous, precise, complete, and of high technical quality; (c) increase the frequency and scope of quality control surveillance and corporate auditing program activities; (d) ensure that maintenance activities do not degrade or render inoperable any component, system or instrument; (e) increase the proficiency of plant personnel by means of expanded training; (f) utilize more effectively the technical expertise of the On-Site Nuclear Safety and Corporate Nuclear Safety staff in enhancing the reliability of plant operations; and (g) undertake actions to enhance and strengthen the management control and organizational discipline necessary to provide for safe and reliable operations. Howe/Dietz at 27-28.



90. As part of the Brunswick Improvement Program, CP&L entered into a comprehensive reassignment of its surveillance tracking system. With the reassignment, CP&L established within its regulatory compliance organization a group that is specifically dedicated to integrated tracking of surveillance tests for the Brunswick plant. This is a computerized program that provides on schedule a list of required surveillance tests, and confirmation that those tests have been accomplished. Tr. 3240-41 (Dietz).

91. Due in part to the 1982 reorganization and, in part, to efforts which had been initiated earlier, the period since the beginning of 1983 has been one of significant improvement in the overall performance of the Brunswick plant. These improvements include reductions in the number of LERs reported, reduction in NRC notices of violation issued and the severity level of those issued, reductions in radwaste produced, reductions of radiation exposure of plant workers, improvement in plant systems and equipment, and overall improvement in employee morale and employee turnover rates. These improvements were testified to by Applicants' witnesses and Staff witness Bemis and are evidenced in the SALP IV Report. Utley et al. at 31-32; Howe/Dietz at 14; Bemis at 16-18, 23-24.

92. The staff at Brunswick has an enlightened and aggressive attitude that is more sensitive to detail and NRC regulations than in the past. This has been accomplished through restructuring management, more involvement of key corporate individuals stationed in management positions at the site, and corporate support. CP&L has recognized where weak areas existed and has filled positions with capable individuals from outside CP&L when necessary. The result has been an improved, more closely coordinated operation, capable of performing difficult, integrated site projects. Improved management has been manifested in several successful long-term goals. Bemis at 23-24.

93. CP&L's management at Brunswick has demonstrated a commitment to excellence and discipline of operations. Howe/Dietz at 13-14, 30-31; Bemis at 24-25.

94. The SALP IV Report found that the reorganization at Brunswick has resulted in a significant increase in management awareness and control, particularly in the areas of operations and outage management. The SALP IV Report also found that the positive effects of locating a Vice President on site were evident, as many problems were handled quickly and effectively with the Vice President dealing directly with administrative obstacles. SALP IV at 6 ff. Tr. 3660.

95. Emphasis has been placed by the Vice President - Brunswick Nuclear Project on effective coordination of activities and effective communications between the sections of the Project and between the Brunswick Project and CP&L's corporate management. This emphasis is reflected in regularly scheduled meetings on-site, as well as the encouragement of communications on a continuing basis to ensure that all plant activities are carried out effectively. Howe/Dietz at 11-13; Tr. 3266-84 (Dietz and Howe).

96. The current authorized staffing level for the Brunswick Project is 1,230 personnel. Approximately 95 percent of the authorized positions are now filled, and the Brunswick Project is operating with essentially a full staff. Howe/Dietz at 15; Tr. 3291-92 (Howe).

97. Looking at its past experience, CP&L recognizes times prior to 1982 when the work load at the plant, due to increasing regulatory requirements and CP&L's efforts to implement reliability improvement modifications, has been greater than CP&L's ability to accomplish that work in the time frame that it would have considered most desirable. There has been no time in the past, however, when staffing levels at Brunswick were not adequate to ensure the safe operation of the facility. CP&L has been successful in increasing the staff and in recruiting necessary personnel. Howe/Dietz at 15-16; Tr. 3299-3300 (Howe).

98. To some extent, staffing levels at the Brunswick plant historically have been affected by higher than desired turnover rates. In recent years, the turnover of personnel at the Brunswick plant has decreased significantly. For example, the turnover rate at Brunswick in 1983 was 5.7 percent compared to 9.5 percent in 1981. CP&L attributes this reduction in the rate of turnover to a number of factors, including improvements in its wage, salary and benefit structure and a higher level of employee morale. Howe/Dietz at 17; Bemis at 25-26.

99. The staffing level of the Brunswick Project is adequate to ensure that the plant is operated and maintained safely, and to enable CP&L to implement effectively the various regulatory and plant improvement modifications necessary to promote the continued safe and reliable operation of the plant. Howe/Dietz at 17.

100. The health physics program at the Brunswick plant has been significantly improved since 1980. As a result of CP&L's efforts, noteworthy improvements in health physics at Brunswick have been achieved. The effectiveness of these improvements were recognized in an NRC report entitled "Health Physics Appraisal Program" (NUREG-0855). As a part of this program, the NRC analyzed radiation protection programs at 48 commercial nuclear power plants. As part of the final report, the NRC identified what they considered to be examples of good programs in the areas reviewed. The Brunswick Project was singled out for its excellent performance in several areas, including personnel selection, qualification and training, and exposure control. Howe/Dietz at 17-19.

101. Since late 1979, CP&L has made significant improvements in the operations area at the Brunswick plant. Prior to 1979, the operating shift consisted of one Shift Foreman responsible for the operation of both units and the radwaste system. In 1979 this organization was revised to provide a Shift Operating Supervisor and three Shift Foremen on each shift. The Shift Operating Supervisor had overall plant operations responsibility, and a Shift Foreman was assigned to each unit. The third Shift Foreman

was responsible for operation of the radwaste system. This change reduced the span-of-control of the Shift Foreman, so that he might devote more attention to supervision and to on-the-job training of operators, and so that he might maintain a better overview of all aspects of plant operations. This structure was further modified in 1981 by the establishment of a separate group responsible for all radwaste operations. This change allowed the Shift Operating Supervisor to concentrate his full attention on operation of the units, and also resulted in improved supervision and control of radwaste system operations. Howe/Dietz at 20.

102. NRC Staff witness Bemis testified: (a) a significant improvement in radwaste control and handling has been realized at Brunswick; (b) the performance of the radwaste group at Brunswick has improved significantly and currently is performing well; and (c) CP&L's success is due to management being more receptive to supervisor and employee input and an application of good engineering practices. Bemis at 17.

103. Brunswick now has a full operating staff and has implemented a six shift rotational concept for its operators. The present arrangement at Brunswick provides a complement of 19 operating personnel on each shift. The Shift Operating Supervisor, Shift Foremen and Senior Control Operators are SRO licensed. The Control Operators are licensed Reactor Operators. Four of the Shift Operating Crews work on three rotating shifts to operate the plant, one crew is used as a relief shift for vacationing and sick operation personnel, and the remaining crew is in training. Each shift periodically rotates to the relief or training shift. This concept provides ample opportunity for personnel to accomplish training and retraining without requiring other employees to incur excessive or unusual overtime. Howe/Dietz at 21.

104. Operator training programs have been expanded to compensate for additional operating personnel and to enhance the training being provided to the existing staff. The Brunswick operator training staff has doubled since 1980. All of the operator instructors teaching safety-related systems courses hold SRO licenses and have been certified as

instructors. Simulator training has been increased significantly. Additional training has been offered for auxiliary operators, and for maintenance, health physics and chemistry personnel. Howe/Dietz at 22-23.

105. A training tool that has been effective is real time training. Brunswick has developed the capacity to provide specific training to operation, maintenance, and environmental and radiation control personnel on the work shift or shortly following the shift. The type of information conveyed is relevant to the employee's work situation, such as plant procedural changes, the results of an incident investigation, and industry events at another plant. Information of less immediate significance is conveyed through off-shift training. Howe/Dietz at 23.

106. The improved training programs at Brunswick have been effective. Performance by Brunswick personnel in NRC license examinations and NRC requalification examinations has improved on examinations administered since January 1983. Twelve of 16 candidates for reactor operator examinations have passed, and 16 of 20 candidates for senior reactor operator examinations have passed. Howe/Dietz at 24.

107. In the SALP IV Report, significant improvements were noted in plant operations at Brunswick, indicating significant management attention and direction of resources into that area. The SALP IV Report found the Brunswick reorganization "has worked very well," and that the Applicants' dedication to improvement has resulted in a decrease in operator turnover, overall improved morale, and fewer regulatory violations. The SALP IV Report also noted that training of Brunswick operations personnel has reached its highest level in plant history, resulting in improved morale and confidence in the plant staff. SALP IV at 31-34 ff. Tr. 3660.

108. Reductions have been achieved at Brunswick in radwaste generation. The level of radwaste generation at Brunswick in 1983 was about half of what it was in 1980. Howe/Dietz at 24.



109. The SALP IV Report found continued improvement in the Brunswick radiation protection program. During 1983, the total collective dose was higher than average, but was reduced from the previous year. The higher man-rem exposure was related to both units accumulating over 400 outage days in 1983. Efforts to decontaminate the contaminated areas at Brunswick have been very effective. CP&L's management attention in radiation protection has been aggressive. SALP IV at 34-37 ff. Tr. 3660.

110. There has been a significant reduction in the number of LERs and NRC violations issued for the Brunswick plant. In 1983 Brunswick achieved a 45 percent reduction in the number of LERs and a 38 percent reduction in the number of NRC notices of violation issued, as compared to 1982. Applicants attribute this reduction to better accountability in the Brunswick organization, the Brunswick Improvement Program, improved procedures resulting from Brunswick's procedure upgrade program, increased emphasis on strict adherence to procedures, improvements in Brunswick's maintenance program, and better tracking of test requirements. Howe/Dietz at 28.

111. As of July 31, 1984, for calendar year 1984, Brunswick had experienced five NRC violations, all Category V - the category of lowest significance. Category V violations have minor safety or environmental significance. There have been 21 LERs (based on revised NRC reporting requirements which became effective January 1, 1984) during this calendar year. These figures reflect the continuing improvements at the plant. Howe/Dietz at 28; Bemis at 15.

112. The annual exposure per individual at Brunswick decreased by 38 percent from 1980 to 1983. Applicants attribute this to a variety of improvements at the plant, including a heightened commitment by all levels of site personnel to ALARA goals and the addition of more personnel devoted to the plant's ALARA programs. Howe/Dietz at 29.

113. The SALP IV Report found "significant improvements" at Brunswick over the previous rating period. The SALP IV Report found no major weaknesses at Brunswick,

while major strengths were identified in several areas, including radiological controls, emergency preparedness, security and safeguards, and refueling. Improvement was observed in nine of ten categories studied, and CP&L received the top rating level in the tenth. SALP IV at 2-3, 5-6 ff. Tr. 3660.

114. The consulting firm of Cresap, McCormick and Paget (Cresap) was retained by the North Carolina Utilities Commission in 1982 to conduct a management audit of CP&L. In the report by Cresap, which was issued in December 1982, Cresap stated:

"The Brunswick situation is complex, and in our opinion, goes back several years. The plant required, as all nuclear plants do, design modifications or enhancements soon after commercial operation. Superimposed upon this workload was a flood of design changes generated by Three Mile Island and mandated by the NRC in the past several years. CP&L attempted to react properly to this drastically increased workload, but did not achieve the required results. During our eight-month review, we observed an expanded and vigorous dedication by the Company to resolve technical and management process problems remaining at Brunswick. To its credit, the Company initiated many of these actions on its own, and we believe that it is now properly postured to return the plant to an acceptable operating performance."

Tr. 2779-92.

115. The Brunswick organization is effective in managing the Brunswick plant in a safe and prudent manner. This is evidenced by Brunswick's improved performance record, its outstanding safety record, and improved plant morale. The management of Brunswick is highly qualified and effective. Howe/Dietz at 31.

116. CP&L's management of the Brunswick Project is evidence that CP&L has the capability and commitment to operate safely the Harris plant. CP&L acknowledges it has had some difficulties in the past in the operation of the Brunswick Plant. The manner in which CP&L has responded to correct those difficulties demonstrates its ability to resolve problems encountered in operating a nuclear plant.

The Robinson Nuclear Project

117. Applicants' witnesses Guy P. Beatty, Jr. and Richard E. Morgan testified concerning the details of the organization and operating experience of the Robinson plant. Mr. Beatty is Manager of the Robinson Nuclear Project Department. Mr. Morgan is General Manager - Robinson Plant. Applicants' Joint Testimony of Guy P. Beatty, Jr. and Richard E. Morgan on Joint Intervenors' Contention I (Management Capability) ff. Tr. 3120 (hereinafter "Beatty/Morgan"), at 1.

118. Mr. Beatty and Mr. Morgan are experienced and knowledgeable in nuclear matters in general and in matters relating to the Robinson plant.

119. As plant manager, Mr. Beatty was responsible for the startup of the Robinson plant in 1971. He was named Manager of the Robinson Nuclear Project Department in August 1983. Beatty/Morgan at 3.

120. After joining CP&L in 1962, Mr. Morgan participated in the Westinghouse Reactor Operator Training Program for initial startup of Robinson 2 and was licensed as an SRO in 1970. He has been with CP&L continuously since 1962 and has held various positions, including Manager - Plant Operations at the Brunswick plant; Manager - Plant Operations at the Harris plant; and General Manager of the Robinson plant. Beatty/Morgan at 1-4.

121. Mr. Beatty and Mr. Morgan demonstrated an excellent understanding of nuclear matters and significant competence in such matters. They demonstrated dedication to their work and were credible in their testimony. Beatty/Morgan at 20-21.

122. Mr. Beatty and Mr. Morgan presented detailed testimony concerning the organization of the Robinson Nuclear Project Department. Beatty/Morgan at 1-10.

123. The Robinson Nuclear Project Department was organized in September 1983 to centralize all plant operating, construction and engineering functions at the site under one on-site Project Manager. Beatty/Morgan at 4.

124. The Robinson Nuclear Project Department is headed by Mr. Beatty as Project Manager, who is stationed at the plant and who is responsible for all aspects of plant operations, including long-range planning and policy making. Reporting to the Project Manager are the managers of the five major sections, who are: General Manager - Robinson Plant; Manager - Planning and Scheduling; Manager - Control and Administration; Manager - Project Construction; and Manager - Design Engineering. Beatty/Morgan at 4-5, Attachment 1.

125. The Project Manager of the Robinson Nuclear Project reports directly to Mr. McDuffie, the Senior Vice President of the Nuclear Generation Group. Responsibility for all project functions (excluding the on-site training, quality assurance and on-site nuclear safety organizations) is under the Project Manager. Decision making authority for most day-to-day issues is held by management officials stationed at the plant site rather than at CP&L's corporate office. This has resulted in more efficient decision making. Beatty/Morgan at 5.

126. The Plant General Manager, who reports to the Project Manager, has day-to-day responsibility for operation and maintenance of both the nuclear and fossil units. With respect to the nuclear unit, the General Manager has direct responsibility for operations, maintenance, regulatory compliance, technical support, environmental protection, and chemistry and radiation protection. The General Manager is responsible for ensuring that the unit operates safely and reliably, in full compliance with applicable regulations and in accordance with CP&L's corporate objectives. Beatty/Morgan at 4.

127. The Robinson on-site organization is structured so that functional groups not directly involved in the operation of the plant do not report to the plant General Manager. This allows the General Manager to concentrate on the safe, reliable operation of the plant. Beatty/Morgan at 5.

128. The Manager - Project Construction is charged with managing the performance of major modifications and additions to the plant according to preplanned and approved schedules. Beatty/Morgan at 6.

129. The Manager - Control and Administration oversees financial planning and control, project administration, material receipt and handling, emergency preparedness, and project security. Beatty/Morgan at 6.

130. The Manager - Planning and Scheduling is responsible for planning and scheduling outages and modification activities to ensure that resources are utilized efficiently and to minimize unit outage time. Beatty/Morgan at 6.

131. The Manager - Design Engineering, a currently unfilled position, is responsible for the design of modifications and additions to the plant to ensure compliance with applicable engineering codes and regulatory requirements. Beatty/Morgan at 6.

132. The organization of the Robinson Project is well suited to conduct the activities of the Project in a safe manner. The organization, which has evolved over time, is properly structured. Beatty/Morgan at 4-7.

133. The management organization for the Robinson Plant is staffed with well-qualified individuals with extensive experience in the nuclear industry. All management/supervisory personnel, operational licensed personnel, technical and maintenance personnel, and quality assurance personnel meet the requirements of ANSI N18.1-1971. Beatty-Morgan at 7-10, Attachment 2.

134. Robinson has experienced a level of employee turnover well below the nuclear utility industry average. For those employees holding an SRO license, the average turnover rate at Robinson for the period from 1978 through 1982 was less than 3 percent. The industry turnover rate was considerably higher. The average turnover rate for licensed Reactor Operators (ROs) at Robinson was approximately 4 percent during the 1978-1982 time period, while the industry average turnover rate during the same time period was 5.5 percent. In 1983, these turnover rates were reduced to zero percent turnover for both SROs and ROs. Beatty/Morgan at 10-11.

135. There has been a steady growth in staffing levels at Robinson, reflecting CP&L's commitment to maintain a staffing level sufficient to ensure safe operation of



the plant in compliance with NRC requirements. The present staff under the direction of the plant General Manager is 268. Beatty/Morgan, at 12, Attachment 3.

136. Robinson has in place a well-defined training program which has produced good results. The percentage of RO and SRO candidates from Robinson successfully completing the NRC examinations has been consistently high. The Robinson training program is producing sufficient numbers of licensed operators to meet plant needs. Beatty/Morgan at 12-13.

137. CP&L has instituted a formal program of strict management controls at Robinson similar to the Brunswick Improvement Program. This program, which is known as the Robinson Long-Term Improvement Program, was submitted to the NRC in March 1983. CP&L has already implemented many of the provisions of the program and is completing the rest. Utley et al. at 30.

138. Evaluations of the Robinson organization by INPO and by the NRC in its SALP process have been generally favorable. Beatty/Morgan at 13-14.

139. In 1983, INPO reviewed plant safety and management controls at Robinson. The INPO evaluation team reported a number of practices indicative of a well-run plant, including improved housekeeping and material conditions; a low personnel attrition level and high experience level; good morale and a positive attitude by plant personnel; strong support of site activities by corporate management; and a number of other delineated "good practices." Beatty/Morgan at 13-14.

140. The SALP Reports for Robinson have been generally positive. In SALP I, the NRC found performance at Robinson to be slightly above average compared to other Region II facilities. In SALP II, Robinson received only two ratings of 3 in the functional areas evaluated with the rest receiving ratings of 1 or 2. The NRC noted that management was aware of and responsive to performance of the plant. The SALP III Report, while identifying a need for improvement in certain areas, concluded overall that performance at Robinson was satisfactory. The NRC letter transmitting SALP IV

commented that: "Management attention and appropriate involvement in various safety activities were evident at Applicants' Robinson facility." J.I. Ex. 19 at 3-3; J.I. Ex. 20 at 3; J.I. Ex. 21 at 3-4.

141. The SALP IV Report found management performance at Robinson to be good, with major strengths in the areas of surveillance, fire protection, emergency preparedness, and refueling. No major weaknesses were identified by SALP IV. The report noted that even though resources at Robinson were strained by an extended outage for steam generator replacement, few problems were identified. This good performance was attributed in part to: (1) a facility reorganization which allowed for more direct observation of work activities by facility senior management; and (2) a new outage management concept which prevented many potential problems from developing. SALP IV at 3-4 ff. Tr. 3660.

142. The SALP IV Report noted a number of major achievements at Robinson during the evaluation period, including: (a) construction of the Health Physics/Chemistry Building; (b) a training/simulator/Emergency Operations Facility/Technical Support Center building; (c) a new security access area; (d) replacement of the steam generators; and (e) in the area of emergency preparedness, the development of a logic matrix for use by shift personnel to determine emergency action. SALP IV at 3 ff. Tr. 3660.

143. During the SALP IV evaluation period, Robinson showed improvement in seven of the nine categories in which trends were determined. In the other two categories, Robinson already had the top rating level in one and maintained its position of level two in the other. In SALP IV the NRC noted that the implementation of the Robinson Improvement Program had progressed well over the SALP period. Areas in which considerable progress was identified included: training, outage management control, procedural upgrade, and reduction of offsite impact on the site staff. SALP IV at 2-4, 10-29 ff. Tr. 3660.

144. The firm of Cresap, McCormick and Paget, Inc. in 1982 evaluated activities at Robinson. The resulting Cresap Report found that performance of Robinson was higher than the industry average for the preceding five years. Cresap identified "more than-acceptable operating performance of . . . the Robinson nuclear generating station" as one of CP&L's "strengths or accomplishments that offer evidence of commendable performance." Beatty/Morgan at 14-15.

145. In terms of capacity factor as a measure of performance, the Robinson plant has operated since 1971 with a lifetime capacity factor above the industry average. This is so, even taking into account the steam generator replacement project which is scheduled to keep the unit out of service for most of 1984. Tr. at 2576-2577 (Utley), 3015-3016 (McDuffie).

146. CP&L's response to the steam generator problem illustrates its ability to manage the unit properly. As a result of measures taken to extend the life of the steam generators, CP&L was able to benefit from the experience of other utilities that were forced to replace steam generators as an emergency planning by CP&L led to lower personnel radiation exposure, smaller radioactive contamination problems, and a more efficient replacement program at Robinson. Beatty/Morgan at 15-17, 21.

147. As a Westinghouse PWR, the Robinson plant's design is generally similar to the design of the Harris plant. Tr. at 2578 (Utley).

148. CP&L has demonstrated at Robinson its management capability to operate and maintain the unit safely, efficiently, and in conformity with NRC regulations. CP&L's management of the Robinson Project has evidenced that it has the capability and commitment to operate safely the Harris plant.

#### The Harris Nuclear Project

149. Applicants' witnesses R. A. Watson and J. L. Willis testified concerning the details of the organization which CP&L is establishing for the startup and operation of

the Harris plant. Mr. Watson is Vice President - Harris Nuclear Project Department. Mr. Willis is General Manager - Harris Plant Operations Section. Applicants' Joint Testimony of R. A. Watson and J. L. Willis on Joint Intervenor's Contention I (Management Capability) ff. Tr. 3390 (hereinafter "Watson/Willis"), at 1.

150. Mr. Watson and Mr. Willis are experienced and knowledgeable in nuclear matters in general and in matters relating to the Harris plant.

151. Mr. Watson has a bachelor's degree from North Carolina State University in nuclear engineering and a master's degree from Union College in physics. He has also studied at the Oak Ridge School of Reactor Technology. Mr. Watson has previously qualified as a senior reactor operator at another facility, and has 28 years of experience in nuclear engineering activities. Watson/Willis at 1.

152. Mr. Willis has a bachelor's degree from the United States Naval Academy in electrical engineering and attended the Navy's Nuclear Power School. He has 29 years in Navy and utility power plant engineering, maintenance, operation, and management, including 26 years of nuclear power experience. Watson/Willis at 1-2.

153. Mr. Watson and Mr. Willis presented detailed testimony concerning the organization which CP&L has been establishing for the startup and operation of the Harris plant.

154. Mr. Watson and Mr. Willis demonstrated an excellent understanding of nuclear matters and significant competence in such matters. They demonstrated dedication to their work, and were credible in their testimony. Watson/Willis at 18-19.

155. The Harris Nuclear Project Department is organized in a manner similar to the organization presently in place at the Robinson and Brunswick plants. It is structured to ensure clear lines of authority, responsibility, and communication in order to promote effective managerial control. The organization has been designed to provide an orderly and efficient transition from plant design and construction phases to the operating phase. Watson/Willis at 3.



156. The Harris Nuclear Project Department is headed by Mr. Watson as Project Vice President, who is stationed at the plant site and who coordinates all site activities. Reporting to the Project Vice President are the managers of the six major site sections, who are: General Manager - Harris Plant Operations Section; Manager - Harris Plant Engineering Section; Project General Manager - Harris Plant Construction Section; Manager - Harris Completion Confirmation Section; Manager - Harris Project Planning and Controls Section; and Manager - Harris Project Administration Section. Watson/Willis at 4, 6-7, Attachment 1.

157. The Vice President - Harris Nuclear Project Department reports directly to Mr. McDuffie, Senior Vice President of the Nuclear Generation Group. Authority and responsibility for all line functions at the site are under the Project Vice President. This has provided more direct management control over the engineering, construction, startup, operation, and maintenance activities at the Harris plant. Quality Assurance and corporate nuclear safety organizations are also located on-site but report off site to ensure the organizational independence of these functions. Utley et al. at 9; Watson/Willis at 3-4.

158. The General Manager - Harris Plant Operations Section is responsible for all operational phases of plant management, including startup and testing, operation, maintenance, chemistry, environmental and radiation controls, and on-site technical support. This section is responsible for ensuring that the Harris plant will operate safely and reliably, in full compliance with applicable regulations and in accordance with CP&L's corporate objectives. This section includes five units and three sub-units: Administration, Regulatory Compliance, Startup, Technical Support, and Plant Operations Units, and Maintenance, Environmental and Radiation Control, and Operations Subunits.

a. The Administration Unit provides administrative support to the Plant General Manager, manages the operations related administrative functions, and directs emergency preparedness planning and operational security activities.



b. The Regulatory Compliance Unit coordinates activities at the plant to ensure that commitments, responses, reports to regulatory agencies, and plant records are prepared, submitted, and maintained in accordance with regulatory requirements. This Unit maintains a tracking system that monitors the status of safety and environmental concerns until their resolution. It also serves as the on-site contact with the NRC and provides expertise necessary to support plant activities in accordance with the plant license and Technical Specifications.

c. The Startup and Test Unit is responsible for performing the Harris Nuclear Project preoperational and startup test program.

d. The Technical Support Unit provides engineering support for the entire plant staff. Their support involves investigations of day-to-day equipment and system operation. Based on their investigations, they recommend modification tasks to maintain the plant in compliance with new regulations or to improve efficiency of operation.

e. The Plant Operations Unit is comprised of the Maintenance, Environmental and Radiation Control, and Operations Subunits. The Unit is responsible for operating the Harris reactor and required support facilities safely and efficiently. Its responsibilities include ensuring timely completion of scheduled periodic tests and ensuring adherence to the terms of the operating license and plant Technical Specifications.

f. The Maintenance Subunit is responsible for all corrective and preventive maintenance on plant systems and equipment. This includes ensuring that the equipment and associated instrumentation and controls and mechanical and electrical systems in the plant are maintained at optimum dependability and operating efficiency.

g. The Environmental and Radiation Control Subunit administers the plant radiation safety and control (health physics) programs, the chemical control programs, and the environmental programs.

h. The Operations Subunit of the Harris Plant Operations Section is headed by the Operations Manager and includes six shift operating crews assigned to the Harris plant. Each shift will be supervised by a Shift Foreman who will have been licensed as a SRO. At a minimum, each shift will consist of two Senior Control Operators who have SRO licenses, two Control Operators who have Reactor Operator licenses, and four Auxiliary Operators. Each shift operating crew will be charged with responsibility for operating the plant in a safe and reliable manner within the plant Technical Specifications, operating procedures, the corporate nuclear safety and health physics policies, the corporate QA and ALARA programs, and NRC and other applicable regulatory requirements. Four of the shift operating crews will operate the plant on three rotating shifts, the fifth crew will be used as a relief shift for vacationing and sick operators, and the sixth crew will be in training. The use of six shifts in this manner is intended to provide ample opportunity for all personnel to receive training and retraining without imposing excessive or unusual working hours on the other personnel. Watson/Willis at 5, 7-9.

159. The Manager - Harris Plant Engineering Section is responsible for administration of the design of the Harris plant during construction. During the testing, startup, and operation of the Harris plant, this section will have the continuing responsibility to direct engineering modifications and design configuration control for the operating unit and to provide additional on-site technical support to the Operations Section. The Harris plant will thus benefit from the fact that the same technical staff that administered its design during construction will be responsible for providing technical support to plant operations during the first several years of plant operations. Watson/Willis at 4.

160. The Project General Manager - Harris Plant Construction Section is responsible for managing the construction of the Harris plant and has control over construction-related contractors at the plant site. Watson/Willis at 5.

161. The Manager - Harris Plant Completion Confirmation Section is responsible for all regulatory activities pertaining to construction, construction document assembly, and construction inspection. This section will not be retained after Harris begins commercial operation. Watson/Willis at 5; Tr. 3468-69 (Watson).

162. The Manager - Harris Project Planning and Controls Section is responsible for site planning and scheduling, cost accounting and controls, industrial engineering, and related activities, including short- and long-range planning, cost monitoring and reporting, and performance evaluation and reporting. Watson/Willis at 5; Tr. 3468 (Watson).

163. The Manager - Harris Project Administration Section is responsible for the efficient and effective overall site administration activities such as directing the records management and document control programs, developing and coordinating communications and management systems, and providing administrative support to the project management and various project organizations. Watson/Willis at 5; Tr. 3468 (Watson).

164. The organization of the Harris Project is well suited to conduct the activities of the Project in a safe manner. The Project organization is properly structured. Watson/Willis at 3-9.

165. The management organization for the Harris Nuclear Project is staffed with well-qualified individuals with extensive experience in the nuclear industry. Watson/Willis at 1-2, 6-7.

166. The staffing positions for the Harris Operations Section were established and the qualifications for personnel filling those positions were developed in accordance with ANSI/ANS 3.1, Selection, Qualification and Training of Personnel for Nuclear Power Plants, September 1979 Draft. Watson/Willis at 9.

167. The NRC Staff has evaluated CP&L's organization for operating the Harris plant and the qualifications of the Harris plant personnel pursuant to Section 182(a) of

the Atomic Energy Act and 10 C.F.R. § 50.40(b) which require that Applicants be technically qualified to operate the Harris plant. Bemis at 8.

168. To assess Applicants' technical qualifications, including management's technical qualification, to operate the Harris plant, the Staff has applied the criteria of the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800 (July 1981). The Standard Review Plan is prepared to serve as guidance for Staff reviewers in performing safety reviews of applications for licensees to construct or operate nuclear power plants. Bemis at 9-10.

169. NRC Staff witness Bemis testified that the Staff, following the criteria of Standard Review Plan 13.1.2, has concluded that the Applicant: (a) has established an acceptable organizational arrangement for plant startup testing and operation; (b) has provided a sufficient number of candidates for licensed positions; (c) has made an acceptable commitment to provide shift technical advisors in accordance with the requirement of TMI Action Plan Item I.A.1.1; and (d) has established acceptance qualification requirements for plant personnel. Bemis at 40.

170. The NRC Staff has concluded that Applicants will complete the construction of the Harris plant in accordance with regulatory requirements and has adequate management and the technical competence to operate the Harris facility within the purview of the NRC's regulations and with due regard for the public health and safety. Bemis at 18, 24, 43.

171. CP&L has staffed the Harris Plant Operations Section in an effective manner. CP&L began staffing the Operations Section in 1979. The Harris Operations/Startup Group, consisting of 57 personnel, moved from the corporate office to the site in 1981. At that time, there were 187 Operations Section personnel assigned to the Harris plant but stationed at other CP&L facilities for training or other assignments. In 1982, the number of Operations Section personnel on-site grew to 370 with the transfer of personnel from other CP&L facilities and the hiring of new



employees. Formation of the Harris Nuclear Project Department in September 1983 resulted in reassignment of some personnel to the Harris Project staff. The current Operations Section staffing is 374 persons. Watson/Willis at 10.

172. CP&L's pay scales for its nuclear plants are comparable and competitive with those of other utilities. CP&L regularly reviews its salary levels to keep them competitive with the market. Licensed operators are given compensation necessary to enable CP&L to attract and maintain qualified operators. Tr. 3533-34 (Davis).

173. The Harris Operations Section staff at commencement of commercial operation, including Startup Unit personnel, is planned to total 459. The 85 positions which are now open will be filled by transferring personnel from other CP&L facilities (while maintaining more than sufficient good personnel at those other facilities) and hiring new employees through CP&L's recruitment program. During the first two years of operation, CP&L plans to maintain Operations Section staffing at approximately the same level as at initial commercial operation to ensure proper staffing, including integration of startup personnel into the operating plant staff. Watson/Willis at 10.

174. CP&L recognizes the necessity for a strong recruiting program as an important means of fulfilling its manpower needs. CP&L has developed a comprehensive program for recruiting new employees from colleges, universities, community colleges, two-year technical schools, and naval installations. CP&L also participates in a Cooperative Education Program, which, along with CP&L's summer employment program, provides vocational training to students and serves as a means of identifying potential employees. Watson/Willis at 11.

175. There are currently 20 personnel in the Harris Plant Operations Section who have previously obtained commercial SRO or RO licenses at other nuclear plants. These personnel collectively have over 60 years of licensed nuclear experience and over 200 years of total nuclear experience. Watson/Wilson at 11.



176. CP&L plans to have 26 licensed SROs and 18 licensed ROs at Harris at initial commercial operation. This planned staffing exceeds regulatory requirements and will be more than the minimum number of licensed personnel required to man the six shifts. Watson/Willis at 11.

177. There are currently 95 Harris plant personnel in the licensed operator training program: 51 SRO candidates, 30 RO candidates, and 14 Auxiliary Operator candidates. CP&L's operator training program incorporates several state-of-the-art techniques and has several special features. The Harris plant simulator is used to provide comprehensive operator training for normal and emergency plant conditions. A new plant simulator, which will more closely replicate the plant and depict design transients, is expected to be in place by October 1985. In addition, CP&L makes use of the Pulstar Reactor at North Carolina State University to reinforce the trainee's understanding of reactor theory. Watson/Willis at 12.

178. The Harris startup and test program is conducted in three sequential programs: (a) the component testing and initial operation program; (b) the preoperational test program; and (c) the startup power test program. The program is designed to provide the necessary assurance that the facility can be operated in accordance with design requirements and in a manner that will protect the health and safety of the public and CP&L's employees. The program's objectives are: (a) to verify that system performance meets design; (b) to train the plant operating and technical staff and familiarize them with the facility as an operating plant; (c) to verify the plant operating and emergency procedures, to the extent practicable, during the performance of the program; and (d) to verify or improve through minor design changes the reliable performance of both safety and non-safety systems and equipment. There are currently approximately 280 plant personnel directly involved in supporting the startup activities. CP&L expects to increase this number to over 400 personnel prior to commercial operation. Watson/Willis at 13-15.

179. The Harris Plant Operating Procedures for Surveillance and Testing and the on-site QA/QC Section ensure that surveillance and testing will be carried out in accordance with NRC requirements. A computer-based tracking and scheduling system will be utilized to assist in assuring that surveillance tests are scheduled and completed as required. In addition, the off-site Corporate QA Services Section performs periodic auditing of the procedures and the surveillance and testing activities. Watson/Willis at 15.

180. Responsibility for implementation of the Harris ALARA program resides with the Plant General Manager, with the support of the Manager Environmental and Radiation Control and the radiation control staff. CP&L is committed to ensuring that occupational radiation exposures are as low as reasonably achievable, and is committed to following the NRC's requirements in 10 C.F.R. Part 20 and the guidance of NRC Regulatory Guides 1.8, 8.8, and 8.10. The Harris ALARA program consists of plant design features for radiation protection, carefully prepared plant operating and maintenance procedures, and a health physics training program for all plant personnel. During the construction phase, plant operations personnel conduct reviews of equipment and components for accessibility and maintainability, with considerations of ALARA principles and work efficiency as key factors in their assessment. Watson/Willis at 16.

181. The Harris plant health physics program is part of the ALARA program and is designed to ensure that the exposure to radiation of CP&L personnel, contractor personnel and the general public will be maintained ALARA. The Harris plant health physics program includes procedures, job planning, record-keeping, special equipment, and an operating philosophy which emphasizes the importance of meeting the ALARA objective. CP&L is committed to providing: (a) proper preparation and planning before personnel enter radiation areas where significant doses could be received; and (b) adequate supervision and radiation protection surveillance in radiation areas to ensure that appropriate work practices and procedures are followed. Watson/Willis at 17.

182. In the SALP IV Report, the NRC identified major strengths at the Harris Plant in the areas of soils and foundations, containment and other safety related structures, and support systems. No major weaknesses were identified. The report also found that: (a) licensee performance with respect to construction was satisfactory; (b) licensee management involvement in and support for quality construction increased; and (c) CP&L's staff was well trained and qualified. SALP IV at 6-7 ff. Tr. 3660.

183. During the SALP IV evaluation period, Harris showed improvement in four of the seven categories in which trends were determined. In the other three categories, Harris already had the top rating level in two and maintained its position of level 2 in the other. Improvement was found in the quality assurance program, piping systems and supports, safety related components and licensing activities. SALP IV at 8 ff. Tr. 3660.

184. Mr. Bemis reviewed CP&L's enforcement history and concluded that CP&L's management at Harris has the technical capability to safely operate the Harris plant in conformance with NRC requirements. Mr. Bemis found that: (a) historical violations at Harris did not generally involve programmatic failures; (b) violations by CP&L at its plants are becoming fewer in number and, more importantly, the level of severity of violations is decreasing; (c) CP&L's management has a strong dedication to not only meet NRC regulations, but to exceed those requirements when possible; and (d) CP&L has demonstrated a willingness and ability to take corrective actions for identified problems. Bemis at 18-22.

185. Mr. Bemis testified that Staff's observation of CP&L's participation in significant projects (including installation, testing and startup of an Augmented Off-Gas System at Brunswick, retubing of the Brunswick Unit 1 Main Condenser, recirculation system piping repairs and the steam generator replacement at Robinson) leads Staff to conclude that CP&L's performance in projects similar to the construction and eventual operation of the Harris Plant is adequate. Bemis at 22-25.

186. The NRC's resident inspector at the Harris plant also testified that in his judgment CP&L has the management capability to safely operate the Harris plant. Tr. at 3861.

187. The NRC Staff performed a preliminary assessment of the organization and management of CP&L as part of the acceptance review of the operating license application for the Shearon Harris Nuclear Power Plants Units 1, 2, 3 and 4. On the basis of its assessment in Chapters 12, 13 and 17 of the most recent SER, the Staff, once again, has concluded that the proposed organization and management for operation of the Harris facility, at both the corporate and plant level, are acceptable and that CP&L is technically qualified to operate the Harris plant within the purview of NRC regulations and with due regard for public health and safety. Bemis at 29-30, 43.

188. CP&L has demonstrated that it has the management capability and commitment to operate and maintain the Harris plant safely, efficiently, and in conformance with NRC regulations.

189. The Harris Nuclear Project management has benefitted significantly from CP&L's experiences at the Robinson and Brunswick plants. Lessons learned at those plants are reflected in the Harris plant organization structure, management controls and experience, efforts in advanced planning and early staffing, and in the personnel training program. Additionally, the training and experience that some of the Harris operators and staff gained at the Robinson and Brunswick plants has helped minimize the need for additional training. CP&L's experiences at Robinson and Brunswick have enhanced the ability of the Harris plant management to operate the plant safely and reliably. Watson/Willis at 17-18.

#### Training

190. Applicants' witnesses James M. Davis, Jr. and A. Wayne Powell testified concerning the technical training which CP&L provides its nuclear plant personnel. Mr. Davis is Senior Vice President of Operations Support for CP&L, and Mr. Powell is the

Director - Training - Harris Plant in CP&L's Nuclear Training Section. Applicants' Joint Testimony of James M. Davis, Jr. and A. Wayne Powell on Joint Intervenor's Contention I (Management Capability) ff. Tr. 3399 (hereinafter "Davis/Powell"), at 1, 4.

191. Mr. Davis and Mr. Powell are experienced and knowledgeable in nuclear matters in general and in matters relating to training.

192. Mr. Davis joined CP&L in 1965 and since that time has held a number of management positions, including: Manager of Rates and Service Practices, Vice President of CP&L, Group Executive for Fuel and Materials Management and Senior Vice President for Operations Support. Among the departments under his management is the Operations Training and Technical Services Department, which includes the Nuclear Training Section. Davis/Powell at 1-2.

193. Mr. Powell, during almost nineteen years of service in the United States Navy, received extensive training in various Navy Service Schools, including the Navy's Nuclear Power, Radar, Instructor, Curriculum Development and Electronics Maintenance Schools. He also was trained by the Navy in the areas of quality assurance inspection and leadership and management. Mr. Powell was certified by the Navy as a Master Training Specialist and was awarded the Navy Commendation Medal for achievements in training program development and instruction. Mr. Powell was certified by the NRC as a senior reactor operator instructor. Davis/Powell at 1-2.

194. Mr. Davis and Mr. Powell demonstrated an excellent understanding of nuclear matters and training concepts, as well as significant competence in such matters. They demonstrated dedication to their work and were credible in their testimony. Davis/Powell at 15-17.

195. CP&L in 1973 established its first full time training staff when it created the position of training coordinator at the Robinson and Brunswick plants. As CP&L's training needs and student population have grown, the training staff has grown to its present strength of 137. More than half of these people are assigned to the three plant training units. Davis/Powell at 4.



196. CP&L's Nuclear Training Section provides training for all major classifications of plant personnel including operators, mechanics, electricians, instrumentation and control (I&C) technicians, radiation control technicians, environmental and chemistry technicians, engineers, and managers. This Section is also responsible for training craft and technical personnel at CP&L's fossil and hydro plants. The Nuclear Training Section is made up of eight units which support the nuclear projects. One unit is located at each of the three nuclear project sites. The other five units are located at the Shearon Harris Energy & Environmental Center (E&E Center) at New Hill, North Carolina. Davis/Powell at 4.

197. In general, the five units at the E&E Center provide generic training, i.e., training applicable to all plants, in a classroom or laboratory environment, and the plant training units provide plant-specific training, i.e., training on the systems, equipment and procedures of a particular plant. Davis/Powell at 4.

198. The three plant training units are similar. Each is composed of about 24 members and is headed by a plant training director. The Harris Training Unit is directed by Mr. Powell. The directors at the Company's two other nuclear plant sites are also well qualified and experienced. Davis/Powell at 5.

199. The plant training directors report off-site to the Manager - Nuclear Training for matters related to integration with the corporate training program, but they function as part of the plant organization for day-to-day working relationships. This allows CP&L to have the centralized resources required for a corporate program and at the same time to be on-site at each plant to provide direct support to the plant staff. This is an effective way to implement a corporate training organization that is flexible enough and independent enough to meet plant training needs. Davis/Powell at 5-6.

200. At the E&E Center, the Nuclear & Simulator Training Unit (N&STU) and the Fossil Operator Training Unit are responsible for conducting basic and advanced training for auxiliary operators and control operator candidates. The N&STU also operates the

Harris plant control room simulator which is currently used for initial training and retraining of Harris and Robinson plant operators. Davis/Powell at 6.

201. The Craft Technical Training Unit provides classroom and laboratory training for plant mechanics, electricians, I&C technicians, radiation control technicians, and environmental and chemistry technicians. These courses typically involve extensive "hands on" training in CP&L's laboratories where the students perform troubleshooting exercises on equipment. Davis/Powell at 6.

202. The Curriculum Development Unit supports training in four major areas. This Unit administers the training evaluation program. They take the lead role in CP&L's efforts to obtain INPO accreditation. The Curriculum Development staff is also responsible for developing and conducting initial and continuing training for its instructors. The Curriculum Development Unit assists section instructors in the development of curriculum and lesson material to support classroom and laboratory training. Davis/Powell at 6-7.

203. The Administrative Unit maintains records, compiles statistics and reports, produces the budget, maintains the technical library, and provides other administrative assistance to the Section. Davis/Powell at 7.

204. Currently, CP&L's Nuclear Training Section staff has 780 man-years of power plant experience, of which more than 580 man-years are nuclear. Thirteen of its personnel have held or currently hold NRC SRO or RO licenses, and an additional 11 of its personnel are certified by the NRC as SRO instructors. Davis/Powell at 7.

205. To ensure that its instructors are well qualified in the techniques of teaching, CP&L has developed an Instructor Certification Course which is administered by the Curriculum Development Unit. This initial course is approximately three weeks in length and teaches the "criterion referenced instruction" method. It includes instruction on program design, test construction, presentation skills and program administration. Each certified instructor attends a periodic refresher course that often includes guest

lecturers from the Education Department of North Carolina State University. There is also a technical skills renewal component that requires instructors to periodically return to a plant assignment in their job skill areas. Davis/Powell at 8.

206. CP&L provides a wide variety of courses for plant personnel, but the focus is on training of operators, maintenance personnel, radiation control technicians, and chemistry technicians. In addition, CP&L has a variety of courses designed for shift technical advisors, engineers, management personnel, and general plant employees. Davis/Powell at 8.

207. CP&L's General Employee Training (GET) is divided into three courses - GET Levels I, II, and III. Levels I and II satisfy the regulatory requirements for training of employees working in radiation areas. GET III is a forty hour program that provides advanced health physics training for personnel who work in radiation areas. The purpose of this training is to give personnel a better appreciation for radiation protection principles in order that they can be more responsible for their own radiation protection. CP&L began this program with the training of CP&L supervisors and contract personnel who direct the activity of workers in radiation areas. Eventually it will be part of the training for all employees whose regular work assignment in radiation control areas requires this advanced level of training. Davis/Powell at 9; Tr. 3423-35 (Davis and Powell), 3453-55 (Willis).

208. CP&L's Operator License and Requalification Programs are designed to produce highly trained operators to operate safely the controls of CP&L's nuclear units. CP&L offers training courses for qualification as auxiliary operator, reactor operator, and senior reactor operator. These courses include generic and plant-specific classroom training and structured on-the-job training, and licensed operators also receive simulator training. Davis/Powell at 9.

209. All of CP&L's training programs are designed, implemented, and evaluated following the same guidelines and procedures. They incorporate and reflect CP&L's

corporate commitment to ALARA, and they are modified as necessary to reflect new regulatory requirements, operating experiences, INPO evaluations, CP&L audits, and plant modifications. Davis/Powell at 11.

210. CP&L's cold-license training program at Harris consists of several phases of training, including: (a) a ten week course consisting of a math review, nuclear and reactor theory, heat transfer, fluid flow, thermodynamics, health physics, radiation protection and chemistry; (b) a seven day program at North Carolina State University utilizing the Pulstar reactor, in which students perform precritical and critical operations of the training reactor, as well as reactor startups; (c) eighteen weeks of Harris plant system training, alternating in one week intervals between formal classroom presentations and system checkouts; (d) a four week pre-simulator course including theory review, control systems review, emergency, abnormal and normal operating procedures, and a review of recent and related industry events; (e) a three week course in transient and accident analysis and mitigating core damage; and (f) a nine week simulator training program designed to duplicate actual plant operations. Davis/Powell at 11; Tr. 3446-48 (Powell), 3526-33 (Davis and Powe<sup>11</sup>).

211. Although the Nuclear Training Section has a separate reporting chain from the plant staff, it does not operate independently of the plant staff. The three plant training units are located on-site and report on a dotted line (matrix) basis to the Plant General Manager. This allows day-to-day communications between the plant training director and the plant supervisors and Plant General Manager. Davis/Powell at 12.

212. The Manager - Nuclear Training visits the plants frequently. He typically goes to each of the three plants at least monthly and makes it a practice to talk with the Plant General Manager or with other key managers. This gives them the opportunity to discuss with him any problems or issues that might require his attention. In addition, it gives him an opportunity to discuss training plans with them and to get their thoughts and suggestions on how training might be improved. Davis/Powell at 12.

213. Below the management level, the training staff and the plant staff maintain close communication and continually interact. Operator instructors frequently visit the plant control rooms and, when possible, accompany operators on their shift assignments. When developing or revising programs, plant input is incorporated by using the operating staff as subject matter experts for job analysis and as Training Advisory Committee members. CP&L has Training Advisory Committees which are composed of first-line supervisors from each of the nuclear and fossil plants, an instructor from the training unit responsible for the program, and a member of the Curriculum Development Unit. These Committees meet to review the appropriateness of CP&L's curriculum for the craft and technical classifications and any significant proposed changes to the curriculum. There is a close relationship between the Nuclear Training Section and the plants. Davis/Powell at 13.

214. There are many indicators that demonstrate the success of CP&L's training programs:

(a) The recent success rate on NRC RO and SRO exams for the Robinson plant has been excellent. Of the 25 candidates who have taken the NRC license exam over the past three years, 24 have passed, for a success rate of 96 percent. The Brunswick operators were also quite successful on the NRC-administered requalification exams in 1983. These exams were the first fully NRC-administered requalification exams given at a utility. Of the fifteen Brunswick operators who took the exam, eleven passed all sections of it. One individual failed only one section, which he passed on reexamination of that failed area. The three individuals who failed more than one section of the original exam were reexamined on those areas after a period of retraining, and all passed.

(b) Another positive indicator of CP&L's training success is the recent accreditation of Robinson operator training programs by the INPO Accreditation Board. The INPO accreditation procedure, which is similar in many respects to the



accreditation program for colleges and universities, features a self-evaluation report by the utility, an accreditation team visit from INPO, a period of response and completion of actions recommended by the team, and presentation of the training program to the Accreditation Board in Atlanta. CP&L was only the fourth utility to have any of its programs accredited by INPO.

(c) Adequacy of the cold-license program at Harris can be evidenced by the successful completion of a certification exam given upon completion of the simulator training phase. Thus far, 28 persons have been certified at the SRO level and 7 persons at the RO level. CP&L has provided over 2,800 hours of simulator training in the first six months of 1984 with a 99.5± percent simulator availability factor. For most of 1984, the simulator has run three shifts per day. Davis/Powell at 13-14.

215. CP&L's training programs comply with applicable NRC regulations and INPO guidelines. CP&L's training programs are also designed to meet the INPO evaluation performance objectives and criteria. Davis/Powell at 15.

216. CP&L has demonstrated a strong commitment to training:

(a) One indicator of CP&L's commitment to training is the resources CP&L devotes to training. The Nuclear Training Section currently has an authorized staff of 137.

(b) CP&L has also committed significant resources toward construction of modern training facilities. CP&L has new training centers at both the Robinson and Brunswick plants, and the Harris training staff will soon occupy new facilities. Both the Brunswick and Harris plants have control room simulators, and CP&L has recently issued a request for bids for a Robinson plant simulator. To date, CP&L has invested \$35 million in training facilities and equipment.

(c) CP&L's commitment to training is further highlighted by the emphasis it has placed on obtaining accreditation by INPO of its training programs. As noted

above, CP&L in May 1984 became only the fourth utility to achieve accreditation of a portion of its training programs. Davis/Powell at 3-4.

217. The testimony of Mr. Davis and Mr. Powell demonstrates that CP&L has a sound program for training the personnel who operate Applicants' nuclear plants which is effective to ensure that these personnel operate the plants competently and safely.

#### Conclusion

218. The reliable, probative and substantial evidence of record in this proceeding, and the foregoing findings of fact related to Applicants' management competence, demonstrate that Applicants have the management capability and technical competence to operate the Harris plant safely. Applicants have in place a management structure, at both the corporate and plant levels, that is properly structured to conduct the activities necessary to operate their nuclear facilities safely. The management organization, at both the corporate and plant levels, is staffed with well-qualified individuals with extensive experience in the nuclear industry.

219. Each of the Applicants' witnesses was very knowledgeable about the conduct of CP&L's nuclear operations, both technically and from a management perspective. The witnesses also demonstrated a deep commitment to ensuring that Applicants' nuclear facilities are constructed and operated prudently and safely.

220. While CP&L has encountered some difficulties in the past in the operation of the Brunswick plant, operations there have never posed a threat to the public health and safety. CP&L's management has taken appropriate and effective actions to resolve difficulties encountered. The performance of the Brunswick plant has greatly improved, as has been recognized by the NRC Staff and as reflected in improvements in performance indices. Mr. Bemis testified that the Brunswick plant has shown steady improvement over the last 18 months as a result of the restructuring of management at the site as well as the implementation of the Brunswick Improvement Program. Bemis at 23. Moreover, CP&L's record in operating the Robinson plant has been essentially a positive one.

221. The testimony of Applicants' witnesses and NRC Staff witness Bemis and the findings of SALP IV demonstrate that CP&L is managing its nuclear operations in a prudent and competent manner with due regard for the public health and safety.

222. Demonstrable improvements have been made in CP&L's nuclear operations across the board. The SALP IV Report is persuasive evidence in this regard because it is based on actual operating experience and the evaluations of NRC personnel over the course of the appraisal period. Tr. 3859 (Bemis); SALP IV at 1-3 ff. Tr. 3660.

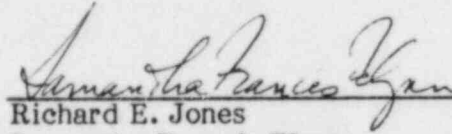
223. Contrary to the allegations of Joint Contention I, the record demonstrates that Applicants' management will operate the Harris plant in accordance with the NRC's regulations in a manner that will protect the health and safety of the public.

224. CP&L has learned from its experiences in operating its Robinson and Brunswick plants and has taken measures to apply those lessons learned for the benefit of the Harris plant. Based on its difficulties in maintaining adequate staffing for startup and operations at Brunswick, for example, CP&L began building its operating staff for Harris as early as 1979. NRC Staff witness Bemis also expressed his opinion that CP&L has learned a great deal from the past in establishing its programs for the present and future. The Harris Nuclear Project management has benefitted significantly from CP&L's experiences at the Robinson and Brunswick plants. Lessons learned at those plants are reflected in the Harris plant organization structure, management controls and experience, efforts in advance planning and early staffing, and in the personnel training program. Additionally, the training and experience that some of the Harris operators and staff gained at the Robinson and Brunswick plants has helped minimize the need for additional training. CP&L's experiences at Robinson and Brunswick have enhanced the

ability of the Harris plant management to operate the plant safely and reliably.

Watson/Willis at 1. -18; Bemis at 26; Tr. 3079-3081 (Utley), 3657 (Bemis).

Respectfully submitted,



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