August 9, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY	)	
AND NORTH CAROLINA EASTERN	)	Docket No. 50-400 OL
MUNICIPAL POWER AGENCY	)	
	)	
(Shearon Harris Nuclear Power Plant,	)	
Unit 1)	)	

APPLICANTS' JOINT TESTIMONY OF E. E. UTLEY, M. A. MCDUFFIE, DR. THOMAS S. ELLEMAN AND HAROLD R. BANKS ON JOINT INTEVENORS' CONTENTION I (MANAGEMENT CAPABILITY)

JOINT TESTIMONY OF E. E. UTLEY, M. A. MCDUFFIE,

DR. THOMAS S. ELLEMAN AND HAROLD S. BANKS

Q1. Please state your name, business address, and position with Carolina Power & Light Company and describe your educational background and professional experience.

A1. Mr. Utley:

My name is E. E. Utley. My business address is Carolina Power & Light Company, 411 Fayetteville Street, Raleigh, North Carolina. I am Executive Vice President, Power Supply, Engineering & Construction.

I attended Louisburg College and North Carolina State University. I have been with CP&L for over 30 years during which time I have been actively involved in the power supply aspects of our Company's business. I have served as superintendent at three of CP&L's fossil plants. In 1972, I was elected as a Company Vice President and in 1977, I was named Senior Vice President in charge of the Power Supply Group. I was named Executive Vice President in charge of the Power Supply & Customer Services Group in 1979. As a result of a corporate reorganization which occurred in mid-1980, that group was reorganized as the Power Supply, Engineering & Construction Group. I am currently serving as CP&L's representative to the Institute of Nuclear Power Operations (INPO) and am Chairman of INPO's Evaluation & Assistance Division-Industry Review Group.

Mr. McDuffie:

My name is M. A. McDuffie. My business address is Carolina Power & Light Company, 411 Fayetteville Street, Raleigh, North Carolina. I am employed by Carolina Power & Light Company as Senior Vice President, Nuclear Generation Group. I received a B.S. degree in civil engineering from North Carolina State University in 1948. I am a registered professional engineer in the State of North

Carolina and a registered civil engineer in the State of South Carolina. I have 32 years experience in the construction of power plants, including 17 years experience in nuclear construction. Prior to joining CP&L, I was employed for 18 years by Ebasco Services Incorporated during which time I served as project superintendent over the construction of Robinson Unit No. 2, CP&L's first nuclear generating unit. I was also involved in the construction of a number of CP&L's fossil plants including Weatherspoon Units No. 1 and No. 2; Lee Units No. 1, No. 2, and No. 3; Cape Fear Units No. 5 and No. 6; Robinson Unit No. 1; Asheville Unit No. 1; Roxboro Unit No. 1 and No. 2. During the years 1968 to 1970, I was Construction Manager for Ebasco and was responsible for the construction of various fossil and nuclear steam electric stations and switchyards on the east coast of the United States. I was employed by CP&L in June 1970 as Manager of Construction in the Power Plant Design & Construction Department. In 1973 I was promoted to Manager, Power Plant Construction Department. In 1974 I was named Vice President, Power Plant Construction Department. In June 1976 I was named Senior Vice President, Engineering & Construction Group, and in August 1983 I assumed my present position.

Dr. Elleman:

My name is Thomas S. Elleman. I am employed by Carolina Power & Light Company as Vice President and head of the Corporate Nuclear Safety & Research Department. My business address is 411 Fayetteville Street, Raleigh, North Carolina.

I have approximately thirty years of professional experience in the nuclear field. I hold a Ph.D. degree in physical chemistry and have worked as Assistant Chief of the Chemical Physics Division of Battelle Memorial Institute, as head of the Advanced Fuels Development Department of General Atomics Corporation, and as a Professor of Nuclear Engineering at North Carolina State University. From 1974 to 1979, I served as Department Head of the Nuclear Engineering Department. I left there in 1979 to accept my present position at CP&L. I am a certified health physicist, a former chairman of the North Carolina Radiation Protection Commission, and a member of the Nuclear Advisory Council established by Governor Richard Reilly of South Carolina.

Mr. Banks:

My name is Harold R. Banks. My business address is Carolina Power & Light Company, 411 Fayetteville Street, Raleigh, North Carolina. I am employed by Carolina Power & Light Company as Manager - Corporate Quality Assurance. I have 20 years of naval experience. During 10 of those years, my work was directly related to naval nuclear reactors. While in the Navy, I qualified as a senior reactor operator and as an instructor. For four years I also served as a Nuclear Ship Superintendent and was responsible for the construction, quality assurance, and startup of new submarine nuclear plants as well as for the overhaul and repair of operating submarine nuclear plants. I joined CP&L in 1968, and since that time, I have been actively involved in the Company's quality assurance program. As the Project Resident Engineer during the construction and startup of H. B. Robinson Unit No. 2, I had responsibilities relating to quality assurance and I also served as a QA Resident Engineer at our Brunswick plant. In 1971, I was promoted to Manager - Quality Assurance in the Power Plant Engineering & Construction Department, and later, I was named as Manager - QA & Training Audit for the Special Services Department. In 1976, I was named Manager - Nuclear Generation. I also served for fifteen months as the General Manager of the Shearon Harris Nuclear Plant before I was named to my current position in February 1981.

Q2. Mr. Utley, please state the purpose of the testimony which will be given by Carolina Power & Light Company in this hearing on Joint Contention I in the Shearon Harris operating license proceeding and briefly summarize the testimony.

A2. Mr. Utley:

Joint Contention I, in effect, challenges CP&L management's capability to safely operate the Shearon Harris plant because of past occurrences at CP&L's other nuclear units. The purpose of the testimony which will be presented by CP&L in this hearing is to respond to that allegation. The testimony will show that CP&L has the capability and the commitment to operate safely the Harris plant. At both the corporate office and at the Harris plant we have organizations that will permit effective management control over, and involvement in, the operation and maintenance of the Harris facility. In addition, we are implementing programs that we have carefully developed for the staffing and training of sufficient numbers of qualified personnel to properly operate and maintain the Harris facility. Finally, CP&L has established various organizations, both on-site and off-site, which provide technical support to the Harris plant and each of our other nuclear plants.

We acknowledge that we have had some difficulties in the past in the operation of the Brunswick plant. We believe, however, that the way in which CP&L has responded to correct those difficulties demonstrates CP&L's management ability and determination to tackle and to resolve successfully the complex problems which face, in varying degrees, all utilities operating nuclear power plants today.

Our experience in operating the H. B. Robinson Unit No. 2, a pressurized water reactor (PWR) of the same general design as the Harris plant, generally has been positive and we believe it is a valid indicator of CP&L's ability to operate the Harris plant in a manner which will assure the protection of the health and safety of the public.

In short, we believe that our management personnel have the capabilities and experience to direct competently our nuclear operations; that we have the quantity and quality of staff to operate safely our nuclear plants; and that our management has demonstrated the flexibility and willingness to change in order to meet the challenges of a complex industry.

CP&L's testimony with respect to these various subjects will be presented by several panels of witnesses. Mr. McDuffie, Dr. Elleman, Mr. Banks and I will testify as to the structure of CP&L's corporate organization responsible for nuclear activities. We will also discuss our management philosophy with respect to nuclear safety and quality assurance and describe the programs that are in place to ensure that these philosophies are implemented.

Next, the Project Managers and Plant General Managers of the Brunswick and Robinson Nuclear Projects, Messrs. Howe, Beatty, Dietz and Morgan, respectively, will discuss in greater detail the organizations, personnel and programs at each of those plants and the operation of those plants from a nuclear safety perspective.

Finally, Mr. Al Watson, Vice President, Harris Nuclear Project; Mr. Jim Willis, Harris Plant General Manager; Mr. Jim Davis, Senior Vice President, Operations Support; and Mr. Wayne Powell, Director of Training for the Harris Nuclear Project, will testify with respect to the organization and staffing of the Harris plant and our corporate training programs, all of which have been designed to ensure the safe and effective startup and operation of the Harris plant.

Q3. Please provide a brief description of CP&L's nuclear experience.

A3. In the 1950s, CP&L participated in a joint venture to construct an experimental nuclear reactor at Paar Shoals, South Carolina. With the success of this venture, CP&L decided to build Robinson Unit No. 2, a 665 megawatt Westinghouse PWR. This unit, which began operation in 1971, was the first operating commercial nuclear plant in the southeast. We then began construction of the Brunswick plant which consists of two 790 megawatt boiling water reactors (BWRs). These units began commercial operation in 1975 and 1977, respectively. We began construction of the Harris plant in 1978. Orginally intended to be a four unit plant, it will now consist of one 900 megawatt PWR.

Q4. Please describe the philosophy and commitment of CP&L's management with regard to the safe construction and operation of its nuclear plants.

A4. CP&L's management has always recognized that proper safety practices and strict adherence to all applicable governmental regulations and CP&L procedures are necessary for the safe operation of its nuclear plants. It is an expressed corporate policy that CP&L will design, construct, and operate its nuclear power plants without jeopardy to its employees or to the health and safety of the public. Pursuant to this policy, CP&L is committed to accomplishing the design, construction, and operation of its nuclear plants in accordance with Nuclear Regulatory Commission (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 NRC operating license. This written policy has been distributed to all appropriate CP&L management and operations personnel.

While adherence to NRC regulations in the conduct of our nuclear operations is essential, we believe that we should strive to excel in those activities and to establish for ourselves standards in excess of minimum requirements where, in our judgment, it is appropriate to do so.

This corporate commitment to safe nuclear operations is supported by the Power Supply, Engineering and Construction Management Philosophy. This philosophy recognizes that those factors that produce efficient operation—namely, good planning, proper employee training, efficient management controls, accurate specification of responsibilities, and good working relationships among employees—are also the factors that will lead to the safe operation of our nuclear facilities.

Q5. Mr. Utley, please describe the structure of CP&L's organization for management of its nuclear facilities.

A5. Chapter 13 of the Harris Final Safety Analysis Report (FSAR), Amendment 13, dated June 12, 1984 contains a detailed description of our nuclear organization as well as the qualifications of CP&L's management personnel. Sections 13.0 through 13.1.3.2 and 13.4 through 13.5.2.2 of the FSAR are Applicants' Exhibit ___. I will highlight some of its more significant aspects. As shown in Utley et al. Attachment 1 to this testimony, the organizational structure with respect to CP&L's nuclear facilities begins with the Board of Directors. CP&L's Board is a strong one, and it has among its membership well qualified executives. CP&L supplements the Board's experience in nuclear power activities by providing the Board with outside assistance from various consultants. For example, Mr. Lee Sillin, the former Chairman of the Board and Chief Executive Officer of Northeast Utilities and the current Chairman of the Board of the Institute of Nuclear Power Operations (INPO), has been retained to work with the Board and to keep them abreast of nuclear programs.

The Chairman, President, and Chief Executive Officer of CP&L is Mr. Sherwood H. Smith, Jr. As such, he is responsible for overseeing all of CP&L's operations. Mr. Smith is extremely active in the nuclear industry's activities. In June of this year he was elected Vice Chairman of the Edison Electric Institute. Reporting to Mr. Smith are three executive vice presidents and one senior vice president.

As Executive Vice President of Power Supply, Engineering and Construction, I have responsibility for supervising CP&L's power supply, engineering and construction activities. There are five organizations reporting to me which, together, comprise our 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. In addition, the Fossil Generation and Power Transmission Group reports to me. The Power Supply, Engineering and Construction Organization is shown on Utley et al. Attachment 1.

The Nuclear Generation Group is headed by Mr. McDuffie, Senior Vice President. The Robinson Nuclear Project, the Harris Nuclear Project, and various engineering and construction sections comprise this Group.

The Operations Support Group is headed by Mr. James M. Davis, Senior Vice President. The Group's role is to provide technical support services to each of the nuclear sites. It ensures that the plants have uniform and high quality programs for nuclear operator and craft training, emergency planning, radiation control, environmental protection, and nuclear fuel procurement.

Overseeing the Brunswick Nuclear Department is also a part of my responsibilities. This department is headed by Mr. Patrick W. Howe, Vice President, who is responsible for the safe operation, maintenance and modification of the two Brunswick units.

The remaining two departments function as the company's independent review branch. The Corporate Nuclear Safety and Research Department (CNS&R), led by Dr. Elleman, Vice President, has the responsibility for ensuring that the Company's nuclear programs are carried out in a safe, effective manner; for establishing and monitoring the corporate health physics policy; for assessing the effectiveness of the health physics programs; and for directing a research and development program to assist management in planning for the use of new technologies in the Company's operations. The Corporate Quality Assurance Department (CQA) is led by its Manager, Mr. Banks. The CQA Department is charged with ensuring that corporate and plant procedures are adhered to and that compliance with governmental regulations is maintained. This organization's programs encompass plants under construction as well as those that are in operation. Both of these departments will be discussed later in this testimony.

Q6. Mr. McDuffie, how does the Nuclear Generation Group provide support for CP&L's three nuclear plants?

A6. As Senior Vice President of the Nuclear Generation Group, the operation of the Robinson and Harris Nuclear Projects is under my direct control. In addition, it is the responsibility of the Nuclear Generation Group to provide the three nuclear plants with whatever resources they may request to enable them to carry out modification projects and other activities related to the construction, operation and maintenance of the plants.

Within the Nuclear Generation Group, there are four supporting organizations: the Nuclear Engineering and Licensing Department (NELD); the Nuclear Construction Department; the Engineering & Construction Support Services Department; and the Nuclear Staff Support Section. A chart depicting the Nuclear Generation Group is set forth on Utley <u>et al.</u> Attachment 2.

NELD is headed by Mr. Al Cutter, Vice President, who has extensive nuclear power plant experience. This department supports the three nuclear projects by providing design services and is responsible for procuring and maintaining construction and operating licenses.

NELD consists of four sections and one unit: the Nuclear Licensing Section; the Nuclear Engineering Projects Section; the Engineering Support, Nuclear Plants Sections I and II; and the Safety Review - Nuclear Engineering Unit. The Nuclear Licensing Section provides the Company's principal interface with the NRC and advises the nuclear projects on regulatory matters.

The Nuclear Engineering Projects Section manages contract engineering work and ensures that the three nuclear projects receive the design and engineering support they request.

The Engineering Support, Nuclear Plants Sections I and II provide electrical, mechanical and civil engineering design support as requested by the three nuclear projects.

The Safety Review Nuclear Engineering Unit reviews CP&L plant LERs, NRC notices and bulletins, and information from INPO and other organizations in order to identify potential problems or trends at CP&L's plants and to provide feedback to the nuclear projects in order that any similar problem in CP&L plant systems designs can be corrected. This unit also assures that as low as reasonably achievable (ALARA) concepts for radiation control are considered in engineering designs.

The Nuclear Construction Department is headed by Mr. Sheldon D. Smith, who has over 30 years of construction experience. This Department provides the three nuclear projects with construction procurement services, expediting services, surplus inventory control, contracting services and construction equipment.

The Engineering and Construction Support Services Department is headed by Mr. W. V. Coley who has 25 years of engineering and management experience with CP&L. This Department provides cost control, cost reporting, and estimating and budget preparation services for the Nuclear Generation Group.

To support the three projects, the Nuclear Staff Support Section works closely with the department managers at the nuclear facilities to ensure that programs and procedures are implemented consistently. This Section is also the Company's primary contact with INPO programs. This Section is headed by Mr. J. L. Harness who has over 25 years of nuclear experience.

Q7. Mr. Utley, please describe the other CP&L organizations that provide support to the three nuclear projects.

A7. The Maintenance Support Section, which is within the Fossil Generation and Power Transmission Group, provides maintenance manpower support to the plants during outages and other times when increased labor support is required. It accomplishes this by directing the services of traveling maintenance crews and by coordinating the use of contract maintenance personnel.

The Operations Support Group led by Mr. Davis is comprised of four departments: the Fuel Department; the Materials Management Department; the Operations Training & Technical Services Department; and the Environmental Services Section.

The Fuel Department determines our needs for nuclear fuel and procures nuclear fuel at the lowest cost consistent with quality requirements. It is responsible for all related activities, such as forecasting fuel requirements, ensuring timely delivery of fuel to the power plants, and performing nuclear fuel analyses.

The Materials Management Department is responsible for the purchasing, control, warehousing, distribution, salvage and disposal of Company material requirements, except for generation fuel, power plant construction materials, and land.

The Operations Training & Technical Services Department provides centralized services to the Power Supply, Engineering and Construction organizations for radiation control, chemistry, operator and technical training and emergency preparedness.

The Environmental Services Section provides the scientific expertise which the Company requires to ensure that its construction sites and operating facilities are in compliance with pertinent environmental regulations. Its personnel have expertise in the areas of fresh water and marine aquatic systems, terrestrial habitat, air quality, metallurgy, meteorological and seismic monitoring, and permitting.

Q8. CP&L has made several changes in its nuclear organization in recent years. Please describe the most significant aspects of those reorganizations and CP&L's reasons for making them.

A8. Since the early 1970s, CP&L has maintained a separate nuclear operations organization, with a complete technical support staff. There has been a continuing evolution in CP&L's senior management structure towards consolidation of all nuclear responsibilities within a single corporate group. Our current organization, which was just described in this testimony, reflects the latest of these changes at the corporate office which occurred in mid-1983.

In 1982, CP&L established the Brunswick Nuclear Project, which consolidated all on-site line activities under the responsibility of a single department head and corporate officer, whom we assigned to the site. This department head, Mr. Howe, reports directly to Mr. Utley.

The results of this restructuring have been quite positive. Consequently, in 1983 CP&L assigned Mr. Beatty and Mr. Watson to the Robinson and Harris sites, respectively, as department heads responsible for those projects. They report directly to Mr. McDuffie.

Prior to these changes, there were three departments, managed at the corporate office in Raleigh, to which the operations, engineering, and construction organizations at the sites reported. As our modification programs at the nuclear plants became more extensive the need for greater coordination grew, and this coordination could not be performed as effectively off-site. In order to strengthen coordination and control so as to ensure safe and efficient operations and regulatory compliance, we placed these three functions, as well as outage management and other functions related to planning, control and administration, under a single site manager.

There are, however, several site programs that can best be administered and implemented from a centralized location such as training, quality assurance/quality control (QA/QC), and nuclear safety. We believe the best way to administer these programs is to establish a central support group that defines general program features, ensures appropriate incorporation of advances in the state-of-the-art, and assigns separate units to each of the plants to assist the plants in implementing these programs.

The purpose of consolidating actual plant activities under the leadership of a department head at the plant site was to provide firmer management control over and greater accountability for activities at the plant, thus enhancing its safe operation. By integrating the management functions of the department, the department head is able to assume a more direct role in site operations, especially those activities that provide support to plant operations. This also enables the Plant General Manager to concentrate more attention on day-to-day plant operation and plant performance. There are some differences among the management organizations of the three nuclear projects which reflect the significant activities currently underway at each of them (i.e., maintenance outages, major modification work, and plant startup and testing). Nevertheless, their structures are substantially similar and they are all alike in that clear lines of authority, responsibility, and communications have been established.

Today, CP&L's nuclear power organization can best be characterized as one of specialization, separation, and consolidation: specialization, because the skills required to manage a nuclear program have become increasingly different from the skills required to manage other conventional generation technology; separation, because we have seen that the pace and the frequency at which decisions must be made require a different set of guidelines and procedures than are sufficient for other parts of our business; and finally, consolidation, because we have recognized an increasing need to pull together under a single senior manager the various organizations involved in our nuclear program.

The current structure of CP&L's nuclear organization reflects, in part, the knowledge of what is required for the safe and efficient operation of a nuclear plant which we have gained through our 25 years of experience in the industry. It is also a response to the numerous regulatory requirements and complex technical issues which have been facing CP&L, and the industry generally, in increasing numbers in recent years, especially since the Three Mile Island incident.

As CP&L has assumed increasing responsibility for the engineering and construction work at its nuclear projects over the years, our staff has also expanded. Due in large part to increased regulatory requirements, our modification and retrofit program has been extensive, and much of the growth in our organization has been due to this work. As an organization grows in size, it is not uncommon that a need to redefine its structure to accommodate the growth will arise. Such has been the case in CP&L's nuclear program.

The objective of any organizational change is to improve the effectiveness of the overall organization. We believe that the changes we have made in our nuclear organization enhance the safety of our plants and improve their operating performance. For example, we have recognized, and management theoreticians have stated, that the greater the rate of change and level of complexity experienced by an organization, the greater the need for autonomy of its managers and for rapid decision-making. By placing the Nuclear Project Managers at the plant sites and by giving them full responsibility over all on-site line functions, we have established an organization that provides the Project Managers with sufficient autonomy to enable them to conduct plant activities more efficiently and safely. Where a nuclear plant is concerned, however, complete autonomy is not permissible and it is not desirable. We, therefore, have our independent oversight groups, such as Corporate Quality Assurance and Corporate Nuclear Safety, which scrutinize the activities at our nuclear plants and assure that our quality and safety programs are being implemented and are operating effectively.

Q9. Mr. Utley, how do you, as Executive Vice President-Power Supply, Engineering & Construction, stay aware of the activities at CP&L's nuclear plants and how do you satisfy yourself that those activities are performed properly in accordance with NRC regulations and CP&L policies and procedures?

A9. There are many ways in which I try to satisfy myself that we are performing our responsibilities in accordance with NRC regulations and CP&L policies and procedures. I conduct nine of our monthly nuclear project senior management meetings at the nuclear sites. These meetings are attended by the senior managers of all three nuclear plants, and we discuss a wide range of relevant issues. These meetings are very valuable in that they provide an opportunity for the project managers to share with each other and with me information about their plants so that all three projects can benefit from the experience of the others. The managers of NELD, Corporate Nuclear Safety and Research and Corporate QA also attend these meetings, and they discuss safety, quality and regulatory performance issues with us.

I make frequent visits to our three nuclear plant sites. My visits include plant tours to view the construction and startup activities at the Harris plant and I also attend Harris staff presentations on topics such as security, training, and procedure preparation. My visits to the Robinson and Brunswick projects include plant tours as well as presentations on plant conditions. I am also in almost daily contact with the Brunswick senior management, and I discuss plant conditions with the Robinson senior management several times a week.

To ensure that our plants are meeting regulatory commitments, I maintain frequent contact with the management of the Nuclear Regulatory Commission staff. I also am in frequent communication with representatives of INPO. I am the Company's official representative to INPO, and I am Chairman of the INPO Evaluation & Assistance Division - Industry Review Group (IRG), which meets three times a year. I have been a member of this Committee since its formation in 1979, and I have been its chairman since January 1981. The IRG provides management oversight of the INPO evaluations of nuclear plants. As part of this effort, members take turns participating in plant evaluations. My participation in this Committee's work not only provides me with the opportunity to get an inside look at how other companies are operating their plants, but it also provides me an opportunity to meet with my peers and exchange with them ideas on establishing excellence in plant operations. Through this first-hand experience, I am in a better position to compare our performance with that of others and to direct our activities in a manner that allows us to benefit from the good practices and experiences of other utilities.

I routinely review incoming and outgoing NRC correspondence for all three nuclear plants. I also receive various formal reports, including quality assurance reports, which keep me abreast of plant conditions.

It is the obligation of every CP&L employee, and particularly of every CP&L manager, to ensure that work is performed in accordance with applicable regulations, policies and procedures. We have worked very hard over the past two years to improve the discipline of our operations which entails, among other things, that an individual assure himself that he is using the right procedure and that he follows that procedure precisely. Personnel are held individually accountable for ensuring that procedures are followed accurately and are subject to disciplinary action for not doing so.

Ensuring that this commitment to discipline in operations is well understood throughout the organization requires the personal dedication and involvement of all of CP&L's senior managers. We are involved, and we strive to communicate this message at every possible opportunity. We have tried to establish, from the top down, a commitment to the types of programs and work habits that will result in individuals performing their tasks in compliance with all applicable regulations, policies and procedures. Through our training programs and our communications with personnel, we attempt to establish an environment that fosters a commitment to compliance. Through reporting and analysis we identify areas where compliance has not been achieved. When we find such an area, we undertake whatever measures are necessary in an effort to ensure that the particular organization takes appropriate remedial actions.

Q10. Mr. McDuffie, how do you, as Senior Vice President - Nuclear Generation Group stay aware of the activities at CP&L's nuclear plants for which you are responsible and how do you satisfy yourself that those activities are performed properly in accordance with NRC regulations and CP&L policies and procedures?

A10. CP&L's senior management is committed to conducting our nuclear operations in the safest, most efficient manner possible. For this to be achieved, I, as a member of senior management, must demonstrate my personal commitment and instill the same sense of commitment through all levels of personnel working under my management.

When the Company reorganized in August 1983, I shared with my managers several standards of conduct which I expected us to meet in our daily activities:

(1) Everyone should make every effort to do his job right and to do it right the first time.

(2) Procedures, schedules, specifications, drawings, manuals, and operating instructions are to be followed verbatim.

(3) Accountability for tasks should be established and clearly assigned.

(4) Parameters of quality, cost and schedules should be met.

(5) Operations should be evaluated thoroughly. Problems should be traced to their root causes so that we can address them rather than merely their symptoms.

(6) Finally, managers should try to develop organizations that work well internally and communicate well with each other, with CP&L's oversight organizations, and with the NRC.

There are many ways in which I personally stay aware of activities at the nuclear projects and attempt to satisfy myself that we are performing those activities properly.

I like to observe, first hand, the construction and engineering work going on at the Harris site so I generally tour the project at least once a week. Sometimes I do this when I'm at the site for a meeting. Sometimes, I go to the site on weekends. I also try to tour the Robinson project when I am at the site for a meeting.

In addition to my personal observations of site activities, I have frequent meetings and communications with my managers. I often attend the daily morning meeting at Harris, for example. I attend, as a rule, the monthly project review meetings at Harris and Robinson as well as the monthly nuclear senior management meetings. I also attend some of the monthly Brunswick Project Review meetings. Harris executive review meetings are held three or four times a year and I try to attend each of those. Finally, I hold a weekly staff meeting for managers located in the corporate office. The Manager of the Corporate QA Department routinely attends these meetings. Project Managers attend those meetings on the third Monday of each month.

Beyond formal meetings, I have numerous informal communications with the Project Managers and the other group managers. They can, and do, call me throughout the work day, and at my home if necessary, to discuss Project activities. Finally, I have frequent communications with NRC staff management and representatives of INPO. These discussions provide me with valuable insight into our own operations.

Q11. Dr. Elleman, please discuss the organizational structure of the Corporate Nuclear Safety & Research (CNS&R) Department.

A11. The Corporate Nuclear Safety and Research (CNS&R) Department is composed of the Corporate Nuclear Safety Section (CNS), the Research Section, and the Corporate Health Physics Section. CNS includes the Nuclear Safety Review Unit (NSR) located at the central office and an On-site Nuclear Safety Unit (ONS) at each of the three nuclear projects. This organization is shown in Utley et al. Attachment 3. CNS includes 41 employees who work in Raleigh in NSR or at one of our plant sites in ONS. CNS employs experienced engineers who 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 for the purpose of developing recommendations for our own activities, initiate special investigations or evaluations of events having possible safety significance at our nuclear plants, conduct independent reviews of plant documents, perform plant system assessments, perform thermal hydraulic analyses of plant transients of interests, and review selected plant procedures and modifications.

The NSR Unit is responsible for the independent review program as well as for providing general evaluation of safety related systems. The NSR independent review activity encompasses review of the following items: (1) procedure and plant design changes meeting 10 C.F.R. § 50.59 review criteria; (2) licensing actions; (3) tests or experiments not described in the facility's FSAR; (4) plant operational occurrences (LERs); (5) NRC notices of violations; (6) Technical Specification changes; (7) Plant Nuclear Safety Committee (PNSC) meeting minutes; and (8) any other item relative to safe operations deemed appropriate for review.

Another major responsibility of the NSR Unit is the evaluation of plant safety-related systems to assess whether they perform safely in accordance with design criteria. This activity is carried out by gathering data generated by tests, modifications, and repairs of the system; conducting interviews with operators; and reviewing performance summaries. The NSR Unit issues reports providing nuclear operations personnel with an outline of the evaluation, conclusions, and any appropriate recommendations and/or concerns.

The NSR Unit also monitors unresolved safety issues and is developing capabilities in the area of transient analysis. The main thrust of these programs is to enable NSR to function as the primary technical contact on key generic issues affecting CP&L nuclear plant operations and to gain the ability in-house to thoroughly evaluate and resolve issues insofar as practicable.

We have eleven employees in ONS at Brunswick, seven at Robinson, and six at Harris. The individuals in these Units fulfill the function of an Independent Safety Engineering Group, as defined by the NRC in NUREG 0737 and in NUREG 0800, the Standard Review Plan, Rev. 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, reviewing selected procedures and modifications, evaluating transients and safety system challenges, directly observing plant activities, and conducting special reviews.

When CNS engineers discern problems, generally they are resolved through direct communication with appropriate members of the plant staff. If such efforts are not successful and it is determined that further action is required to enhance plant safety, a formal concern or recommendation is issued. Formal correspondence describing the concern or recommendation is initiated and sent to the appropriate department manager in the nuclear operations organization for resolution. Target dates for resolution and final corrective action are established consistent with the safety implications of the problem. If the problem is of immediate safety concern, the concern is orally communicated to the Plant General Manager and respective department manager for prompt resolution.

The Research Section monitors, evaluates, and conducts research and development projects related to the electric utility industry. The Section follows and provides support to research projects conducted by the North Carolina Alternative Energy Research Corporation and area universities. The Section also conducts selected research projects which can be more effectively carried out in-house.

The Corporate Health Physics Section staff reviews the health physics practices at our plants; conducts assessments of our health physics programs;

assesses the current status of health physics technology to make sure that we are using current methods; and reviews what other utilities are doing in this area. In general, their function is to make sure that we comply with regulatory requirements in the health physics area, and that we use proper health physics practices.

The individuals in these sections report through their respective managers to me, and I, in turn, report directly to Mr. Utley. I keep Mr. Utley aware of significant events. In the event a section experiences difficulties in resolving a problem, the matter can be brought to Mr. Utley for his personal consideration.

Q12. Dr. Elleman, please describe some of the other specific mechanisms that have been established within CP&L to implement CP&L's commitment to nuclear safety.

A12. Safe operation of our nuclear facilities is the primary responsibility of the plant operations staff. Several review and oversight organizations have been established to ensure that this responsibility is met. The Plant Nuclear Safety Committee (PNSC) at each of our operating nuclear plants consists of the Plant General Manager and those subordinate managers whose job requirements relate to safe operation. The PNSC reviews plant events and operational incidents of apparent safety significance for the purpose of ensuring that plant actions are appropriate. PNSC actions and reviews are documented in minutes which are distributed to key personnel having responsibility for nuclear safety. For Robinson, for example, the PNSC minutes are distributed to the Manager of the CNS Section and to Mr. Beatty, the Manager of the Robinson Nuclear Project Department.

In addition, a Corporate Nuclear Safety Review Board meets quarterly to review nuclear safety issues of potential importance to CP&L. I serve as chairman of this Board which also includes an outside consultant and representatives from Plant Operations, Engineering, CQA, Licensing, and CNS&R. Corporate Nuclear

Safety Review Board decisions are implemented through actions of the organizations represented on the Board.

To ensure that the safety-related programs of CP&L are functioning properly, senior management employs a number of review and monitoring techniques. Senior management officers hold monthly review meetings concerning each nuclear plant during which they receive an update on plant problems, accomplishments, and priorities. Reports from CQA and CNS&R are transmitted regularly to senior management and discussed personally with appropriate individuals. As the Vice President for Corporate Nuclear Safety and Research, I meet periodically with various individuals at our nuclear plants to ascertain their perception of plant operations and problems. I also meet on a regular basis with Mr. Smith and the Board of Directors to review nuclear safety issues. A variety of reports that identify trends important to safety are regularly prepared by plant staff and are given broad distribution to appropriate management personnel. These reports include data on CP&L licensee event reports (LERs), personnel contaminations, radiation exposures, NRC notices of violations, waste volumes generated, measures of plant chemistry, and other measures of the safety performances at our plants. This body of information helps management to evaluate trends in radiation control and safety performance.

Q13. Dr. Elleman, please describe CP&L's ALARA Program.

A13. The Corporate Health Physics Policy requires that the Company develop, implement, and maintain sound health physics programs at CP&L facilities where radiation-producing equipment and/or radioactive materials are used or stored. These programs are structured to ensure that the exposure to radiation of CP&L personnel, contractor personnel and the general public will be maintained at levels which are as low as reasonably achievable (ALARA).

Some of the major facets of the programs are: (1) the establishment of ALARA goals, plans, procedures, and methods; (2) the review of the design of facilities and equipment that can affect potential radiation exposures; (3) the identification of locations, operations, and conditions that have the potential for causing significant exposures; (4) the coordination of preplanning and post-operational debriefings for jobs having potentially high exposures; (5) the review of associated procedures; (6) the periodic review of results of ALARA programs; (7) the development of recommendations for improvements; (8) the conduct of training in ALARA concepts; and (9) the collection, maintenance, and analysis of personnel exposure data.

The Corporate Health Physics Section staff reviews the ALARA programs annually to assure they are effective in minimizing exposure to radiation, and makes recommendations for program improvements. The Section also provides assistance in development of ALARA training programs, counseling on good health physics practices, and other support services.

Q14. Mr. Banks, please describe the organization and responsibilities of CP&L's Corporate Quality Assurance Department.

A14. CP&L's Corporate Quality Assurance (CQA) Department is responsible for providing quality assurance (QA) and quality control (QC) for CP&L's nuclear activities, including engineering, construction, and operations. The objective of the CQA Department is to provide an effective QA/QC program that will ensure safe, efficient, and reliable power plant engineering, construction and operation and that will meet all regulatory requirements. In addition, the CQA Department is responsible for QA audit functions. This Department was formed in early 1981 to provide more efficient and effective QA/QC within CP&L by consolidating the QA/QC functions that had previously been performed by three separate departments in the Company. The Department is currently staffed with 283 people, including 116 professional employees. Each nuclear plant has an on-site QA/QC staff to direct QA/QC activities for engineering, construction and operations.

As manager of the CQA Department, I report directly to Mr. Utley. This organizational relationship provides the independence necessary to guarantee that quality assurance decisions are made free of cost and schedule considerations. We have established three primary sections within my Department: the QA/QC Brunswick and Robinson Plants Section, the QA/QC Harris Plant Section and the Quality Assurance Services Section. A chart of the Department is shown on Utley et al. Attachment 4.

Q15. Mr. Banks, please describe the organization and responsibilities of the QA/QC Brunswick and Robinson Plants Section and how they relate to the programs for quality assurance and quality control at the Harris plant.

A15. The QA/QC Brunswick and Robinson Plants Section is responsible for assuring proper application of quality standards, practices, and procedures associated with the operation, maintenance, or modifications at CP&L's presently operating nuclear plants. We anticipate that the operations QA/QC program which we implement at the Harris plant will be substantially similar to the programs in place at Brunswick and Robinson.

The Manager of this Section is located in the corporate office with a Director of QA/QC located at each plant. The Director - QA/QC Brunswick Plant and the Director - QA/QC Robinson Plant and their respective staffs are responsible for conducting on-site QA/QC activities in accordance with the Corporate QA Program and QA/QC procedures.

The QA/QC program for our operating plants covers many facets of the plant's operations, maintenance, environmental and radiation control activities, as well as modification activities. Among the activities that are performed under these QA/QC programs are the following: (a) reporting quality-related problems for correction; (b) stopping maintenance or modification work that does not meet requirements; (c) reviewing plant modification and maintenance documents, the Plant Operating Manual, and other plant procedures and instructions to assure that quality requirements are adequately prescribed; (d) ensuring holdpoints have been inserted in work control documents; (e) conducting inspections and witness points for maintenance and modification of the plant; (f) verifying acceptability of items and conditions by means of inspections, examinations, or tests; (g) providing guidance or check lists for accumulation of documentary evidence of quality and other QA records for retention; (h) coordinating and conducting surveillance of on-going plant activities, reporting results to the appropriate plant supervision and following up to assure that timely corrective action is taken, when appropriate; (i) providing procedures or instructions necessary for the accomplishment of QA/QC activities; (j) reviewing purchase requisitions and ensuring that QA/QC requirements are specified, except when reviewed by Quality Assurance Services; (k) reviewing contracts to ensure inclusion of necessary QA/QC requirements; (l) reviewing site-generated design specifications and procurement documents to ensure inclusion of QA/QC requirements; and (m) reviewing the Corporate QA program and proposing revisions, as appropriate.

Q16. Mr. Banks, describe your Quality Assurance Services Section's organization and its responsibility.

A16. The Quality Assurance Services Section, which is located in the corporate general 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 designed to qualify QA/QC personnel for maximum interchangeability among various QA/QC activities. This Section assures proper application of quality standards, practices, and procedures during engineering, construction, operation and modification of CP&L's nuclear plants.

Q17. Mr. Banks, since the formation of your Department in early 1981, what further actions has CP&L taken to enhance the overall effectiveness of its QA program?

A17. One important action was the retention of Management Analysis Company (MAC) in August 1982, to help identify opportunities for improvement. MAC made 167 recommendations to us, 164 of which we adopted. We have completed implementation of all but 6 of those recommendations. In addition, we have made other changes based upon our own analysis of our needs. By doing so we have substantially improved our QA/QC program.

For example, QA engineers have been assigned to the three plant sites to provide additional technical expertise and to enhance communications with the plant staffs. Various functions such as vendor surveillance, QA auditing, QA training, administrative support, and QA engineering have been consolidated under the QA Services Section. The on-site QA surveillance program has been strengthened by placing more emphasis on plant operations, health physics, security, and special evaluations requested by the Project Managers and Plant General Managers. At both of the operating plants, on-site QA/QC monitors and verifies changes to the Technical Specifications. A videotape on quality performance for use in the General Employee Training Program has been developed and is in use. The QA Services Section has had additional engineers and specialists assigned to its organization, thereby increasing the Section's capability to support the nuclear plants.

Q18. Mr. Banks, please briefly summarize CP&L management's position on quality assurance.

A18. I, as Manager - Corporate Quality Assurance Department, am responsible for the implementation of the approved Corporate QA Program. In that respect, QA and QC activities are independent from scheduling and production commitments. The managers of QA/QC activities under me have sufficient authority and organizational freedom to identify quality problems; to initiate, recommend, or provide solutions; and to verify implementation of solutions.

I report directly to Mr. Utley. I also have the authority to communicate directly with other corporate management up to and including the Chairman/President/Chief Executive Officer and, if appropriate, with the Board of Directors to resolve any quality assurance concerns which cannot be resolved satisfactorily at a lower management level. CP&L management has made substantial efforts to instill in our personnel a commitment to the philosophy of Quality Assurance. We want all individuals on the CP&L team, whether they be craftsmen, operators, engineers, managers or QA personnel, to understand that quality assurance is each individual's responsibility and that the Quality Assurance program is designed to help every individual achieve his maximum level of effectiveness and thereby meet our goals of safety, reliability and economy.

Q19. Mr. Utley, in your opinion, are the organizations and programs at CP&L, including those which have been described thus far, adequate to translate CP&L's corporate commitment to nuclear safety into safe operations at its nuclear plants?

A19. Yes. Moreover, the recent management reorganizations that placed senior managers at our nuclear plants will make it easier to integrate assistance of all site support groups when problems arise and to improve further the flow of information between management and operations personnel.

Q20. How does CP&L respond to violations proposed by the NRC?

A20. The regulations of the NRC provide the framework within which a response to proposed violation should be structured. The licensee is required to acknowledge or deny the violation as proposed, explain the cause of a violation which is acknowledged, identify the actions that it intends to take to correct the violation and to prevent the recurrence of similar violations, and specify a date by which compliance will be achieved. The approach used by CP&L in developing our substantive responses is to seek the root cause of a violation and take corrective actions that will address the perceived cause, rather than merely the symptoms, of the violation. Where, for example, a violation relates to a deficiency in management control or training, the remedial actions proposed are likely to involve commitments to strengthen the relevant aspect of the management organization or training program. We use this approach in responding to violations of all severity levels.

In 1982, the NRC imposed a substantial civil penalty against CP&L for what it perceived as programmatic weaknesses that led to violations of Technical Specifications for missed surveillance testing at the Brunswick plant. Mr. Howe and Mr. Dietz will testify in detail about those events and the corrective actions we took in response. I would like to mention it here, however, because I believe it illustrates well the process I have just described.

The NRC and CP&L viewed the specific errors that occurred as evidence of programmatic deficiencies in the management controls over the Brunswick plant. CP&L, therefore, undertook a comprehensive program of actions designed to correct the immediate deficiencies, i.e., the symptoms, and to ensure that the programmatic weaknesses, i.e., the root causes of the violations, would be remedied.

The proposed CP&L actions for long-range improvement were ultimately formalized in the Brunswick Improvement Program, a copy of which was submitted to the NRC. On December 22, 1982 the NRC's Office of Inspection and Enforcement issued Confirmatory Order EA-82-106 requiring CP&L to implement the Brunswick Improvement Program. CP&L responded to the Confirmatory Order on January 10, 1983 by providing the NRC with a schedule for implementation of each task identified in the Brunswick Improvement Program and by submitting copies of the outside consultants' studies performed in connection with this improvement effort. A formal corporate program has since been in place to ensure satisfactory completion and implementation of the items identified in the Brunswick Improvement Program.

An investigation was also carried out at Robinson and at Harris to ensure that similar problems did not exist at those facilities. We did not find any such problems. Nevertheless, we instituted a formal program of stricter management controls at Robinson similar to the Brunswick Improvement Program which we call the Robinson Long-Term Improvement Program. We submitted this Program, including a schedule for its implementation, to the NRC in March 1983. We have already implemented many of its provisions and are completing the rest. A similar program was also developed for Harris.

The Brunswick Improvement Program incorporates the recommendations of INPO resulting from a "special assistance visit" to CP&L in September 1982 during which activities at the Brunswick site and the corporate office were evaluated.

Also as part of the Brunswick Improvement Program, two studies were conducted by an independent consultant, Management Analysis Company (MAC). One study reviewed outside demands on the plant staff and made recommendations for reducing such demands in order to allow more attention by plant staff to operations and maintenance. This study was conducted during the fall of 1982. CP&L has either implemented or committed to implement many of MACs recommendations. With respect to the remainder of the recommendations, we were satisfied, upon review of them, that their objectives were being met by programs already in place.

MAC also conducted a detailed review of the Corporate QA program as Mr. Banks mentioned. This review encompassed the overall corporate program, as well implementation of that program at all three nuclear plant sites.

We made several organizational changes for the Brunswick plant to provide 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. The comprehensive actions undertaken in the Brunswick, Robinson, and Harris Improvement Programs reflect the corporate philosophy of taking all reasonable action to ensure that the root cause of a problem is identified and corrected. The progress of the comprehensive self-appraisal, the implementation of improvements and the results of organizational changes have been monitored very closely by CP&L senior management.

Q21. Mr. Utley, what evidence is there that CP&L's methods of conducting its nuclear operations, including the remedial measures and organizational changes CP&L has instituted, are having positive results?

A21. I am confident that our nuclear operations will be even stronger as a result of the recent comprehensive improvement programs and organizational restructuring we have instituted. Many of these improvements are intangibles that cannot easily be measured quantitatively. An example is the significant improvement in the morale of personnel at the Brunswick plant which I can see. Moreover, as I stated, one of the objectives of the improvement programs at our plants and our on-going consolidation of responsibility for nuclear operations is to achieve, in the long term, significant improvements in the management and conduct of our nuclear program. For this reason, it is reasonable to expect, and I do expect, that many positive results of our efforts of the past two years will become evident throughout the years to come. Nevertheless, there are, today, tangible examples which taken together demonstrate the effectiveness of the manner in which we are conducting our nuclear program.

At the Brunswick plant, for example, there have been improvements in our operations which are indicative of the success of the various improvement programs that have been instituted there. The number of NRC notices of violation issued with respect to Brunswick has decreased. There also has been an overall reduction in the severity level of the violations that have occurred.

We have made a concerted effort to improve our program of training of our reactor operators at Brunswick. The success of these efforts is illustrated by the improved examination results achieved at Brunswick since January 1983.

We can also point to specific plant programs to illustrate improvements that have occurred at the plants. The NRC's Systematic Assessment of Licensee Performance (SALP) report for the period of January 1, 1982 through January 31, 1983, while critical of some aspects of CP&L's nuclear operations, did raise the rating of the health physics programs at both Robinson and Brunswick. The NRC evaluation of Robinson noted that "programmatic efforts to improve in the radiation protection area were evident in health physics controls." The report also noted an increased emphasis on preplanning training and the use of mock-ups. The Brunswick evaluation cited a successful ALARA program and identified improvements in the radiation protection program.

There is additional evidence of our management's commitment to building a quality program in health physics. The radiation exposure levels at Brunswick for 1983 were held about 30 percent below projected exposures and a similar reduction would have been obtained at Robinson if continued deterioration of the steam generators and resulting inspections had not produced increases in radiation exposure. Tighter controls have produced a significant reduction in the number of personnel contamination events at both plants, and sorting of radioactive materials has produced a significant reduction in solid waste volume at Brunswick. Once the waste volumes associated with the steam generator replacement have been accounted for, we are projecting radioactive waste volume reductions at that plant as well. A strong program of decontamination at both operating plants has reduced the size of radioactive contamination areas at both operating plants.

There have been positive results of the reorganization at our Robinson and Harris sites. Our steam generator replacement project at Robinson is progressing well due in part to the planning program and due in part to the assignment of an individual with total site responsibility to the project. At our Harris site, the transition from the construction program into a startup program has been quite smooth because an individual is now on site with total responsibility for directing the efforts of construction, startup and plant operations.

An audit of CP&L's management capabilities commissioned by the North Carolina Utilities Commission was published in December 1982 by the management consulting firm of Cresap, McCormick and Paget, Inc. (Cresap). While Cresap made several recommendations to CP&L for improvement of its operations at the corporate office and at the nuclear plants, it also found that in many respects CP&L is one of the best managed companies that the firm had audited in the past several years.

My visits to the plants and my participation in CP&L activities related to our nuclear operations have convinced me that we are continually improving our capabilities to run our nuclear plants. We have experienced low personnel turnover rates for the last several years at Robinson and the turnover rate has substantially improved at Brunswick in the last two years. This has significantly increased our base of experienced personnel. Personnel additions from outside CP&L also have been helpful in increasing our experience base. Morale is high at our nuclear plants. We are increasingly relying on new technologies to monitor operations, planned outages, and commitments.

Q22. Mr. Utley, what in your opinion is the single most important improvement in the way CP&L manages its nuclear program?

A22. In my opinion the most significant improvement is the consolidation of all activities at each nuclear plant under the direction of a senior manager who is located at the plant site. By organizing in this way, we have a single individual who is accountable for virtually everything that happens at his plant. This provides for better discipline over all aspects of plant operations and facilitates better establishment of priorities. Perhaps the greatest benefit of the structure is that because our project managers are at their sites, they can see for themselves, first hand, what the conditions are when a problem arises; and they can react immediately. Moreover, because they have the authority to act for the Company, they can make prompt decisions on behalf of the Company. This greatly increases the time within which corrective actions can be decided upon and implemented.

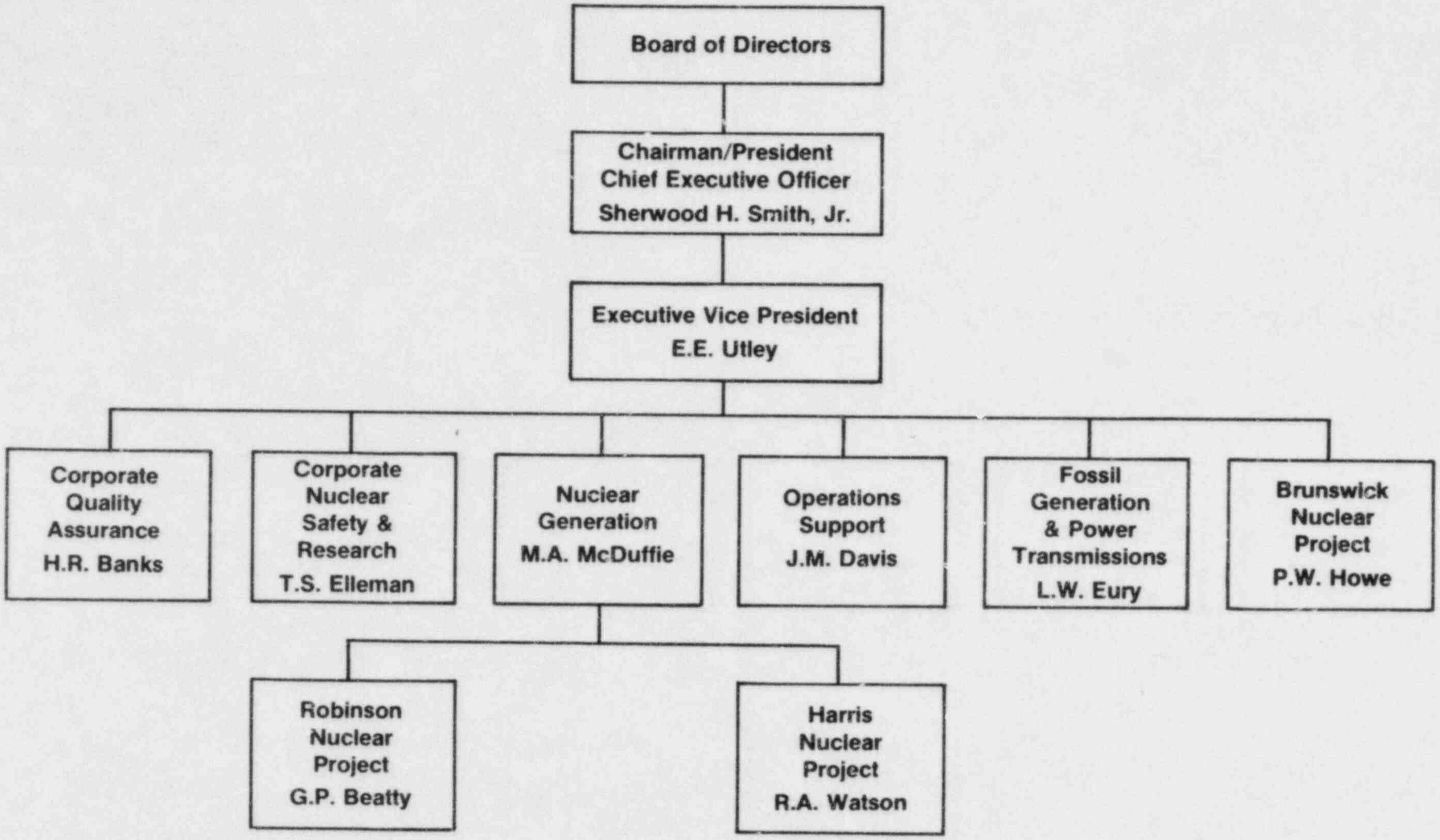
Q23. Mr. Utley, in your judgment, is CP&L's nuclear organization structured properly to manage effectively the operations of CP&L's nuclear facilities in a safe and prudent manner?

A23. Given the managerial requirements associated with nuclear power today, I believe that CP&L has the right organization, both in terms of staffing and in terms of structure, to manage CP&L's nuclear facilities in a safe and prudent manner. We will continually evaluate our organization and refine the structure further when it is appropriate to do so. Should circumstances in the industry, or for CP&L specifically, change significantly, we will certainly examine the question of whether our organization should change. If, for example, the amount of modifications necessary to be made substantially decreases, the current structure may no longer be necessary. The key is to be flexible and to remain capable of adapting to changing circumstances.

Q24. Does this conclude your testimony?

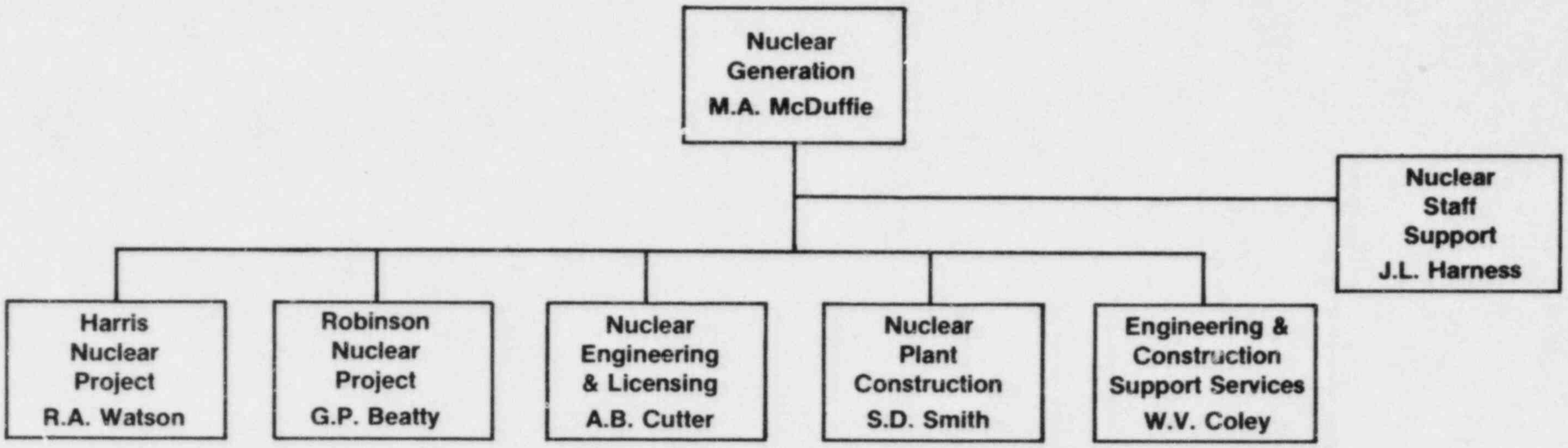
A24. Yes, it does.

CORPORATE NUCLEAR ORGANIZATION



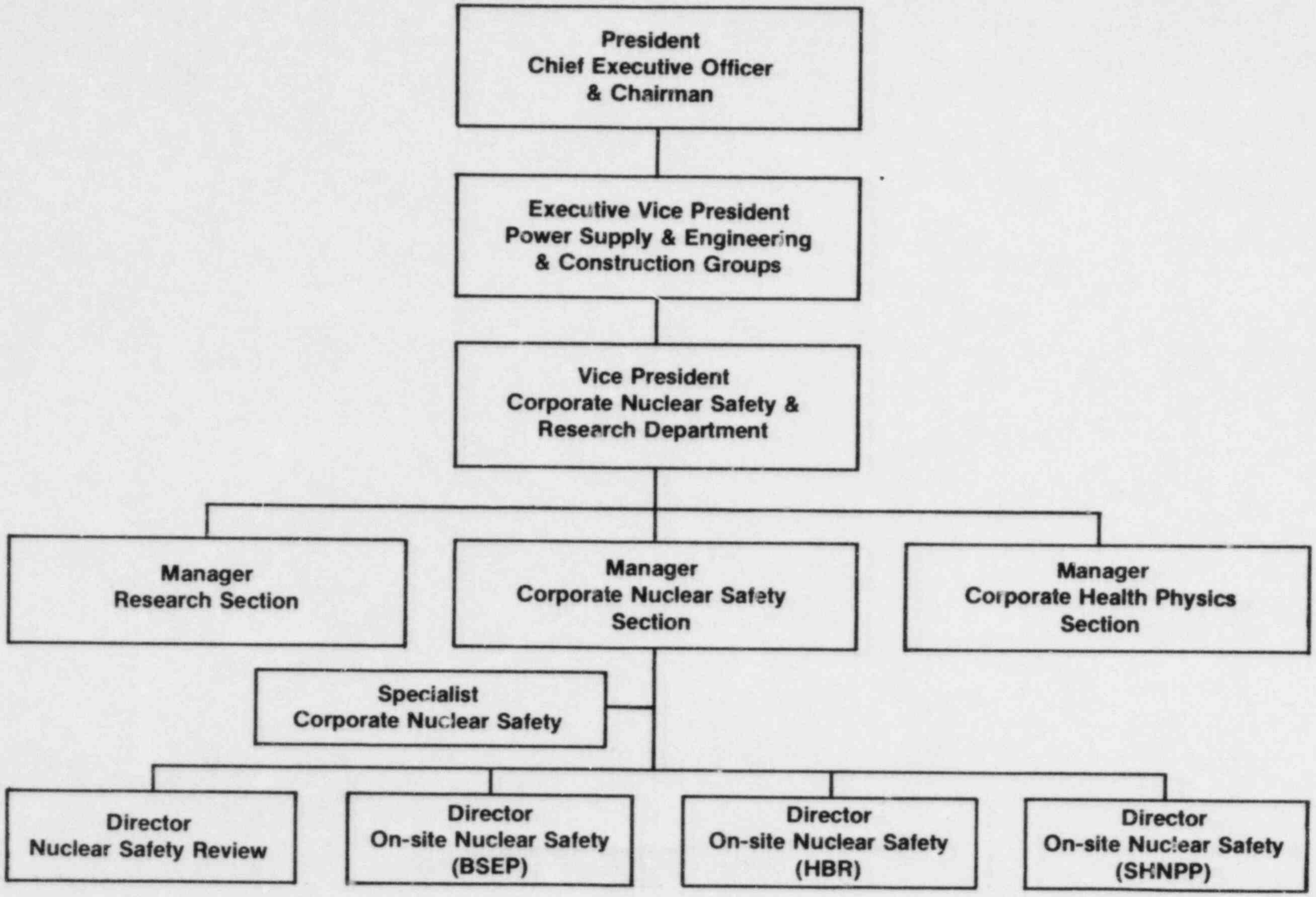
Utley et al. Attachment 1

NUCLEAR GENERATION GROUP



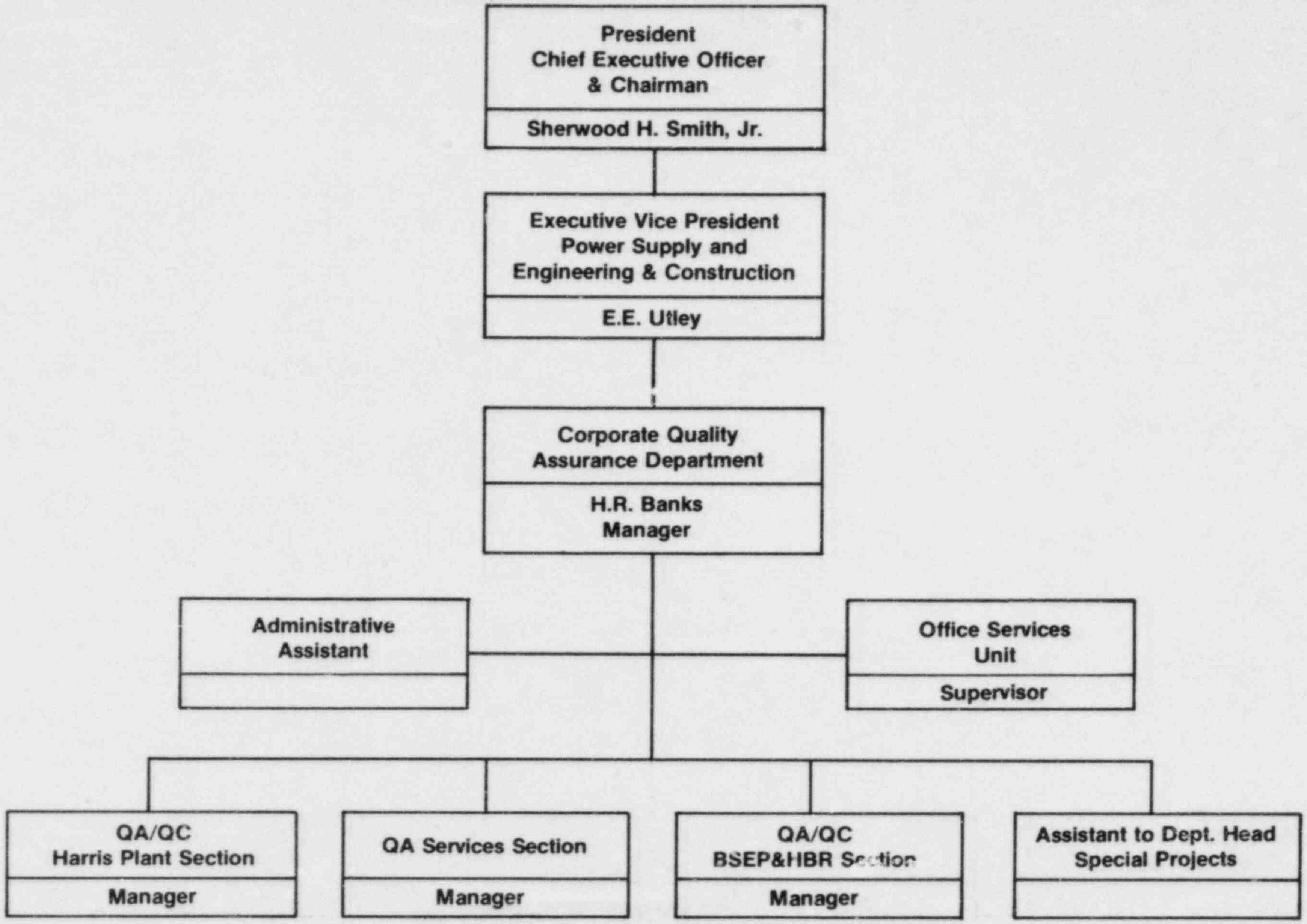
Utley et al. Attachment 2

CORPORATE NUCLEAR SAFETY & RESEARCH DEPARTMENT ORGANIZATION



Utley *et al.* Attachment 3

CORPORATE QUALITY ASSURANCE DEPARTMENT ORGANIZATION



Utley et al. Attachment 4

RELATED CORRESPONDENCE

August 9, 1984

DOCKETED
USNRC

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY	)	
AND NORTH CAROLINA EASTERN	)	Docket No. 50-400 OL
MUNICIPAL POWER AGENCY	)	
	)	
(Shearon Harris Nuclear Power Plant,	)	
Unit 1)	)	

APPLICANTS' JOINT TESTIMONY OF
PATRICK W. HOWE AND C. R. DIETZ ON JOINT
INTERVENORS' CONTENTION I (MANAGEMENT CAPABILITY)

JOINT TESTIMONY OF
PATRICK W. HOWE AND C.R. DIETZ

Q1. Please state your name, business address, and position of employment.

A1. Howe:

My name is Patrick W. Howe. My business address is P.O. Box 10429, Southport, North Carolina. I am Vice President - Brunswick Nuclear Project with Carolina Power & Light Company (CP&L).

Dietz:

My name is C.R. Dietz. My business address is P.O. Box 10429, Southport, North Carolina. I am General Manager - Brunswick Plant with CP&L.

Q2. Will you please describe your educational background and professional experience?

A2. Howe:

I graduated from The Citadel with a B.S. degree in chemistry in 1951. From September 1951 to February 1956, I held positions as Laboratory Supervisor with E.I. Dupont de Nemours & Company, Inc., at the Savannah River Plant in Aiken, South Carolina. From August 1957 to June 1966, I served as Department Head at the Lawrence Radiation Laboratory, University of California at Berkeley. In 1967 I accepted the position of Chief, Site Environmental and Radiation Safety Group - Division of Reactor Licensing, with the United States Atomic Energy Commission in

Washington, D.C. I served in this position until March 1971 when I joined CP&L as Manager of the Environmental and Technical Services Section. In February 1974 I assumed the position of Manager of the Licensing & Technological Services Section and in February 1975 I became Manager of CP&L's Special Services Department. In December 1976 I was named Vice President - Technical Services Department. I assumed my present position as Vice President - Brunswick Nuclear Project in September 1982.

Dietz:

I graduated from Montana State University in 1963 with a B.S. degree in chemical engineering. Following graduation I worked from 1963 to 1965 as a reactor engineer at the Phillips Petroleum Company Atomic Energy Division in Idaho Falls, Idaho. In that position I was responsible for operations, refueling, and experimental test control at the Materials Testing Reactor. From 1965 to 1968, I held various positions at the Piqua Nuclear Power Plant in Ohio, including that of Assistant Plant Superintendent. I was a licensed Senior Reactor Operator (SRO) at that plant. From 1968 to early 1981, I was employed by the General Electric Company (GE) in a variety of positions, including Startup Engineer, Training Supervisor, Operations Superintendent, Operations Manager, and Manager of Operator Training. I worked at a number of project sites, including GE's Morris, Illinois facility, Nine Mile Point, Cooper and Brunswick.

I joined CP&L in 1981 as Plant General Manager of the Brunswick plant.

Q3. What is the purpose of your testimony?

A3. The purpose of our testimony is to describe the management and staffing of CP&L's Brunswick Nuclear Project Department. We will concentrate on those aspects of the organization and past experience at Brunswick that relate to CP&L's capability to operate the Brunswick plant safely, efficiently, and in compliance with the regulations of the Nuclear Regulatory Commission (NRC).

Q4. What is the departmental mission of the Brunswick Nuclear Project Department?

A4. It is the mission of the Brunswick Nuclear Project Department to manage the operations, maintenance and modification of the Brunswick nuclear plant in such a manner as to promote its safe, reliable, and economic operation. We strive to perform this mission in accord with regulatory requirements, Institute of Nuclear Power Operations (INPO) performance criteria and good practices, and CP&L corporate requirements. In so doing, the Department coordinates activities with all of the other groups in Power Supply, Engineering & Construction (PSE&C) and assumes responsibility for the performance and control of the Brunswick Plant. The Department has a dual objective of achieving the highest standards of operating performance and ensuring the safe operation of the plant.

Q5. Please describe the structure of the organization of the Brunswick Nuclear Project Department.

A5. The Brunswick Nuclear Project Department is headed by a Project Vice President, located at the plant, who coordinates all site activities. The managers of each of the four major site sections report to the Project Vice President. They are: the General Manager - Brunswick Steam Electric Plant; Manager - Engineering & Construction; Manager - Outages; and Manager - Site Planning & Control. A chart setting forth the current organization structure is Howe-Dietz Attachment 1.

In addition to these organizations which 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 team. These are the on-site Corporate Nuclear Safety, Corporate Quality Assurance, Nuclear Training and Employee Relations units. These units work very closely with line organizations at the site to assist in ensuring the safety of our operations, the quality of our performance, the coordination of operator and craft training and the recruiting and retention of qualified staff personnel. The activities of the Corporate Nuclear Safety and the Corporate Quality Assurance units are discussed in greater detail in the testimony of Messrs. Utley, McDuffie, Elleman and Banks.

Q6. Mr. Howe, how has the current structure of the Brunswick management organization evolved?

A6. Mr. Utley, in his testimony, has reviewed the evolution of CP&L's management structure for its nuclear plants. I would like to emphasize a few aspects of that development. In 1982, the Brunswick project was reorganized. I was assigned to the site as Project Vice President. I report directly to Mr. Utley, the Executive Vice President - Power Supply, Engineering & Construction. In this role, I have authority and responsibility for all engineering, construction, operation and maintenance activities at the plant. This organizational structure provides greater management control of these activities, allowing greater ability to identify and resolve problems that may occur.

In early 1984, this structure was further refined with the consolidation of several separate work functions into two new sections under my direction: the Outage Management Section and the Site Planning and Control Section. The primary objective of this reorganization was to enhance the safe operation of the plant through firmer management control. This reorganization also was a major step towards integrating the management functions of the department. This action allows me as Project Vice President to be more involved in plant operations, including support activities, and allows the General Manager to concentrate on the operation and maintenance of the generating units.

Q7. Mr. Howe, what are the responsibilities of the Sections which report to you?

A7. The Plant Management Section has the primary responsibility, through the five units of the section (Operations, Maintenance, Regulatory Compliance, Environmental and Radiation Control, and Technical and Administrative Services), for the day-to-day management and control of the plant facility. The five units of this section are grouped under the Plant Manager to consolidate operations control. Through the activities of these units, and in coordination with the other sections and groups, the Plant General Manager manages the operation and maintenance of the equipment and facilities. Above all, the Plant Management Section is responsible at all times for the safe operation and maintenance of the Brunswick facility.

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. The section works closely with other project organizations, particularly the site's Outage Management Section. E&C has first-line responsibility for carrying out the modification projects required for the plant. It does so through two units: Engineering and Construction.

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. These activities require close coordination with the other on-site organizations as well as organizations headquartered in the corporate office. It is the responsibility of this Section to sustain a continual planning process for major outages and to respond during outages with the resources needed to conduct the outages in the most economical way, consistent with regulatory requirements.

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. These activities include coordination of long-range planning and scheduling, budgeting, cost monitoring and reporting, program planning, and industrial engineering.

Q8. You have outlined your background and experience. Please describe the qualifications and experience of the other Managers at Brunswick.

A8. The Manager - Engineering & Construction, Mr. T.H. Wyllie, holds a bachelor's degree in civil engineering, is a registered professional engineer, and has 35 years experience in power plant construction. During his career, he has had over 20 years of managerial and supervisory experience. Mr. Wyllie worked for Ebasco Services, Inc. from 1948 through 1972 on a variety of fossil and nuclear power plant construction projects. He joined CP&L in 1972 as Site Manager of the Harris construction site. In 1975 he was promoted to Manager - Nuclear Construction, and in 1981 became Manager - Engineering and Construction at the Brunswick and Robinson plants. In 1982, Mr. Wyllie moved to the Brunswick plant and assumed his current position.

The Manager - Outages, Mr. J.R. Holder, holds a bachelor's degree in mathematics and physics and has over 18 years experience in the nuclear industry. Mr. Holder was employed by CP&L from 1973 through 1976 and held various positions including the position of Superintendent of Startup and Test at the Brunswick plant. In this position, Mr. Holder directed the original startup efforts for Brunswick Unit 2. From 1976 through 1982, Mr. Holder was employed by Washington Public Power Supply System in Richland, Washington, where he served as Manager of Technical Services in the operating organization. Mr. Holder returned to CP&L in 1982 as the Assistant to the Vice President of the Brunswick Nuclear Project.

The Manager - Site Planning and Control, Dr. G.J. Oliver, holds a bachelor's degree in physics, master's degrees in nuclear physics and economics, and a doctorate in radiological hygiene. He is a licensed SRO and a Certified Health Physicist. Prior to joining CP&L, Dr. Oliver was employed by North Carolina State University as a staff member in the Physics Department from 1970 to 1973. Dr. Oliver joined CP&L in 1973 as a Health Physics Specialist and was promoted to Senior Specialist in 1975, Project Specialist in 1978, Manager - Environmental & Radiation Control for Brunswick in 1980, Assistant to the General Manager in 1983, and to his current position in 1984.

A table setting forth the qualifications and experience of the key individuals on the Brunswick Nuclear Project management team is Howe-Dietz Attachment 2.

Q9. You stated that the Plant Management Section is responsible at all times for the safe condition of the Brunswick facility. Please elaborate.

A9. The Plant General Manager has overall responsibility for the safe operation of the plant through the five units that report to him. All operation activities are subject to his control. The Plant General 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.

Two of the units of the Plant Management Section are devoted entirely to safety related matters. They are the Regulatory Compliance Unit and the Environmental and Radiation Control Unit.

The Regulatory Compliance Unit is responsible for assisting other plant organizations to ensure compliance with all regulatory requirements. The Unit's specific responsibilities include: (1) coordinating and monitoring site activities related to resolving NRC, Corporate Nuclear Safety, Quality Assurance (QA) and INPO concerns; (2) coordinating activities related to fulfilling commitments to the NRC; and (3) ensuring that accurate responses to NRC communications are submitted, that reportable occurrences are detected and reported, and that documentation of regulatory compliance matters is maintained.

The Environmental and Radiation Control Unit is responsible for providing the environmental and radiation control necessary for the safe operation of the plant within plant Technical Specifications and applicable state and federal regulations. These responsibilities include planning, organizing and directing the chemical control and environmental surveillance programs of the plant as well as providing the specialized technical support and surveillance required for the plant radiation control program. These activities are directed at ensuring that there is no adverse impact on the health and welfare of the public or plant personnel as a result of plant operations, and ensuring that radiation exposure is controlled and maintained at as low as reasonably achievable levels (ALARA).

Q10. Mr. Howe, how do the various sections at Brunswick coordinate with each other?

A10. Effective communications are important to the safe and efficient operation of the Brunswick project, not only on site, but between the project and corporate management. In my position as Vice President of the Brunswick Nuclear Project, I represent corporate management at the site and am the principal link between the plant management and the corporate office. I talk with Mr. Utley almost daily to review with him the status of the plant and any significant problems that may require his attention. In addition, I participate in a monthly Nuclear Project senior management meeting involving the other Nuclear Project Department managers and senior management personnel from the general office. These meetings provide me the opportunity to discuss first-hand with these management personnel the status of any support efforts that the Brunswick project may have requested. It also allows me to meet with other Nuclear Project managers to exchange information so that we can all improve our operations based on our common experience.

Since I assumed my position at Brunswick, I have placed significant emphasis on ensuring that adequate communication and coordination are being achieved among the various organizations at the plant. I encourage a candid exchange of information in all of our communication.

There are several regularly scheduled meetings conducted on-site. These meetings include a daily coordination meeting, conducted by the Plant General Manager, which I attend. All of the section managers on-site attend this meeting. The purpose of this meeting is to review plant status, events and/or trends of the past 24 hours, and review any action items that are necessary to ensure overall coordination of our work activities. During major plant outages, we also hold outage meetings on a daily basis to review the status of outage activities and ensure proper coordination of outage activities. Monthly site management meetings are attended by all of the project managers, supervisors, foremen, other professional personnel and myself. Corporate Nuclear Safety, Corporate Quality Assurance, and nuclear training personnel also participate.

My management team and I recognize that planned meetings are only a tool for facilitating communications. To be effective, communications must be a continuing day-by-day and moment-by-moment process. Therefore, my management team tries to promote communications on a continuing basis in an effort to ensure that all of the plant activities are carried out effectively with a high degree of team work and coordination.

In addition to formal meetings, therefore, other plant management personnel and I frequently tour the plant to observe plant conditions and work activities first-hand.

Such tours include a required tour by the Shift Foreman on each shift and a required weekly tour by the managers and unit directors. These tours provide an opportunity for discussion with plant personnel from all levels of the organization and assist in promoting a free exchange of ideas and concerns.

Q11. What is the philosophy of the conduct of operations at Brunswick?

A11. At the Brunswick plant, we have a strong commitment to a rising standard of excellence in all aspects of our nuclear activities. We give all symptoms close scrutiny. We search for root causes to problems and take the necessary management action to correct those root causes. We try to promote effective communication and coordination across all lines and levels of responsibility, with plant management encouraging and monitoring such communication and coordination. We recognize the importance training plays in the successful operation of a nuclear power plant; thus, we place emphasis on both technical and managerial training for our staff.

Perhaps most importantly, we are trying to encourage a personal commitment from each employee. We demand that people think, we demand attention to detail and we hold people accountable. Our standards of performance are understood and appreciated throughout all levels of the organization. We will continue to strive to maintain a disciplined, professional and well-trained staff.

Q12. What has been the overall performance of the Brunswick plant since the reorganization of the Brunswick Nuclear Project occurred?

A12. Due in part to the reorganization and, in part, to efforts which were initiated several years ago, 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 Licensee Event Reports (LERs) and NRC notices of violation issued, reductions in radioactive waste produced, reductions in radiation exposures of plant workers, improvement in plant systems and equipment, and overall improvement in employee morale.

We continue to maintain an excellent record in industrial safety as we have for many years. This year's (1984) accident statistics are some of the lowest in our history, with a frequency of 6.09 non-lost time accidents per million man-hours and no lost time accidents at Brunswick.

Q13. Prior to the reorganization, some problems had been experienced at the Brunswick plant. Please discuss these.

A13. At various times prior to the reorganization, problems were experienced 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.

Q14. Has CP&L taken appropriate corrective action to address these problems?

A14. Yes. We have had improvement efforts underway at Brunswick in a number of areas for several years. These include improvements in our staffing levels, health physics, maintenance and operations. We believe these improvement efforts have been successful and have resulted in a significantly improved level of overall performance at the Brunswick plant.

Q15. What is the current staffing at Brunswick?

A15. The current authorized staffing level for the Brunswick plant 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.

Q16. How does your current staffing level compare with historical staffing levels for the Brunswick plant?

A16. The staffing levels at Brunswick have grown significantly since commercial operation of the plant. The growth of the operating staff is illustrative. In 1975, when the first of the two units achieved commercial operation, the operating staff at the Brunswick plant consisted of approximately 187 people. By 1979, the operating staff had grown to 320. Growth since 1979 has been significant. This growth is illustrated by the table below, which sets forth the approximate size of the Brunswick plant operating staff at the middle of each year listed.

Brunswick Plant - Operations Staff Size

Year	Size
1980	400
1981	440
1982	600
1983	790

Q17. Have there been any periods in the past when the staffing levels at the Brunswick plant were not adequate?

A17. There has been no time in the past when our staffing levels were not adequate to ensure the safe operation of the facility. Looking at our past experience, however, we do recognize times when the work load at the plant, due to increasing regulatory requirements and our efforts to implement reliability improvement modifications, has been greater than our ability to accomplish that work in the time frame that we would have considered most desirable. We have taken action, however, to increase the staff and as the above table illustrates we have been successful in recruiting the personnel we needed.

To some extent, staffing levels historically have also 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 for the Department in 1983 was only 5.7 percent compared to 9.5 percent in 1981. The reduction in the rate of turnover has been due to a number of factors, the most significant of which include improvements in our wage, salary and benefit structure and a higher degree of employee morale.

Q18. Is the current staffing level adequate to ensure safe operations of the Brunswick facility?

A18. Yes, it is. Our staffing level is adequate to ensure that the plant is operated and maintained safely, and to enable us to implement effectively the various regulatory and plant improvement modifications necessary to promote the continued safe and reliable operation of the plant.

Q19. What improvements have been made in the health physics program at the Brunswick plant?

A-19. As just discussed, staffing levels at Brunswick began to increase significantly after 1979. In late 1979 and early 1980 we realized that our health physics program was not coping as well as we would have liked as we increased the number of personnel at the site. We realized that improvements were necessary.

Our initial step was the establishment of the position of Manager of Environmental and Radiation Control (E&RC). This position was initially filled by Dr. G.J. Oliver, whose background (B.S. and M.S. degrees in physics, an M.S. degree in economics, and a Ph.D. degree in radiological hygiene) and experience we have already discussed.

In December 1980, we instituted organizational changes in the health physics program. As part of these changes, the functions of health physics and chemistry were divided so that personnel in each area could devote full-time attention to each of these specialities. We hired more health physics and chemistry technicians, and expanded the professional and supervisory health physics and chemistry staff. The net effect was approximately a 50 percent increase in the staff of this organization at the Brunswick plant.

We expanded and improved the training programs for health physics personnel and health physics training for all other employees. We also implemented a qualification card program for chemistry and health physics technicians in order to further ensure that these personnel were fully qualified to perform the duties to which they were assigned.

As a result of these efforts, noteworthy improvements in health physics have been achieved. The effectiveness of these improvements were recognized in an NRC report entitled "Health Physics Appraisal Program" (NUREG 0855). This report, published in March 1982, was based upon results of the Power Reactor Health Physics Appraisal Program initiated by the NRC in 1980. As a part of this program, the NRC analyzed radiation protection programs at 48 commercial nuclear power plants. The objectives of the program were: (a) to determine if the plants had adequate radiation protection programs; (b) to determine whether the plants had incorporated the lessons learned regarding radiation protection from the Three Mile Island accident; and (c) to identify generic radiation protection problems.

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.

Subsequent to implementation of these programs, Dr. Oliver was succeeded in the position of Manager of E&RC by Mr. A.G. Cheatham. Mr. Cheatham joined CP&L in June 1982. Prior to that time, he had accumulated approximately 20 years industry experience in the area of health physics and radiation control. He served as a Radiological Control Supervisor with Morrison and Knudson Company, Inc.; Radiological Control Supervisor at the Knolls Atomic Power Laboratory in Windsor, Connecticut; and for four years prior to joining CP&L, he was the Radiological Services

Supervisor at the Millstone Nuclear Power Station of Northeast Utilities.

Q20. Please discuss improvements in operations at the Brunswick plant.

A20. Since late 1979, we have made significant improvements in the operations area. Prior to that time, the operating shift consisted of one Shift Foreman responsible for the operation of both units and the radwaste system. This concept was changed in late 1979 when we revised the organization 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 allowed us to reduce the span-of-control of the Shift Foreman so that he could devote more attention to supervision and to on-the-job training of operators, and could maintain a better overview of all aspects of plant operations, such as equipment out of service and maintenance in progress.

In early 1981, we further modified the organization by establishing 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.

During this time we continued to make concerted efforts to increase the staffing level and qualifications of our operators. We currently have a full operating staff and have implemented a sixth shift rotational concept for our operators.

Q21. Please discuss the sixth shift rotational concept.

A21. Each operating shift at Brunswick consists of a Shift Operating Supervisor who is responsible for the operations of both units. Reporting to the Shift Operating Supervisor are two Shift Foremen, one responsible for each unit. The staff under each Shift Foreman consists of 1 Senior Control Operator, 1 Control Operator, 1 Senior Auxiliary Operator and 5 Auxiliary Operators. This arrangement 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.

In addition to the complement of operators discussed above, we also have on each shift at least two health physics technicians and at least one environmental and chemistry technician. As I previously indicated, radwaste system operations are staffed separately from the plant operating shift.

Q22. Please discuss improvements in training at the Brunswick plant.

A22. Operator training programs have been expanded to compensate for additional operating personnel and to enhance the training being provided to the existing staff. Our operator training staff has doubled since 1980. All of the operator instructors hold SRO licenses and have been certified as instructors. Additional heat transfer and fluid flow training was added to our program in 1980. In 1982, we increased simulator training time for initial training by 100 percent and by 33 percent for retraining. We also implemented a revised training program for auxiliary operators for classes which began in 1983.

Operator training and operator retraining have also been upgraded substantially by the use of our new training center which houses our plant specific simulator. Installation of the simulator was completed in February 1984, and the simulator has been used extensively since that time in initial operator training, retraining, emergency procedure training, and systems training for supervision and management. This simulator has received high marks from all the students, and we are very enthusiastic about its role in our future. In addition, we offer more training to maintenance, health physics and chemistry personnel.

Another training tool that has been effective is real time training (or on the job training). We have developed the capacity to provide specific training to operation, maintenance and environmental and radiation control personnel in real time, that is, 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 that our people should know about. Information of less immediate significance is conveyed through off-shift training. The sixth shift concept, which allows for both a relief shift as well as a training shift, enhances our off-shift training program. The training shift is needed for annual retraining and real time training efforts.

Not only are our people trained in their areas of technical responsibility, but they also are trained to be knowledgeable of the other work going on in their work area so that they can be of assistance to their co-workers should the need arise. In the discussion above, we have highlighted some of the more significant aspects of training at Brunswick. Other CP&L witnesses will address training in greater detail.

Q23. Have the training programs implemented at Brunswick been effective?

A23. Yes. We have improved our performance in NRC license examinations and NRC requalification examinations administered since January 1983. Twelve of sixteen candidates for reactor operator examinations have passed and sixteen of twenty candidates for the senior reactor operator examination have passed. Brunswick reactor operators and senior reactor operators have successfully passed the NRC administered requalification examination. The average scores have ranged from 80.79 to 88.3 for the different examinations.

Q24. What level of reductions have you achieved in radwaste generation?

A24. Our level of radwaste generation in 1983 was about half of what it was in 1980. This reduction is due to several organizational, equipment, and administrative improvements that have been implemented during this time. For example, due to improvements in our organization and training, there is better planning and control of radwaste processing and radwaste inventories. Maintenance improvements have resulted in reductions in inleakage to the radwaste systems. We have improved the radwaste processing system, thereby improving its performance. Administrative changes have improved controls to prevent unnecessary materials from being taken into contaminated areas. Finally, improved planning of modifications and maintenance has minimized the amount of radwaste generated during such activities. These radwaste reductions are particularly significant when you consider that they occurred during a period in which there was a high level of plant modification activity. I believe the level of radwaste reduction would have been significantly greater had this not been the case.

Q25. CP&L's failure in 1982 to comply with certain Technical Specifications resulted in a $600,000 fine by the NRC. What actions has CP&L taken to remedy this problem and to ensure it does not reoccur?

A25. In June 1982, CP&L discovered that a Technical Specification requirement relating to surveillance testing of a relay in Brunswick Unit 2's auxiliary power distribution system had not been implemented. The NRC determined that this error was the result of programmatic weaknesses in the management of the Brunswick plant. We were very concerned that the test had been omitted and about the finding of programmatic deficiencies. Accordingly, we immediately established a team to review Technical Specification surveillance requirements in order to determine if there were any other required surveillances that had not been fully implemented. Our survey of the entire Technical Specification requirements, consisting of some 2,000 separate surveillance tests, revealed three other surveillance requirements that had not been implemented. Upon testing, the affected systems were found to perform satisfactorily, so no compromise of public safety had occurred.

CP&L undertook a comprehensive program of actions designed to correct the immediate deficiencies and to ensure that the programmatic weaknesses would be remedied. The proposed CP&L actions for long-range improvement were formalized in a document known as the Brunswick Improvement Program, which was submitted to the NRC. As stated in the testimony of Messrs. Utley, McDuffie, Elleman and Banks, the Brunswick Improvement Program became a formal commitment under Confirmatory Order EA-82-106. CP&L provided the NRC with a schedule for implementation of each task identified in the Brunswick Improvement Program and submitted copies of the outside consultants' studies performed in connection with this improvement effort. A formal corporate program was put in place to ensure satisfactory completion of the items identified in the Brunswick Improvement Program. A conscientious effort has been made to complete the action items which comprise the Brunswick Improvement Program. The implementation of the program has been completed, and the completion was recognized by the NRC in April 1984.

Q26. What were the major objectives of the Brunswick Improvement Program?

A26. The Brunswick Improvement Program encompassed seven major objectives. They were:

(i) Ensure full and timely compliance with all surveillance requirements, regulatory commitments, and regulatory requirements.

(ii) Ensure that all necessary procedures (including those resulting from plant modifications and new requirements) exist and are clear, unambiguous, precise, complete, and of high technical quality.

(iii) Increase the frequency and scope of quality control surveillance and corporate auditing program activities.

(iv) Ensure that maintenance activities do not degrade or render inoperable any component, system, or instrument.

(v) Increase the proficiency of plant personnel by means of expanded training.

(vi) Utilize more effectively the technical expertise of the On-site Nuclear Safety and Corporate Nuclear Safety staff in enhancing the reliability of plant operations.

(vii) Undertake actions to enhance and strengthen the management control and organizational discipline necessary to provide for safe and reliable operation.

The Brunswick Improvement Program incorporated the recommendations of INPO resulting from a "special assistance visit" to CP&L in September 1982 during which activities at the Brunswick site and the corporate office were evaluated.

Q27. You stated that there has been a reduction in the number of LERs and NRC violations issued for the Brunswick plant. What reduction has been experienced?

A27. 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. We believe this improvement is a direct result of several factors including better accountability within 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.

As of July 31, 1984, Brunswick had experienced five NRC violations, all Category V. 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.

Q28. Please explain the reductions in radiation exposure to plant personnel.

A28. The annual exposure per individual at Brunswick decreased by 38 percent from 1980 to 1983. Several factors were instrumental in achieving radiation exposure reductions. First, we began using a computerized radiation exposure record and tracking system which identified adverse exposure trends. We have added additional personnel devoted to the implementation of the plant's ALARA programs. We have enhanced review of design and construction plans prior to installation. Finally, we encouraged a commitment by all levels of site personnel, especially first-line supervision and management personnel, to ALARA goals. Management will undertake to maintain, and improve if possible, these levels.

Q29. Are improvements being made at Brunswick in management methods?

A29. Yes. We have made many improvements in management methods and we believe that many of our techniques are changing for the better. We are, for example, in the process of developing a more structured long-range plan. This will aid us in accomplishing our work, including work that is regulatory in nature, more efficiently. We have instituted the ARTEMIS Computer Based Project Management System, which we are using to plan, monitor, and analyze projects. This system has proven its worth in the most recent Unit 2 condenser tube outage. The ability to control projects is a real enhancement to safety. We have also developed probabilistic risk assessment capabilities to ascertain the need for modifications and to assess the extent to which proposed "upgrades" to plant systems are likely to enhance the safe operation of the plant. We have increased our use of industrial engineering methods such as work management, work force sampling and manpower and resource planning, and we are finding that these techniques are providing line management firmer control over their organizations.

Q30. In summary, how would you characterize the organization at Brunswick?

A30. The organization at Brunswick is an organization with a strong commitment to excellence. The strength of this commitment is felt and appreciated throughout the organization. It is the ability to communicate this commitment effectively to the working levels that has resulted in improved performance at Brunswick. The large and complex dual unit facility requires a large and technically qualified staff for efficient operation, maintenance, and control. A greater spirit of coordination and teamwork has been developed among the various support organizations at the site. This attitude is reinforced by a continuous emphasis on effective communication among all levels of the project team. In addition, a greater emphasis on technical and management skill development has strengthened the individual abilities of our team members. We exercise strong management control and discipline over the operation of our facilities. These management concepts have been effectively executed as evidenced by our improved performance in plant activities.

Q31. In your judgment, is the organization which you have described effective in managing the operation of the Brunswick plant in a safe and prudent manner?

A31. Yes. As evidenced by our improved performance record, our outstanding safety record, and the increased sense of pride among our employees, we believe that the management team at Brunswick is highly qualified and effective. Due to management's commitment to continually improving all aspects of the plant's performance, everyone on the Brunswick team is working to make Brunswick the safest and most reliable plant possible. This kind of dedication and commitment on the part of the employees in our organization results in an operation that is efficient, safe and prudent.

Q32. How do you personally ensure that your philosophy of managing the Brunswick plant is being carried out?

A32. Howe:

There are a number of techniques by which I ensure the philosophy of the Brunswick project management is being implemented. Among these are my attendance at the daily management meeting, personal contacts with a variety of plant personnel, tours of the plant, the Regulatory Compliance Unit's "Facility Automated Commitment Tracking System," review of the Shift Status Report, special presentations by plant personnel and management, review of INPO evaluations, review of QA and NRC audits and inspection reviews, discussions with NRC staff management, review of SALP reports, evaluation of the plant's achievements against corporate and departmental goals, and participation in a broad variety of technical meetings.

In addition, there are various quantifiable indexes which I also use to measure our performance. Among these are: Licensee Event Reports, NRC notices of violation per inspector hours, volume of radioactive waste generated, radiation exposure records, industrial safety records, outage schedule achievements and scores on training program exams. Each and all of these assist me in maintaining a continuous assessment of how well the management philosophy for Brunswick is working. I am confident that the other managers of Brunswick and I will remain sensitive to these indicators of performance.

Dietz:

I utilize the same techniques as Mr. Howe. I keep abreast of plant activities by regular contact with plant personnel, both through scheduled meetings and through more informal communications, and by frequent tours of the plant. I have in the past, and will in the future, utilize QA to verify the implementation of procedures and programs we have initiated at the plant, i.e. to see that our programs are as we intend them to be. Finally, I carefully review analyses by outside organizations of our activities, e.g. INPO and the NRC, to assist me in evaluating our performance.

Q33. Does that conclude your testimony?

A33. Yes, it does.

BRUNSWICK NUCLEAR PROJECT ORGANIZATION

- **Vice President** Brunswick Nuclear Project
  - **General Manager** Brunswick Steam Electric Plant
    - Assistant to General Manager
    - **Manager** Operation
    - **Manager** Maintenance
    - **Manager** Environment & Radiation Control
    - **Manager** Technical & Administration
    - **Director** Regulatory Compliance
  - **Manager** Engineering & Construction
    - **Manager** Construction
    - Project Resident Engineer
  - **Manager** Outage Management
    - **Director** Planning & Scheduling
    - **Director** Outage Documentation & Reporting
    - **Director** Projects (Unit #1)
    - **Director** Projects (Unit #2)
  - **Manager** Site Planning & Control
    - **Director** Integrated Planning, Budgeting & Scheduling/ Long Range Planning
    - **Director** Financial Planning & Control
    - **Director** Organizational Performance & Forecasting
    - **Project Engineer** Industrial Engineering

Howe-Dietz Attachment 1

NAME	TITLE	DEGREE	BSEP SRO YES	BSEP SRO NO	CP&L EXPERIENCE BSEP	CP&L EXPERIENCE OTHER	CP&L EXPERIENCE TOTAL	USN	OTHER	TOTAL YEARS NUCLEAR EXPERIENCE
Howe	Vice President, Brunswick Nuclear Project	B.S. (Chem.)		X	2	11 1/2	13 1/2	0	19 1/2	33
Dietz	General Manager - Brunswick Plant	B.S. (ChE)		X	4	0	4	0	17	21
Wyllie	Manager - Engineering & Construction	B.S. (ChE)		X	2	10	12	0	5	17
Holder	Manager - Outage Management	B.S. (Math/Physics)		X	4 1/2	1 1/2	6	0	13	19
Oliver	Manager - Site Planning & Control	Ph.D. (Env. Eng.)	X		4	7	11	0	0	11
Tucker	Assistant to the General Manager	B.S. (EE)	X		8	4 1/2	12 1/2	3	0	15 1/2
Chase	Manager - Operations	B.A. (Pol. Sc.)	X		2	0	2	7	10	19
Dimmette	Manager - Maintenance	B.S. (Physics)		X	6	0	6	7 1/2	0	13 1/2
Cheatham	Manager - Environmental & Radiation Control			X	2	0	2	0	20	22
Hill	Manager - Technical & Administrative Support	B.S. (ME)	X		4	0	4	0	0	4
Enzor	Director - Regulatory Compliance	B.S. (EE)	X		12	0	12	0	4	16

Howe-Dietz Attachment 2

NAME	TITLE	DEGREE	BSEP SRO YES	BSEP SRO NO	CP&L EXPERIENCE BSEP	CP&L EXPERIENCE OTHER	CP&L EXPERIENCE TOTAL	USN	OTHER	TOTAL YEARS NUCLEAR EXPERIENCE
Groover	Project Construction Manager	B.S. (EE)		X	9	0	9	0	0	9
Peeler	Director - Planning & Scheduling		X		10 1/2	0	10 1/2	6	1 1/2	18
Coburn	Director - Outage Documentation & Reporting			X	12	0	12	0	0	12
Brown	Director - Unit Outage	B.S. (ME)		X	10 1/2	0	10 1/2	0	9	19 1/2
Wagoner	Director - IPBS Long Range Planning	B.S. (ME)		X	10	3	13	0	0	13
Snakenburg	Director - Organizational Performance and Forecasting	B.S. (IE)			1/2	0	1/2	0	0	1/2
Lipman	Director - Industrial Engineering	B.S. (IE)		X	3	0	3	0	0	3
Helme	Director - Onsite Nuclear Safety	M.S. (NE)		X	2	6 1/2	8 1/2			
Jones	Director - QA/QC	B.S. (Metal.E)		X	1 1/2	11	12 1/2	0	5	17 1/2
Hegler	Superintendent - Operations		X		10 1/2	0	10 1/2	7	0	17 1/2
Bishop	Manager - Technical Support	B.S. (NE)		X	10 1/2	1	11 1/2	0	1/2	12
Boyer	Director, Administrative Support	B.S. (EE)		X	3	0	3	0	0	3

Howe-Dietz Attachment 2

August 9, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY	)	
AND NORTH CAROLINA EASTERN	)	Docket No. 50-400 OL
MUNICIPAL POWER AGENCY	)	
	)	
(Shearon Harris Nuclear Power Plant,	)	
Unit 1)	)	

APPLICANTS' JOINT TESTIMONY OF GUY P. BEATTY JR.
AND RICHARD E. MORGAN ON JOINT INTERVENORS' CONTENTION I
(MANAGEMENT CAPABILITY)

JOINT TESTIMONY OF
GUY P. BEATTY, JR. AND RICHARD E. MORGAN

Q1. Please state your full name, employer, position, and business address.

A1. Beatty:

My name is Guy P. Beatty, Jr. I am employed by Carolina Power & Light Company (CP&L) as Manager of the Robinson Nuclear Project Department (RNPD). My business address is P. O. Box 790, Hartsville, South Carolina.

Morgan:

My name is Richard E. Morgan. I am the General Manager-Robinson Plant in CP&L's Robinson Nuclear Project Department. My business address is the same as that of Mr. Beatty.

Q2. What is your professional training?

A2. Beatty:

I graduated from Clemson University in 1958 with a bachelor's degree in mechanical engineering. Since then, I have received considerable additional training including nuclear reactor safety and radiological health training in courses taught by the U. S. Department of Health, Education and Welfare and by the Massachusetts Institute of Technology. I have completed the Westinghouse Reactor Operator Training Program and was licensed as a Senior Reactor Operator (SRO) for H. B. Robinson Unit No. 2 (Robinson 2).

Morgan:

While serving in the United States Air Force for four years, I was trained as a Medical Services Specialist. This included training in radiological effects related to nuclear warfare and the assessment of medical x-rays. After joining CP&L, I participated in the Westinghouse Reactor Operator Training Program for initial startup of Robinson 2 and was licensed as an SRO in 1970. This license was renewed by annual retraining and qualification through January 1978. I have also completed course work in economics at North Carolina State University and in electrical and electronics principles at Florence-Darlington Technical School.

Q3. Please describe your professional experience.

A3. Beatty:

With the exception of the ten-year period between 1972 and 1982, I have spent my professional career with CP&L. After graduation from college, I became a plant engineer at CP&L's coal-fired H. F. Lee Plant. I then became a plant engineer and subsequently plant maintenance supervisor at Unit 1 of the H. B. Robinson Plant, which is also a coal-fired unit. Between 1964 and 1966, I was operation supervisor at the Lee plant. In February 1966, I returned to the Robinson plant to become plant manager — a position I held until 1972. The nuclear-powered Unit 2 (Robinson 2), a 665 megawatt Westinghouse pressurized water reactor, was constructed on the same site during this time period and began commercial operation in March 1971. As plant manager, I was responsible for the continued operation of the coal-fired unit and for the preoperational testing, initial core loading, startup and initial commercial operation of Robinson 2.

In July 1972, I joined Florida Power Corporation as a nuclear staff engineer and was primarily involved in the preoperational training and licensing for Crystal River Unit 3, an 855 megawatt pressurized water reactor. I later became general plant manager of the Crystal River plant which includes both fossil and nuclear units. During the final construction and preoperational phase of Crystal River Unit 3, I was assistant project manager. Subsequently, during the preoperational testing, startup and commercial operation phases, I became plant manager of Unit 3. I held this position between 1975 and 1979 when I became an assistant to the vice president for nuclear operations of Florida Power Corporation.

In 1982, I was on loan from Florida Power Corporation to the Institute for Nuclear Power Operations (INPO), an industry-sponsored organization dedicated to ensuring the safe and efficient operation of commercial reactors. While at INPO, I served as a member and later manager of INPO Evaluation Teams. My responsibilities included traveling to various nuclear plants to review whether their management was in compliance with the INPO Performance Objectives. The Evaluation Teams provided comments and reports to plant management detailing how their administration, maintenance and operations measure up to INPO standards. Before leaving INPO, I was promoted to manager of the Technical Support Section of INPO's Evaluation and Assistance Division.

I returned to CP&L in October 1982 as Manager of Special Projects with primary responsibility as Project Team Manager of the Robinson 2 steam generator replacement project. In August 1983, I was named Manager of the Robinson Nuclear Project Department which is the position I currently hold. As Project Manager, I am the on-site manager who has overall responsibility for all aspects of plant operations including long range planning and policy-making.

Morgan:

Upon leaving the Air Force in 1962, my utility experience began as a trainee at CP&L's H. F. Lee Plant. As a trainee, helper and auxiliary operator at the Lee plant, I learned basic maintenance and operations procedures for a fossil power plant. After transferring to the Robinson plant in 1965, I worked as a control operator, shift foreman, senior generation specialist and operating supervisor. In these positions, I worked in the areas of equipment qualification, licensing and operations for both the fossil and nuclear units at Robinson. In January 1979, I transferred to the Harris plant as Superintendent-Startup and Test which is the position I held until July 1980 when I became Manager - Plant Operations at the

Brunswick plant. In August 1982, I was transferred back to the Harris plant as Manager - Plant Operations and held that position until I became General Manager of the Robinson plant in September 1983. As General Manager, I report to Mr. Beatty, the Project Manager, and have day-to-day responsibility for operations and maintenance of both the nuclear and fossil unit. With respect to Robinson 2, I have direct responsibility for operations, maintenance, regulatory compliance, technical support, environmental protection, and chemistry and radiation protection. In short, I am charged with the task of ensuring that the unit operates safely and reliably, in full compliance with applicable regulations and in accordance with Company objectives.

Q4. Mr. Beatty and Mr. Morgan, what is the purpose of your joint testimony?

A4. The purpose of our testimony is to describe the on-site organization, operating history, and enforcement record of Robinson 2. We will concentrate on those aspects of the organization and past experience at Robinson 2 that relate to CP&L's capability to operate the unit safely, efficiently, and in compliance with the regulations of the Nuclear Regulatory Commission (NRC).

Q5. Please describe the overall on-site organization for the Robinson Nuclear Project Department.

A5. Beatty:

The Robinson Nuclear Project Department (RNPD) was organized in September of 1983 to centralize all plant operating, construction, and engineering functions at the site under one on-site Project Manager. Prior to that time, there was no position comparable to Project Manager and many policy-level decisions had to be made at CP&L's corporate office rather than the plant site. The reasons for the 1983 reorganization are discussed in more detail in the testimony of E. E. Utley, et al. in this proceeding. In addition to Mr. Morgan, the General Manager, the on-site managers who report directly to me are J. J. Sheppard, Manager - Planning and Scheduling; B. G. Rieck, Manager - Control and Administration; Matthew J. Reid, Manager - Project Construction; and the Manager - Design Engineering (a position which is presently vacant). The five sections headed by these managers together comprise RNPD. As Project Manager, I report directly to M. A. McDuffie, Senior Vice President - Nuclear Generation Group. Beatty-Morgan Attachment 1 is a chart that illustrates the organization of RNPD.

This basic management organization is designed to establish a strong corporate presence at the Robinson site, while providing the on-site managers with the necessary freedom of action to be responsive to operational, regulatory and safety issues. In this respect, there are two distinct advantages of the current organization. First, the General Manager is able to concentrate on the safe, reliable operation of the plant. This has been accomplished by structuring the on-site organization such that functional groups not directly involved in the operation of the plant no longer report to the General Manager. Movement of the responsibility of those auxiliary functions (such as administration, cost control, and planning and scheduling) into the Project Manager's organization frees the General Manager and his operating staff to concentrate on plant performance.

Secondly, responsibility for all project functions (excluding the on-site training, quality assurance and on-site nuclear safety organizations) is now under the Project Manager. Thus, decision-making authority for most day-to-day issues is situated at the plant site rather than CP&L's corporate office. This has resulted in more efficient decision-making and a greater sense of direction.

Q6. What are the responsibilities of the on-site managers at Robinson 2?

A6. Beatty:

Mr. Morgan has already discussed his role as General Manager. I will discuss briefly the general responsibilities of each of the other managers who report to me and whose positions are identified in Beatty-Morgan Attachment 1.

The Manager - Project Construction is charged with managing the performance of major modifications and additions to the plant according to preplanned and approved schedules. This is, of course, a very important position at any nuclear plant.

The Manager - Control and Administration oversees financial planning and control, project administration, material receipt and handling, emergency preparedness, and project security. He supports the General Manager - Robinson Plant while freeing the General Manager of administrative burdens which existed prior to the reorganization of RNPD.

As his title implies, the Manager - Planning and Scheduling plans and schedules outages and modification activities to ensure that resources are utilized efficiently and to minimize unit outage time. He is responsible for both short-range and long-range planning. During outages, he carefully follows and reports on work activities. In that way, the other Company managers and I are always aware of the status of outage-related work at the plant so that planning for system-wide power needs can be accommodated.

Finally, the position of Manager - Design Engineering, which is currently unfilled, is responsible for the design of modifications and additions to the plant to ensure compliance with applicable engineering codes and regulatory requirements. That position would also assist in the preparation of work packages necessary to accomplish plant modifications and additions.

Q7. Have there been other significant changes in this organization since Robinson 2 began commercial operation?

A7. Yes. Although the basic management structure of the Robinson plant has been maintained since commercial operation of Robinson 2 began in 1971, we have made a number of changes to reflect the demands of our increasingly complex industry. In addition to the 1983 reorganization discussed above, one notable change is the separation of managerial responsibilities for Unit 1 (the fossil unit) and Unit 2 (the nuclear unit) below the Plant General Manager level. This allows the managers of Robinson 2 to concentrate exclusively on that unit. The process of separating managerial responsibilities between the two units began in 1979 and was completely implemented by 1984. We have also made a number of changes to ensure that technical expertise is available to cope with changing conditions. For example, the position of Environmental and Radiation Control Supervisor (now Environmental and Radiation Control Manager) was established in 1974 to reflect the importance of environmental protection, radiation protection, and chemistry control.

Q8. How would you characterize the educational qualifications and experience of Robinson 2 personnel?

A8. We think the personnel at Robinson 2 are extremely well qualified. The education and experience level of key personnel are summarized in the chart which is attached to this testimony as Beatty-Morgan Attachment 2.

All management/supervisory personnel, operational licensed personnel, technical and maintenance personnel, and quality assurance personnel must satisfy the requirements established by ANSI N18.1-1971. Because our personnel do meet this ANSI standard, there is added assurance that they have adequate qualifications to operate Robinson 2 safely and reliably. Finally, we should mention that Robinson 2 personnel are periodically retrained by CP&L in order to maintain and demonstrate their level of competence. CP&L's training program is described in detail in the joint testimony of James M. Davis, Jr. and A. Wayne Powell in this proceeding.

Q9. Can you describe the education, training and experience of key plant personnel in more detail?

A9. Matthew J. Reid, the Manager - Project Construction at the Robinson plant, has a bachelor's degree in mechanical engineering from the University of Rhode Island and has more than 35 years of experience in the construction industry. Upon joining CP&L in 1982, he was initially employed as Project Construction Manager (Robinson) in the Brunswick and Robinson Site Management Section of the Nuclear Plant Construction Department before being promoted to his current position.

The Manager - Control and Administration, B. G. Rieck, holds a bachelor's degree in chemistry and has over 25 years of administrative project management experience. A CP&L employee since 1982, he has been in his current position since January 1984.

James J. Sheppard has been the Manager - Planning & Scheduling since March 1984. Prior to that time, he was employed as Principal Engineer, Nuclear Licensing Unit, in CP&L's Nuclear Engineering & Licensing Department. He received a bachelor's degree in engineering from the U. S. Naval Academy in 1970 and a master's degree in business administration from Duke University in 1982. He has 5 years of nuclear naval experience and has been employed with CP&L since January 1979.

In addition to these managers who report to the Project Manager, key personnel include the Manager - Operations and Maintenance, Manager - Technical Support and Manager - Environmental and Radiation Control (all of whom report to the Plant General Manager). At the supervisor level, key personnel are the Operating and Maintenance Supervisors for Unit 2.

C. Wayne Crawford, the Manager - Operations & Maintenance, graduated from North Carolina State University in 1969 with a bachelor of science degree in nuclear engineering. In March 1970, he joined the Robinson staff as an engineer in CP&L's Nuclear Operations Department. In 1971, he obtained his SRO license at Robinson. Mr. Crawford subsequently became Administrative Supervisor and Maintenance Supervisor, remaining in the latter position until January 1979. He then became the Operating Supervisor. In November of that same year, he became the Manager - Operations & Maintenance which is his current position. All of Mr. Crawford's 14 years of nuclear experience have been acquired at Robinson.

Joseph M. Curley has been in the position of Manager - Technical Support since March 1981. Prior to that time, he was employed as the Engineering Supervisor in CP&L's Nuclear Operations Department. He received his bachelor of science degree in nuclear engineering from Texas A&M University in 1974 and has a total of 14-1/2 years of nuclear experience in the U. S. Navy and utility industry. He obtained his SRO in 1977 at Robinson.

Richard M. Smith, Environmental and Radiation Control Manager, assumed his position in July 1984. He retired from the U. S. Navy in 1975, having spent 10 years in the Army Package Power Program. He was a qualified operator of various Army nuclear plants under a joint military program and spent three years in Antarctica as the Chemistry-Health Physics Supervisor for one such plant. Upon retirement from the Navy, he became the Plant Health Physicist and later Radiation Protection Manager at VEPCO's Surry Nuclear Plant. While with INPO from 1981 to 1984, he evaluated over a score of nuclear plant health physics or chemistry programs.

Frederick L. Lowery, the Operating Supervisor - Unit 2, has been at the Robinson plant since May 1971, shortly after initial commercial operation of Robinson 2. He has 9 years of U. S. Navy experience (1961-1971) for a combined total nuclear experience of 22 years. He received his SRO license in 1975. Since that time, he has been employed as a senior control operator, shift foreman, training coordinator and operating supervisor.

William T. Gainey, Jr. and R. H. Chambers share the title of Maintenance Supervisor - Unit 2. Mr. Gainey is primarily responsible for mechanical maintenance while Mr. Chambers concentrates on instrumentation and electrical maintenance. Mr. Gainey began employment with CP&L in 1969 as a Control Operator at Robinson. In 1972 he obtained an SRO license and subsequently became Shift Foreman at Robinson 2. He worked as a Senior Quality Assurance Specialist in the Operations Quality Assurance Section, and as a Project Specialist - Administration/Special Projects in the Nuclear Operations Department and Technical Services Department. He was transferred to Robinson in November of 1983 to become Maintenance Supervisor - Unit 2. Mr. Chambers holds a bachelor's degree in nuclear engineering. He has been at Robinson 2 since 1973 where he has held various engineering positions. He has been Maintenance Supervisor - Unit 2 since 1979.

Q10. What has been the experience regarding employee turnover at Robinson 2?

A10. In general, Robinson 2 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 2 for the period from 1978 through 1982 was less than 3 percent. The industry turnover rate was considerably higher. For example, the industry turnover rate for SROs during 1981 was 5.1 percent. The average turnover rate for licensed Reactor Operators (ROs) at

Robinson was approximately 4 percent during the 1978-82 time period, while the industry average turnover rate during the same period was 5.5 percent. In 1983, these already low rates were further reduced to zero percent turnover for both SROs and ROs. The implementation of CP&L's Nuclear Supplement Pay Program, which establishes a salary differential for employees at nuclear plants, has helped to maintain low turnover rates. Even more importantly, that program has allowed Robinson 2 to attract and retain well qualified personnel, thus enabling us to maintain low turnover rates.

Another indication of the low turnover at Robinson 2 is the number of on-site managers now at the plant who have worked there for a substantial period of time. Both of us were employed at Robinson when construction of Unit 2 commenced in 1966. Other current managers or supervisors who were at Robinson 2 when it began commercial operation thirteen years ago are C. Wayne Crawford, William T. Gainey, Jr., and J. A. Eaddy, Jr. (Environmental and Chemistry Supervisor). In addition, management/supervisory personnel who have had more than eight years experience at Robinson are J. M. Curley, F. L. Lowery, R. H. Chambers, H. S. Zimmerman (Director - Planning & Scheduling) and R. E. Denney (Radiation Control Supervisor). As we will discuss later, Robinson's low attrition level and high experience level were cited by INPO as a major strength on its most recent plant evaluation.

Q11. Please describe the current and historical staffing levels at Robinson.

A11. It has always been the objective of CP&L to staff all of its generating units with adequate numbers of personnel to construct, operate and maintain the plants properly and safely. Personnel from off-site organizations within CP&L and outside contractors are used during peak work periods to supplement the permanent plant staff.

There has been a steady growth in staffing levels for Robinson 2 as can be seen by reference to Beatty-Morgan Attachment 3. This increase reflects the commitment of CP&L to maintain a staffing level sufficient to ensure safe operation of the plant in compliance with NRC requirements. More extensive NRC regulation has increased the workload for plant staffs throughout the nuclear industry, including Robinson 2. The increase in personnel has been especially marked since the accident at Three Mile Island Nuclear Plant in 1979. Between 1972 and 1978, the Robinson 2 staff increased by 54 persons—from 80 to 134. Since 1979, the staff has increased by an additional 134 persons to the present complement of 268. As a typical example, the Environment and Radiation Control section at Robinson 2 numbered fewer than 10 persons in 1975, but now has a personnel complement of nearly 40 persons.

Q12. Can you provide some information about training programs for the personnel at Robinson 2?

A12. The training programs at CP&L's nuclear projects, including Robinson 2, are described in the joint testimony of James M. Davis, Jr. and A. Wayne Powell in this proceeding. We will highlight several areas in which these programs have been successfully implemented at Robinson 2.

First, our training program for the licensing of operators (both SROs and ROs) has produced outstanding results. The NRC's testing of Reactor Operators is a rigorous experience, with industry success rates of less than 50 percent common. Yet, as the attached Beatty-Morgan Attachment 4 demonstrates, the number of ROs at Robinson 2 passing the NRC examination has been at least 80 percent in all years since 1977 in which the examination has been administered to Robinson personnel. SROs have been equally successful. With the exception of 1980, Robinson SROs have consistently achieved a 100 percent passing rate since

1977. All three of the SROs who did not initially pass the examination in 1980 subsequently did pass after additional training. The number of persons shown in Beatty-Morgan Exhibit 4 who have taken and successfully completed the SRO and RO examinations is also important since it demonstrates that the training program is producing sufficient numbers of licensed operators to meet plant needs.

Another notable training-related achievement at the Robinson project is the certification of three areas of the Robinson training program by INPO in May 1984. The INPO accreditation process is described further in the joint testimony of Messrs. Davis and Powell. These areas accredited comprise the operator training areas. Certification of the remaining seven areas is anticipated by 1986. This certification places Robinson 2 well ahead of typical nuclear utility training programs. Robinson is only the fourth nuclear unit in the United States to receive INPO certification of a portion of its training program.

We would also note that the completion of an on-site training center in the spring of 1984 at a cost of over 2 million dollars is a tangible demonstration of our commitment to proper staff training. This facility houses classrooms and offices for the full time training staff which now numbers approximately 20 persons.

Finally, the comprehensive training of fire brigade members at Robinson 2 is worth noting. Members of the Robinson fire brigade not only participate in in-house training, but also receive professional fire fighting training at an excellent fire fighting school in Columbia, South Carolina. Thus, in the eventuality of a fire at Robinson 2, the fire brigade is unusually qualified to respond.

Q13. Have any independent organizations evaluated aspects of the Robinson 2 organization?

A13. There have been three recent evaluations of the Robinson 2 organization. In November 1983, INPO conducted an evaluation of site activities to make an overall determination of plant safety and management controls. Overall, the INPO evaluation team for Robinson 2 reported a number of practices that are 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; and strong support of site activities by corporate management. Additionally, the INPO team noted the following "good practices": (1) enhancement of plant operations by the expeditious processing of temporary procedure changes and revisions; (2) thorough and timely responses to deficiencies through the QA program which reflect a strong management commitment to quality; and (3) use of the plant layout/grid system to quickly direct personnel to the location of plant equipment.

The results of a second recent outside evaluation are contained in the NRC's Systematic Assessment of Licensee Performance (SALP) report for Robinson 2 for the period from January 1, 1982 through January 31, 1983. The SALP program is an NRC Staff effort to collect performance observations on an annual basis and to evaluate the licensee according to the observations. Positive and negative attributes of performance are noted. Although the SALP report did identify a need for improvement in the areas of licensing and quality assurance at Robinson, its overall conclusion was that performance at the plant level was satisfactory. The NRC transmittal letter dated June 14, 1983 for the SALP report commented that "Management attention and appropriate involvement in various safety activities were evident at your Robinson facility."

A final outside review was performed by the management consulting firm of Cresap, McCormick, and Paget, Inc. (Cresap). Pursuant to a 1982 order from the North Carolina Utilities Commission, Cresap performed an audit of CP&L's management, including an evaluation of activities at the Robinson site. The resulting Cresap Report found that performance of Robinson 2 was higher than the industry average for comparable units during the preceding five years. In its letter of December 15, 1982, transmitting the results of the management audit, Cresap identified "more-than-acceptable operating performance of . . . the Robinson nuclear generating station" as one of the CP&L "strengths or accomplishments that offer evidence of commendable performance."

Q14. How has the Company dealt with operating difficulties that have arisen at Robinson 2 over the years?

A14. Operating difficulties should be rectified promptly to ensure safe, efficient operation of our power plants. One such difficulty at Robinson 2 was increased degradation of steam generator tubes which became apparent in 1980. This steam generator degradation problem was not unique to Robinson 2. In February 1982, the NRC reported that of the 40 PWR units operating in the United States with U-tube steam generators, 32 had experienced one or more forms of tube degradation. Extensive denting-related degradation of steam generator tubes forced Virginia Electric & Power Company to replace the steam generators at its Surry Units 1 and 2 beginning in 1979, followed shortly by Florida Power & Light Company at Turkey Point Units 3 and 4, and Wisconsin Electric Power Company at Point Beach Unit 2.

When Robinson 2 started experiencing steam generator tube degradation, the Company promptly initiated actions to arrest the corrosion problem. The most effective actions were variation of the phosphate chemistry control and reduction of the primary system temperature. As a result of these actions, the Company maintained operation using the phosphate water chemistry longer than any similar Westinghouse unit. In January 1984, it became necessary to shut down Robinson 2 in order to repair leaking tubes. On February 6, 1984, the decision was made to initiate a steam generator replacement.

When it became apparent that replacing the Robinson 2 steam generators would probably be necessary, we began to plan for that eventuality in coordination with utilities that had already undergone similar replacements. Thus, we were able to benefit from the experience of other utilities that were forced to replace their steam generators at an earlier date.

As a part of our planning, more than two dozen CP&L employees who would have responsibility for quality assurance, radiation control, health physics, planning and scheduling, and construction supervision during the Robinson repair program observed and studied repair efforts underway at Florida Power & Light Company's Turkey Point plant or at Wisconsin Electric Power Company's Point Beach plant. Good practices observed at those plants were incorporated into pre-planning for the Robinson program. For example, as a result of observations at Turkey Point, we decided to do some of the welding at Robinson outside the containment area to reduce radiation exposure. A CP&L project engineer was assigned to the Turkey Point project for seven months as construction coordinator and field supervisor on their replacement program. That experience was invaluable when he returned to Robinson and was assigned the responsibility to coordinate construction activities during our replacement program.

Not only did the Company send employees to other plants to observe replacement projects, but we also employed a number of persons with actual experience in the planning and scheduling, construction and health physics aspects of the steam generator repair programs at Surry and Turkey Point. The Westinghouse project manager for the Turkey Point replacement program was assigned to the same duties at Robinson, serving as liaison between CP&L and Westinghouse as contractor for the replacement program.

To maintain radiation exposure levels for both on-site and off-site personnel at levels that are as low as reasonably achievable (ALARA), CP&L developed a comprehensive radiological protection program. We have employed a variety of techniques to reduce exposure levels, including decontamination of the containment building and specific high exposure components in the work areas, use of temporary shielding in the work areas, and use of specialized tools (such as remote cutting apparatus) when appropriate. There has also been a heavy emphasis on personnel training as a means to reduce levels of radiation exposure.

We believe these efforts are paying off. As a result of CP&L's comprehensive planning and preparation, the total occupational radiation exposure recorded for all major tasks completed to date during the replacement program is approximately 50 percent of the amount originally projected. For most activities, actual exposures have been much lower than projected. For example, radiation exposure during the cutting and removal of the upper assemblies was projected to be 80 manrems but the work was accomplished with less than 5 manrems exposure. The replacement program is on schedule and more than 75 percent complete; the unit is expected to be returned to service before the end of this year.

Q15. How has the Company dealt with other operating difficulties that have arisen at Robinson 2 over the years?

A15. Another example of the capability of CP&L management to deal effectively with unusual operating difficulties was its handling of the pressurized thermal shock (PTS) issue. This issue centered on the ability of the reactor vessel at Robinson 2 to withstand a temperature-shock while at pressure. It was theorized that certain welds on the reactor vessel could fracture under certain temperature-pressure conditions due to the presence of trace metals in the welds. In turn, this might result in an unisolatable loss of primary coolant from the primary containment system. In the early 1980s, it seemed possible that very major modifications and repairs would be required to allow continued operation of the unit. In response to this concern, the Company mounted major efforts to train personnel to recognize the condition and operate the unit accordingly, plan necessary modifications, redesign the core so as to reduce neutron leakage (which irradiated the affected area), and reanalyze the reactor vessel. As a result of the reanalysis and a new low-leakage core design, CP&L was able to alleviate the PTS concern from a high priority issue with large potential impact on plant performance, to an issue with no expected impact on plant performance or life.

Q16. Please characterize the record of NRC enforcement activities for Robinson 2 over the past several years.

A16. A summary of NRC enforcement actions since 1981 with respect to Robinson 2 is contained in Beatty-Morgan Attachment 5. A list of the number of LERs submitted during each year since 1970 is provided in Beatty-Morgan Attachment 6. Over the past several years, the number of LERs has remained essentially constant with some fluctuations from year to year.

As can be seen from Attachment 5, the number of NRC notices of violation (NOVs) issued with respect to Robinson 2 declined between 1981 and 1983. Only 24 such NOVs were issued during 1983 compared with 41 in 1982 and 34 in 1981. Through the end of July 1984, 22 NOVs have been received during 1984, primarily due to the much greater site activity associated with the steam generator replacement program. We expect this number to decline again when the replacement program is completed. Of the 24 NOVs issued during 1983, 23 were in the two lowest severity levels. The remaining one was a Severity Level III violation for which a $40,000 civil penalty was initially assessed, but which was subsequently reduced to $20,000 because of CP&L's prompt corrective actions. This violation involved the failure of a security guard employed by a CP&L contractor to secure access and the failure of a shift supervisor to respond properly to the situation. In response to the violation, CP&L took extensive corrective action, including initiating disciplinary action against the persons involved, conducting a series of meetings and classes with personnel to emphasize the importance of assigned duties, and committing to greater CP&L oversight of the security force.

Q17. What is CP&L's record on industrial safety at Robinson 2?

A17. Our industrial safety record at Robinson 2 has been outstanding. In the past seven years, there has been only one accident at Robinson 2 which resulted in lost work time. Within the past six weeks, the plant operators won an in-house award for 200,000 manhours worked without a doctor-attended accident. Our commitment to safety has been recognized by the South Carolina Department of Labor which in 1976, 1977, 1978, 1982 and 1983 awarded the plant (and the rest of CP&L's Southern Division) the South Carolina Occupational Safety Council Award for outstanding safety performance compared to other South Carolina companies in the power generation and transmission industry. In addition, Robinson 2's good record has contributed to CP&L's receiving a number of national and regional safety performance awards.

Q18. How would you characterize your philosophy in managing Robinson 2?

A18. Our ultimate goal is the safe and reliable operation of the plant. We are totally committed to plant safety and regulatory compliance. To accomplish this goal, we attempt to employ the best persons for each position and to ensure that they are properly motivated to do their job. We believe that the operating staff should be relieved of unnecessary administrative burdens so that they can concentrate on effective operation and maintenance. In addition, we believe that it is important that the plant management structure establish clear lines of authority and responsibility. It is essential that all plant personnel be held accountable for the effects of their actions on plant operation.

One manifestation of our commitment to safety and regulatory compliance at Robinson 2 is the Robinson Long-Term Improvement Plan (RLTIP). The RLTIP was established in 1983 as a result of a self-initiated evaluation of Robinson 2. Although that evaluation found that performance was acceptable in all areas, we identified improvements that could be made in such areas as regulatory compliance, revision to procedures, and training. Of the 18 action items identified in the RLTIP, 16 have already been implemented. The remaining two items, dealing with the formatting, revision and upgrading of procedures, are well along toward completion.

Q19. How do you personally assure yourself that this philosophy is carried out?

A19. Beatty:

First of all, I try to incorporate the knowledge I've gained through experience in the nuclear industry in fulfilling my managerial responsibilities. This experience is of great value to me in selecting plant personnel and in discussing technical and operational problems with my staff. I always make an effort to get out in the plant on a daily basis to observe ongoing activities. In addition, I hold routine meetings with all segments of the plant staff and regularly review standard plant performance indicators to determine if any problems have arisen. I have worked to implement the managerial changes that were included in the 1983 reorganization and which, I believe, establish the kind of management structure conducive to optimum plant operation.

Morgan:

I wholly concur with Mr. Beatty's comments. Let me emphasize that in managing a nuclear power plant there is no substitute for personal inspections and direct involvement in plant operations. I spend a very substantial part of my time each day in just those kinds of activities.

Q20. Mr. Beatty and Mr. Morgan, do you believe that the record of Robinson 2 supports the position that CP&L has the management capability to operate and maintain the unit safely, efficiently, and in conformity with NRC regulations?

A20. It is clear that CP&L's track record in the operation of the Robinson 2 is good. The Company's responsiveness to regulatory requirements is demonstrated by the enforcement record at Robinson 2, implementation of the RLTIP, and the Company's willingness to take prompt corrective action when compliance problems have arisen. The Company's positive approach toward regulatory compliance is confirmed by the findings of the last SALP report on Robinson 2 and the other outside evaluations which we mentioned.

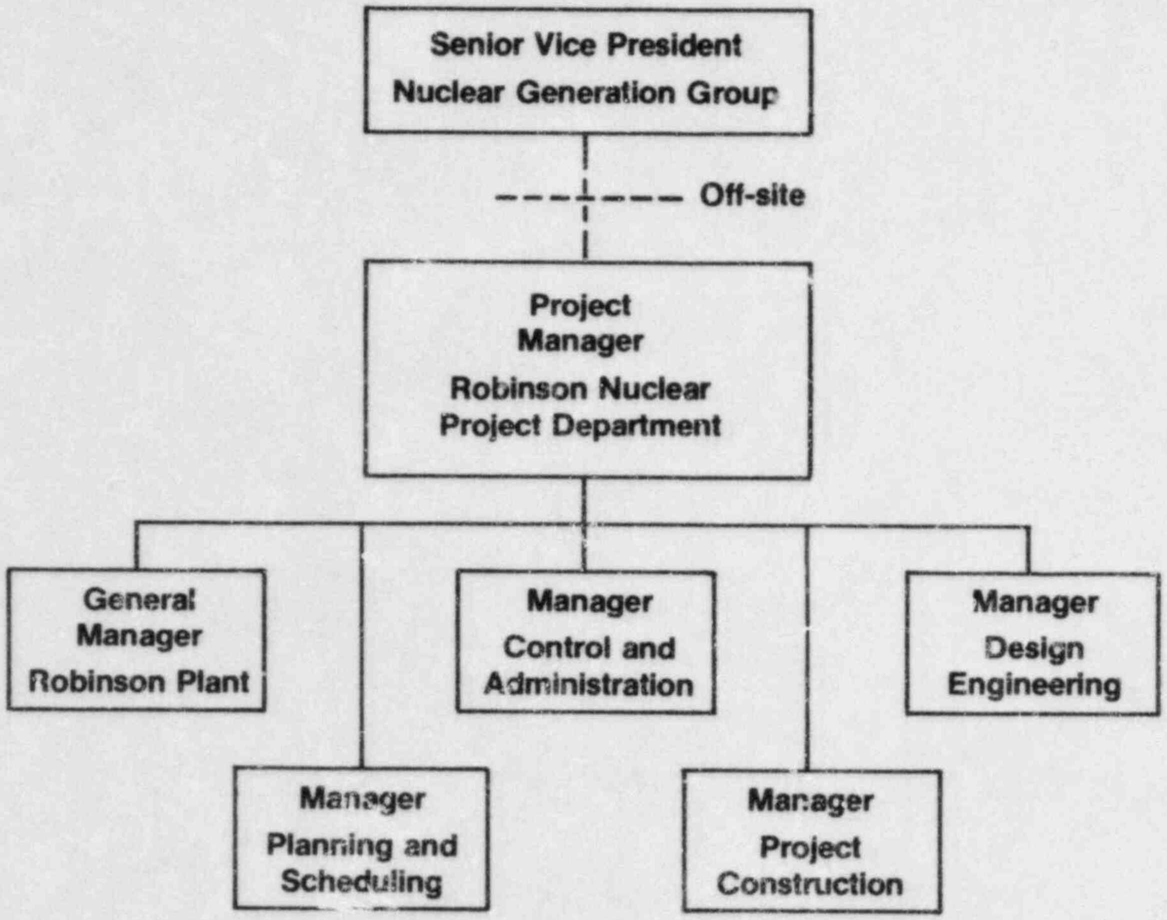
CP&L's response to the steam generator problem is a good illustration of its ability to manage the unit properly. As a result of measures taken to extend the life of the steam generators, we were able to benefit from the experience of other utilities that were forced to replace steam generators at an earlier date. Our extensive preplanning has led to lower personnel radiation exposure, smaller radioactive contamination problems, and a more efficient replacement program at Robinson 2. The current replacement outage is on schedule and should compare favorably in duration with that experienced by other utilities. It should ultimately result in the improved availability of Robinson 2.

We believe that we have a strong management team in place at Robinson 2 and that the current organizational structure permits efficient decision-making at all levels. We have always sought to maintain high standards in managing Robinson 2 and will continue to do so in the future.

Q21. Does this conclude your testimony?

A21. Yes, it does.

ROBINSON NUCLEAR PROJECT DEPARTMENT MANAGEMENT ORGANIZATION



Beatty-Morgan Attachment 1

TITLE	PERSON ASSIGNED	EDUCATION DEG/MAJOR/YR	SRO	NUCLEAR EXPERIENCE (YEARS) CP&L HBR	CP&L OTHER CP&L EXPERIENCE	CP&L TOTAL	USN	OTHER INDUS.	GRAND TOTAL
Manager - Robinson Nuclear Project	G. P. Beatty	BS/ME/1958	1970	8	-	8	-	10	18
General Manager - Robinson Plant	R. E. Morgan		1970	15	4 1/2	19 1/2	-	-	19 1/2
Manager - Project Construction	M. J. Reid	BS/ME/1948	NR	2	-	2	-	3	5
Manager - Control & Administration	B. G. Rieck	BS/Chem/1949	NR	1/2 yr.	1 1/2	2	-	27	29
Manager - Planning & Scheduling	J. J. Sheppard	BS/NE/1970 MBA/1982	NR	1/2 yr.	5	5 1/2	5 1/2	1 1/2	12 1/2
Manager - Operations & Maintenance	C. W. Crawford	BS/NE/1969	1971	14	-	14	-	-	14
Manager - Technical Support	J. M. Curley	BS/NE/1974	1977	9 1/2	-	9 1/2	5 1/2	3	18
Manager - Environmental & Radiation Control	R. M. Smith		NR	1 mo.	-	1 mo.	10	9	19
Operating Supervisor - Unit No. 2	F. L. Lowery		1985	13	-	13	9	-	22
Maintenance Supervisor - Unit No. 2	W. T. Gainey		1972	7 1/2	7	14 1/2	-	5 1/2	20
Maintenance Supervisor Unit No. 2	R. H. Chambers	BS/NE/1973	1976	11	-	11	-	-	11

NR - Not Required
ME - Mechanical Engineering
NE - Nuclear Engineering

Beatty-Morgan Attachment 2

Robinson 2 Staff Size (Actual)

Date	Number*
1971	91
1972	80
1973	80
1974	101
1975	102
1976	111
1977	113
1978	134
1979	157
1980	215
1981	220
1982	256
1983	298
1984	268**

* Actual staff assigned to Robinson 2 in the mid-year period of the year indicated. Number does not include approximately 45 SHNPP personnel assigned to Robinson 2 from 1979 to mid - 1982.

** The drop in staff size between 1983 and 1984 reflects the management reorganization described in the testimony at pages 4-5. Personnel performing certain administrative functions were transferred out of the Plant General Manager's organization.

ROBINSON NUCLEAR PROJECT

NRC LICENSE EXAMINATION RESULTS

	Licensed Reactor Operators			Senior Reactor Operators		
Year	Number Tested	Number Passed	%	Number Tested	Number Passed	%
1977	6	5	83	6	6	100
1978	9	9	100	0		
1979	9	9	100	3	3	100
1980	0			4	1	25
1981	5	4	80	0		
1982	6	6	100	6	6	100
1983	0			8	8	100

NONCOMPLIANCE HISTORY FOR H. B. ROBINSON UNIT NO. 2 (Notices of Violation Issued by NRC)				
	1981	1982	1983	1984*
Security Level:				
I	0	0	0	0
II	0	0	0	0
III	3	1	1	1
IV	11	21	12	13
V	17	19	11	8
VI**	3			
Total Violations:	34	41	24	22

Security Levels I and II: Violations that are of very significant regulatory concern. In general, violations that are included in these severity categories involve actual or high potential impact on the public.

Security Level III: Violations that are cause for concern.

Security Level IV: Violations that are less serious but are of more than minor concern; i.e., if left uncorrected, they could lead to a more serious concern.

Security Level V: Violations that are of minor safety or environmental concern.

*Notices of Violation received through July 1984

**No longer used

LICENSEE EVENT REPORTS H. B. Robinson Unit No. 2	
YEAR	NUMBER
1970	13
1971	18
1972	19
1973	21
1974	32
1975	20
1976	21
1977	33
1978	32
1979	37
1980	29
1981	33
1982	19
1983	31

August 9, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY	)	
AND NORTH CAROLINA EASTERN	)	Docket No. 50-400 OL
MUNICIPAL POWER AGENCY	)	
	)	
(Shearon Harris Nuclear Power Plant,	)	
Unit 1)	)	

APPLICANTS' JOINT TESTIMONY OF
R.A. WATSON AND J.L. WILLIS ON JOINT INTERVENORS'
CONTENTION I (MANAGEMENT CAPABILITY)

JOINT TESTIMONY OF

R. A. WATSON AND J. L. WILLIS

Q1. Please state your name, business address, and position with Carolina Power & Light Company and describe your educational background and professional experience.

A1. Watson:

My name is R. A. Watson. I am Vice President - Harris Nuclear Project Department. My business address is the Shearon Harris Nuclear Power Plant, Post Office Box 165, New Hill, North Carolina. I have a bachelor's degree from North Carolina State University in nuclear engineering and a master's degree from Union College in physics. I have also studied at the Oak Ridge School of Reactor Technology in Oak Ridge, Tennessee. I am a registered professional engineer, I have previously qualified as a senior reactor operator at another facility and have 28 years of experience in nuclear engineering activities. I was with the Knolls Atomic Power Laboratories for 13 years. I have been with Carolina Power & Light Company (CP&L) for 15 years and was Vice President of the Fuel Department prior to assuming my current position.

Willis:

My name is J. L. Willis. I am General Manager - Harris Plant Operations Section. My business address is the Shearon Harris Nuclear Power Plant, Post Office Box 165, New Hill, North Carolina. I have a bachelor's degree from the United States Naval Academy in electrical engineering and I attended the Navy's Nuclear Power School. I have 31 years in Navy and utility power plant engineering, maintenance, operation, and management, including 28 years of nuclear power experience. Immediately prior to my employment with CP&L, I was Manager of Nuclear Training for Southern California Edison. I have been with CP&L since October 1981 and have been the plant General Manager at Shearon Harris since April 1982. I was assigned as Manager - Plant Operations at Harris from October 1981 to April 1982.

Q2. What is the purpose of your testimony?

A2. The purpose of this testimony is to describe the Harris Plant Nuclear Project Department organization and to demonstrate that CP&L possesses the management capability to operate the Harris plant safely.

Q3. Mr. Watson and Mr. Willis, will you please describe your approach to managing the Harris Plant?

A3. Watson:

My objective is to operate the plant in such a manner that the health and safety of the general public is assured at all times. My management philosophy incorporates some rather fundamental concepts:

Good management must start with good people who work as a unified and cohesive team. Thus, strong organization consisting of highly qualified and dedicated people with a clear definition of responsibility and authority is the foundation of the Harris Nuclear Project Department. Effective communication, upward as well as downward, is essential at all levels of the organization. Management follow-through and personal accountability are required at all levels of management. Finally, discipline and strict adherence to procedures are absolute requirements for any nuclear activity.

I have attempted to communicate this philosophy to ·" lant personnel and I will continue to refine my approach to managing Harris based on feedback from personnel in all levels of our organization. I believe that this will ensure that operations of the Harris plant will meet the highest of standards.

Willis:

I share Mr. Watson's views, and I would add that our philosophy of management includes ensuring a sound training program for our management and operating personnel. Also, the importance of staff attention to detail and procedural compliance cannot be over-emphasized. There must be a desire and willingness to take the time to do a job right the first time and to search for root causes of problems. We insist that constant vigilance and attention to detail be maintained.

Q4. Please describe the organizational structure of the Harris Nuclear Project Department.

A4. The Harris Nuclear Project Department is organized in a manner similar to the organization presently in place at CP&L's 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 the Harris plant design and construction phases to the operating phase.

A chart depicting the organization of the Harris Nuclear Project Department is shown on Watson-Willis Attachment 1. As discussed by Mr. Utley in his testimony, in 1983 CP&L assigned Mr. Watson, a company Vice President, to the plant site with the authority and responsibility for all line functions at the site. 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.

The Harris Nuclear Project Department, located entirely on site, is organized into five sections: Operations, Engineering, Construction, Administration, and Planning and Controls. Each section is headed by a manager who reports directly to the Vice President — Harris Nuclear Project Department.

The Harris Plant Operations Section, which we will discuss in greater detail later, is responsible for all operational phases of plant management, including startup and testing, operation, maintenance, chemistry, environmental and radiation controls, and on-site technical site support.

Administration of the design of the Harris plant during construction is the responsibility of the Harris Plant Engineering Section. 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 personnel during the first several years of plant operation.

The Harris Plant Construction Section manages the construction of the Harris plant and has control over construction-related contractors at the plant site.

The 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 state-of-the-art communications and management systems, and providing administrative support to the project management and various project organizations.

Finally, the Harris Project Planning and Controls Section provides site planning and scheduling, cost accounting and controls, industrial engineering, and related activities. These related activities include short- and long-range planning, cost monitoring and reporting, and performance evaluation and reporting.

In addition to the Harris Nuclear Project Department, other corporate organizations provide essential support to the Harris plant. These include the on-site Quality Assurance (QA) organization, the on-site Nuclear Safety (ONS) Unit, the on-site Training Unit, and the on-site Employee Relations Unit, which are all integral parts of the operation of the Harris plant. Although they report off-site, these units work directly with our plant organization to ensure the quality of work performed, safety of operations, and adequate training of plant personnel, and to assist in recruitment and retention of personnel. The activities of these organizations are further discussed in the testimony of Messrs. Utley, et al. and Messrs. Davis and Powell.

Q5. Please describe the educational qualifications and experience of the other Harris plant managers.

A5. The Manager - Harris Plant Engineering Section, Mr. L. I. Loflin, has a bachelor's degree in electrical engineering, has a professional degree in nuclear engineering, and is a registered professional engineer. He has had 19 years of engineering and power plant operations experience, 13 years of which have been in nuclear engineering. He was employed as operating supervisor responsible for all plant operational functions at VEPCO's Surry Nuclear Plant, and has held a Senior Reactor Operator's (SRO) license. After joining CP&L, Mr. Loflin served for a time as engineering startup coordinator at the Brunswick plant and later as Manager of the Corporate Nuclear Safety Section.

The Project General Manager - Harris Plant Construction Section, Mr. R. M. Parsons, holds a bachelor's degree in civil engineering, is a registered professional engineer, and has 16 years of experience in nuclear power plant construction management. Prior to joining CP&L, he was employed by Ebasco Services, Inc., the Architect - Engineer for the Harris plant. During that time, he received construction management experience at the Virgil C. Summer and St. Lucie Nuclear Plants, and at CP&L's nuclear-powered Robinson Unit 2. Mr. Parsons has been with CP&L for eight years.

The Manager - Harris Project Planning and Controls Section, Mr. T. J. Allen, has a bachelor's degree in civil engineering and a masters degree in business administration. Mr. Allen is a registered professional engineer with nine years experience in planning and scheduling activities, two of which were directly related to nuclear plant activities. He was previously assistant to the Executive Vice President at CP&L's Brunswick plant.

The Manager - Harris Project Administration Section, Mr. W. J. Hindman, Jr., holds a bachelor's degree in civil engineering, and is a registered professional engineer. He has nine years of experience in nuclear plant engineering and construction-related activities with CP&L. He has been at the Harris site since 1979 as a Senior Engineer and Director - Project Analysis prior to his current position.

Q6. Returning to the Harris Plant Operations Section, will you describe its basic structure?

A6. The Harris Plant Operations Section will actually operate the plant and is headed by the Plant General Manager who reports directly to the Vice President - Harris Nuclear Project. The Plant General Manager is supported by five units, and three subunits: Administration, Regulatory Compliance, Startup, Technical Support, and Plant Operations Units, and Maintenance, Environmental and Radiation Control, and Operations Subunits. A chart depicting the Operations Section is set forth in Watson-Willis Attachment 2. The qualifications of the men who manage those units and subunits are summarized in Chapter 13 of the Harris Final Safety Analysis Report (FSAR) Amendment 13. See Applicants' Exhibit ______.

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.

The Regulatory Compliance Unit coordinates activities at the plant to ensure that commitments, responses, and reports to regulatory agencies as well as plant records are prepared, submitted, and maintained in accordance with regulatory requirements. This unit maintains a tracking system that monitors the status of plant 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.

The Startup and Test Unit is responsible for performing the Harris Nuclear Project preoperational and startup test program which we will discuss later.

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.

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 plant 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.

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.

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

The Operations Subunit 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 (RO) licenses, and four Auxiliary Operators (AO). 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 as low as reasonably achievable (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. Each shift will periodically function as the relief shift or the training shift. 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.

Q7. Is the Harris Operations Section being staffed in accordance with NRC guidelines?

A7. Yes. The staffing positions we have 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, as documented in the Harris Plant FSAR at Chapter 1.

Q8. How has CP&L gone about staffing the Harris Plant Operations Section?

A8. 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 September 1981, when construction of Harris Unit 1 was approximately 50 percent complete. 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.

Our Operations Section staff at comencement of commercial operation, including Startup Unit personnel, is planned to total 459. We intend to fill the 85 positions which are now open by transferring current CP&L personnel from other CP&L facilities (while maintaining more than sufficient good personnel at those other plants) and hiring new employees through CP&L's recruitment program.

During the first two years of operation, we plan to maintain the total Operations Section staff at approximately the same level as at initial commercial operation to ensure proper staffing including integration of startup personnel into the operating plant staff.

Q9. Describe CP&L's recruiting and hiring program in more detail.

A9. The Company recognizes the necessity for a strong recruiting program as an important means of fulfulling its manpower needs. Thus, the Company has developed a comprehensive program for recruiting new employees from colleges, universities, community colleges, two-year technical schools, and naval installations. Particular emphasis is placed on recruiting engineering and technical personnel. The Company also participates in a Cooperative Education Program which has been established at eight four-year and six two-year educational institutions. This program, along with the Company's summer employment program, provides vocational training to students, and serves as a means of identifying potential employees.

Q10. How many previously licensed operators are currently employed at the Harris plant and how many will be employed during startup and normal operations?

A10. Currently, 20 personnel in the Harris Plant Operations Section 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.

We plan to have 26 licensed SROs and 18 licensed ROs, for a total of 44, at initial commercial operation. This staffing projection is based on the numbers of personnel whom we believe will pass our training program and be recommended for and receive licenses from the NRC. We expect to have more than the minimum number of licensed personnel required to man the six shifts. This planned staffing exceeds regulatory requirements. Incidently, this number does not include the Shift Technical Advisors. It is our intention that they also will be licensed.

Q11. How many Harris plant personnel are currently in the licensed operator training program?

A11. Currently there are 95 Harris plant personnel in the licensed operator training program: 51 SRO candidates, 30 RO candidates, and 14 AO candidates. Cold license exams (all exams given prior to commercial operation of the reactor) are slated for the spring of 1985 and hot license exams (those given after commercial operation) are scheduled for 1986. Training for the latter exams will begin in late 1985.

The Company's comprehensive training programs are described in detail in the joint testimony of James M. Davis, Jr. and A. Wayne Powell. We would like to mention, however, a few of the features of the operator training program which are of particular importance to the operation of the Harris plant.

CP&L's operator training program incorporates several state-of-the-art techniques and has several special features. Much of the training is conducted in CP&L's modern training facilities at the Shearon Harris Energy & Environmental (E&E) Center. The Harris plant simulator is used to provide comprehensive operator training for normal and emergency plant conditions. This simulator, delivered in 1977, was one of the first of its kind in the southeast. We are now in the process of purchasing a new simulator which will more closely replicate the plant and will be even more accurate in its depiction of design transients. This new simulator 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 trainees' understanding of reactor theory.

Another major feature of Harris operator training is that operating shifts will be set up on the six-shift rotating basis to ensure that all operators receive adequate time off, vacation, and a maximum amount of refresher training.

Q12. Please describe the Harris plant startup and test program.

A12. The startup and test program is conducted in three sequential programs: (1) the component testing and initial operation program, (2) the preoperational test program, and (3) the startup power test program.

The program is based on the criteria set forth in the NRC Regulatory Guide 1.68, Revision 2 as described in Chapter 14 of the FSAR, see Applicants' Exhibit _____; information obtained from other utilities and from Westinghouse, the NSSS supplier; and on CP&L's experience in placing its three other nuclear units into service. 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 our employees. The program's objectives are: (1) to verify that system performance meets design; (2) to train the plant operating and technical staff and familiarize them with the the facility as an operating plant; (3) to verify the plant operating and emergency procedures, to the extent practicable, during the performance of the program; and (4) to verify or improve through minor design changes the reliable performance of both safety and non-safety systems/equipment.

The component test program begins upon completion by construction personnel of portions of systems which are "released for test" to the Startup Group. The primary objective of this program is to prepare systems for preoperational testing by verifying that components within the system have been checked out, calibrated, and/or initially operated. The first Harris system was released for test in September 1982. As of August 1984, more than 500 out of 1064 of such systems or system components have been released for test.

The preoperational test program will begin upon turnover of systems to the Harris Plant Operations Section. The primary objective of preoperational testing is to verify prior to initial core loading that systems perform in accordance with design and safety requirements. The safety-related preoperational tests described in Section 14.2.12 of the FSAR will receive the most scrutiny. It is obviously important to CP&L, however, that non-safety systems operate efficiently and reliably. For this reason, we will also perform system functional tests on non-safety systems of the same type and format as those we conduct on safety-related systems. One hundred and fifty-five safety and 71 non-safety test procedures will be performed during this program.

The startup power test program will begin with initial core loading after receipt of the plant's operating license. The program encompasses initial criticality, zero power operation, ascension to full power, and the 100-hour full power test. The primary objectives of this program are to verify nuclear and thermal hydraulic parameters of the reactor and to demonstrate the plant's ability to withstand anticipated transients.

All phases of our testing program are coordinated and directed by the Startup Unit of the Operations Organization. This Unit consists of engineers who prepare test procedures and plan and direct the testing of all plant systems. The Unit was formed in 1979 and assigned to the Harris site in September 1981, 45 months prior to scheduled fuel loading.

The Startup Unit reports to the Plant General Manager and is divided into four groups each under a startup supervisor. One group is responsible for the nuclear steam supply systems, another, the balance of plant systems, a third, the radwaste and HVAC systems, and the fourth group is responsible for electrical and electronic systems.

The Harris Startup Unit is supported by other units of the Operations Section. There are currently approximately 280 plant personnel directly involved in supporting the startup activities. We expect to increase this number to over 400 personnel prior to commercial operation.

Q13. What programs do you have in place to ensure that surveillance and testing of plant systems will be carried out in accordance with NRC requirements?

A13. The Plant Operating Procedures for Surveillance and Testing and the on-site Quality Assurance/Quality Control (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 us in assuring that surveillance tests are scheduled and completed as required. The Operating Procedures for Surveillance and Testing incorporate NRC requirements. The on-site QA/QC section is responsible for independently assuring adherence to NRC requirements during the startup and subsequent operation of the Harris plant. In addition to these activities performed by the on-site QA/QC Section, the off-site Corporate QA Services Section performs periodic auditing of the procedures and the surveillance and testing activities.

Q14. Please explain how the ALARA concept is being implemented at Harris.

A14. The Company is committed to ensuring that occupational radiation exposures are as low as reasonably achievable (ALARA). In implementing the ALARA concept, the Company will follow 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 ALARA concept is embodied in the corporate health physics policy which insists upon compliance with all state and federal regulations that pertain to radiation protection. The Company's Radiation Control and Protection Manual provides the direction for implementing this corporate policy and comprises part of the plant operating procedures. This manual sets forth the philosophy and general radiation protection standards and procedures that are essential to the safe operation of CP&L's nuclear plants.

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. Additionally, during the construction phase, plant operations personnel conduct reviews of equipment and components for accessibility and maintainability. Considerations of ALARA principles and work efficiency are key factors in their assessment.

The 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.

Q15. Please review your radiation protection program for Harris.

A15. 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. Proper preparation and planning will be conducted before personnel enter radiation areas where significant doses could be received. Adequate supervision and radiation protection surveillance will be provided in radiation areas to ensure that the appropriate work practices and procedures are followed.

Q16. How have CP&L's experiences in operating the Robinson and Brunswick plants aided you in managing the Harris Nuclear Project?

A16. The Harris Nuclear Project management has benefitted significantly from the experiences at the Robinson and Brunswick plants. Lessons learned at those plants are reflected in the Harris plant organization structure, our management controls and experience, our efforts in advanced planning and early staffing, and in the personnel training program.

We have benefitted substantially from the reorganization of our plant management organization. Consolidating all line functions under the direction of a Project Manager who is on-site has improved management controls over the Harris project. The management organization has also benefitted from management experience gained by Harris plant personnel who previously held positions at the Robinson or Brunswick plants. We have learned from Robinson and Brunswick the value of early staffing. Thus the planning for the Harris plant staffing began early - in 1978 - and actual staffing began in 1979. Moreover, the training and experience that some of our Harris operators and staff gained at the Robinson and Brunswick plants has helped minimize the need for additional training. For example, the Harris plant already has 12 ROs and 6 SROs who were previously licensed at the Robinson or Brunswick plants. Thus the valuable experiences at Robinson and Brunswick have enhanced the ability of the Harris plant management to safely and reliably operate the plant.

Q17. Mr. Watson and Mr. Willis, how will you personally ensure your philosophies of Harris Plant management will be carried out?

A17. Watson:

Implementation of my management philosophy will be ensured in a number of ways. An efficient and effective management organization structure is in place with clear lines of authority and responsibility. This organization is staffed with well-qualified personnel who are dedicated to carrying out our mission. As I stated earlier, this is the foundation of the Harris team. Effective communication channels within the plant organization, with other parts of the Company, and with our regulators are essential. Continuing attention to developing even more effective communications is a necessary action in my management philosophy. I will demand 100% effort from each member, and I will evaluate the performance of each as well as the effectiveness of management. Further, I will continue to monitor the collective effectiveness as a team directing the efforts to the overall plant objectives. My direct involvement and presence in plant activities and decision making, through my regular personal inspections of plant area and my participation in key meetings, provides me with knowledge that my management philosophy is being carried out. Prompt follow-up of significant issues is essential. Continuous quality support to the plant staff will be provided by the on-site QA Unit, ONS, corporate management, and the corporate support units.

I believe these actions will ensure successful implementation of this philosophy.

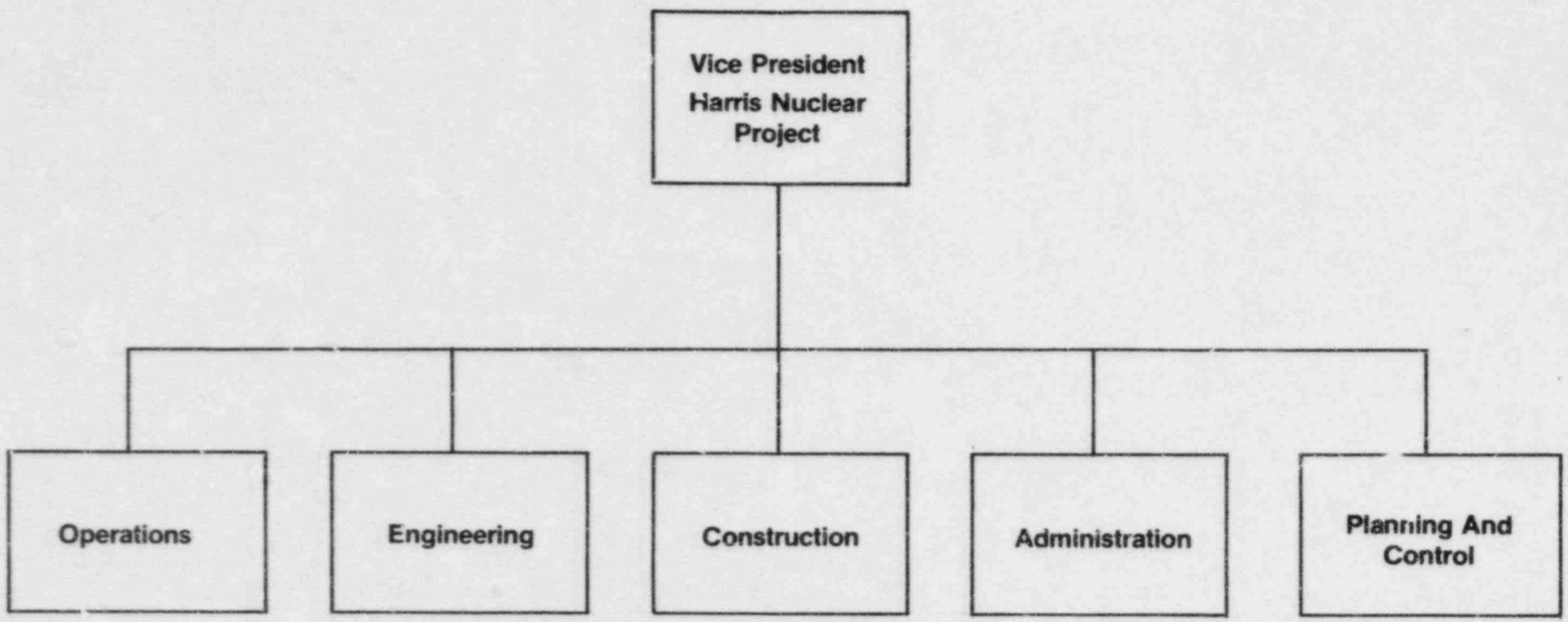
Willis:

I will ensure implementation of my management philosophy through my personal involvement in the day-to-day activities of the plant; by setting high standards for performance, communicating those standards and making sure they are enforced. Personnel will be held accountable for their assigned responsibilities and actions, and my own frequent observations of plant operations will help confirm that the high standards for performance are being met.

Q18. Does this conclude your testimony?

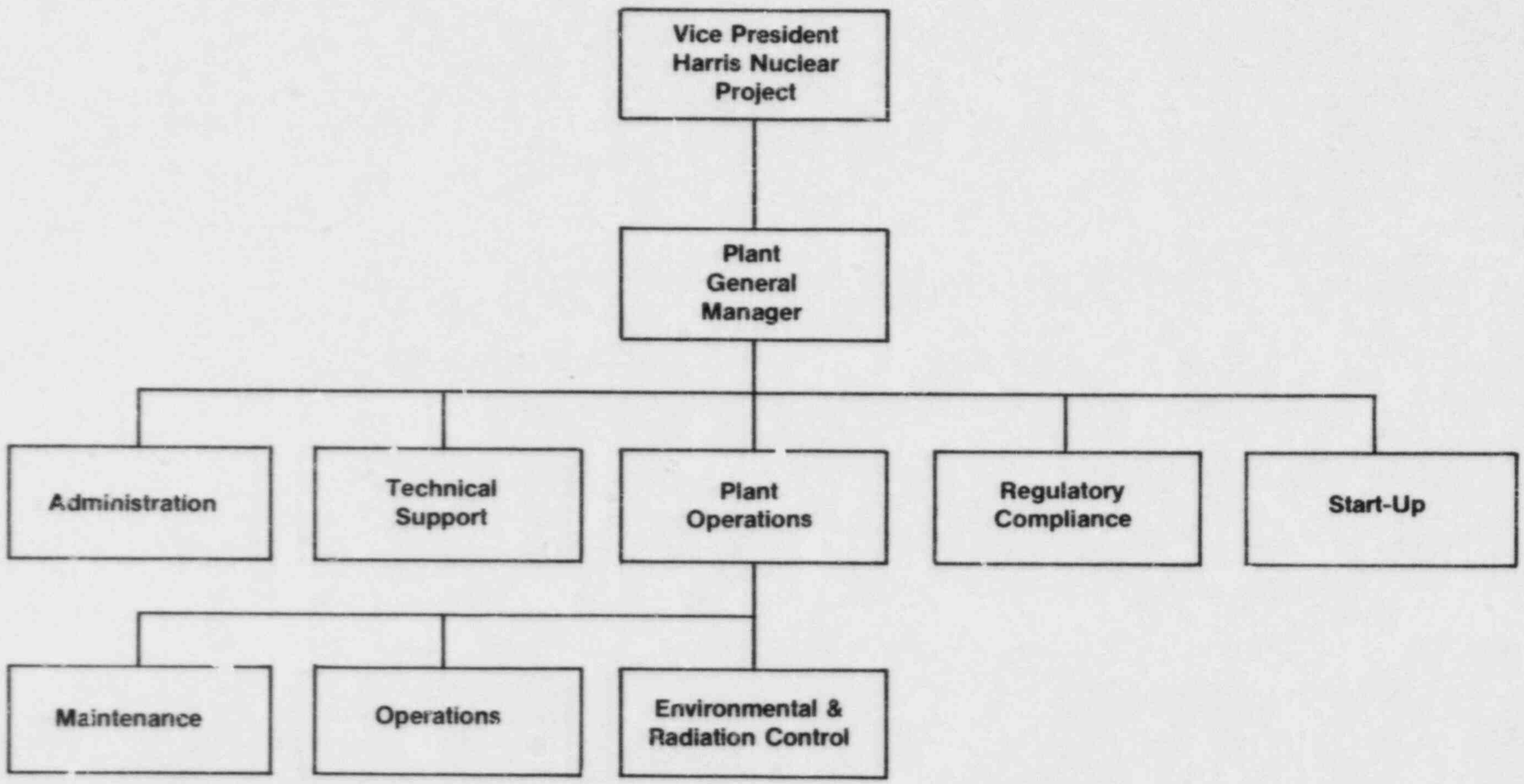
A18. Yes, it does.

HARRIS NUCLEAR PROJECT



Watson-Willis Attachment 1

HARRIS PLANT OPERATIONS SECTION



Watson-Willis Attachment 2

RELATED CORRESPONDENCE

August 9, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of	)	
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AND NORTH CAROLINA EASTERN	)	Docket No. 50-400 OL
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(Shearon Harris Nuclear Power Plant,	)	
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APPLICANTS' JOINT TESTIMONY OF JAMES M. DAVIS, JR.
AND A. WAYNE POWELL ON JOINT INTERVENORS' CONTENTION I
(MANAGEMENT CAPABILITY)

JOINT TESTIMONY
OF
JAMES M. DAVIS, JR. AND A. WAYNE POWELL

Q1. Will you please state your name, employer, position, and business address?

A1. Davis:

I am James M. Davis, Jr., and my business address is 411 Fayetteville Street, Raleigh, North Carolina. I am Senior Vice President of Operations Support for Carolina Power & Light Company (CP&L).

Powell:

My name is A. Wayne Powell. I am the Director-Training - Harris Plant in CP&L's Nuclear Training Section. My business address is Post Office Box 165, New Hill, North Carolina.

Q2. Will you briefly describe your educational and professional background?

A2. Davis:

I am a graduate of North Carolina State University, from which I received a B.S. degree in mechanical engineering. After three years service as an officer in the U. S. Air Force, I was employed by Pratt and Whitney Aircraft as a test engineer in the Experimental Engineering Department. In 1965, I went to work with CP&L as an engineer in the Special Services Section. I joined the Rates and Regulation Department in February 1968 and was named Manager of Rates and Service Practices in December 1976. In May 1979, I was elected a Vice President of the Company and on June 1, 1979 became a Group Executive for Fuel & Materials Management. In December 1980, I became Senior Vice President of the Company. I was named Senior Vice President for Operations Support in the reorganization of August 1983. Among the departments under my management is the Operations Training and Technical Services Department which includes the Nuclear Training Section.

Powell:

While serving in the United States Navy for almost 19 years, I received extensive training in various Navy Service Schools. For one year I attended the Navy's Nuclear Power School which provided training in all aspects of nuclear reactor operations. In addition, I received training from the Navy's Radar School, Instructor School, Curriculum Development School and Electronic Maintenance School. While in the Navy, I was also trained in the areas of quality assurance inspection and leadership and management. I have accumulated approximately 60 hours of credit toward a bachelor's degree from Baptist College at Charleston. South Carolina.

After completing the Nuclear Power School, I served on a number of nuclear-powered ships, first as a reactor operator then as Reactor Control Division Supervisor. I was also qualified as Engineering Watch Supervisor and Engineering Officer of the Watch. In 1976, I became an instructor and curriculum developer at the Navy Fleet Ballistic Missile Submarine Training Center in Charleston, South Carolina. While there I was certified as a Master Training Specialist. I was also awarded the Navy Commendation Medal for achievements in training program development and instruction.

After my retirement from the Navy, I joined CP&L in July 1979 as a Generation Specialist in the Generation Department. Subsequently, I served as a Senior Specialist in the Nuclear Training Section. I was certified by the NRC as a senior reactor operator instructor. In December 1983, I became Director-Training of the Harris Training Unit in the Nuclear Training Section. That is the position which I currently hold.

Q3. What is the purpose of your joint testimony?

A3. It is important that the personnel who operate and maintain nuclear power plants be properly trained and qualified. The purpose of our testimony is to discuss the way in which CP&L provides technical training for its nuclear plant personnel. We will highlight CP&L's corporate commitment to training, the structure of our training organization, the scope of the training program, the personnel who provide this training, the Harris training program and some of the positive results that indicate that we have a good program.

Q4. Discuss CP&L's commitment and philosophy related to training.

A4. CP&L's written Corporate Policy on Training states, in effect, that it is CP&L's policy to provide highly trained and qualified personnel to operate and maintain its nuclear plants. Our training programs are designed to achieve those results.

One indicator of CP&L's commitment to training is the resources we devote to it. The Nuclear Training Section currently has an authorized staff of 136.

CP&L has also committed significant resources toward construction of modern training facilities. We have 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. In fact, CP&L was the first utility in the southeast to procure and operate a nuclear plant simulator. This simulator, which is associated with the Harris plant, will be replaced in 1985 with a newer model which more closely replicates the Harris control board. To date, CP&L has invested $32 million in training facilities and equipment.

CP&L's commitment to training is further highlighted by the emphasis we place on obtaining accreditation by the Institute of Nuclear Power Operations

(INPO) of our training programs. In May 1984, CP&L became only the fourth utility to achieve accreditation of a portion of its training programs. Accreditation of the Robinson plant operator training programs was granted by the Accreditation Board based on an evaluation by the INPO Accreditation staff and presentation of these programs at the May 16, 1984 meeting of the Board.

Q5. Please describe the CP&L organization for technical training.

A5. In 1973, CP&L established its first full time training staff when it created the position of training coordinator at the Robinson and Brunswick plants. As our training needs and student population have grown, the training staff has grown to its present strength of 136. More than half of these people are assigned to the three plant training units. The current structure of the training organization and the reporting relationships with the nuclear projects is shown in Davis-Powell Attachment 1.

The 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.

In general, the five units at the E&E Center provide generic training, <u>i.e.</u>, training applicable to all plants, in a classroom or laboratory environment, and the plant training units provide plant-specific training, <u>i.e.</u>, training on the systems, equipment and procedures of a particular plant. For example, much of the auxiliary operator classroom training, which is primarily generic, is conducted at the E&E Center while most reactor operator training, which is primarily plant specific, is conducted by the plant units. These programs are coordinated to ensure completeness without unnecessary duplication.

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 Wayne Powell whose qualifications have already been discussed. In addition, there are directors at the Company's two other nuclear plant sites.

The Director - Training - Robinson Plant is Charlie Bethea. Mr. Bethea holds an SRO license on Robinson and was one of the original Robinson licensees in 1970. He served as a shift foreman on Robinson and has five years of experience in training.

The Brunswick Training Unit is directed by Perry Hopkins. Mr. Hopkins retired after an aviation career in the U.S. Army and Air Force. He has a master's degree in political science from the University of South Carolina. He was a Department Head and Director/Coordinator at Midlands Technical College in Columbia, South Carolina, for six years and worked with the NRC as a resident inspector for one year.

Davis-Powell Exhibit 1 shows the relationships between the plant managers and the plant training directors. We believe that these relationships are a strong feature of our training organization. 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 us 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. We find that this is the most effective way to implement a corporate training organization that is flexible enough and independent enough to meet plant training needs.

At the centrally located 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.

The N&STU is supervised by Mr. Howard Smith. Mr. Smith has 20 years of nuclear experience with CP&L and was among the original Senior Reactor Operator (SRO) licensees on the Robinson plant. He has six years of experience as a shift foreman at Robinson.

The Fossil Operator Training Unit is directed by Mr. Tom Suggs. Mr. Suggs has 20 years power plant experience with CP&L and was a fossil plant shift foreman for 10 years.

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" laboratory training in our well-equipped laboratories where the students perform troubleshooting exercises on actual equipment which is "guaranteed not to work the first time."

The Craft Technical Training Unit is supervised by Mr. Marvin Pate. Mr. Pate has seven years experience with CP&L. Prior to his employment with CP&L, he was employed by Wake Technical College for 10 years, the last 3 years of which he served as Dean of the Vocational Program.

The Curriculum Development Unit supports training in four major areas. This Unit administers the training evaluation program which lets us know how well our courses and instructors are doing, which programs can be improved, and how. 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 our instructors, i.e., they teach our instructors how to teach and provide advice and counsel on the latest training methods and techniques. Most important, the Curriculum Development Unit assists section instructors in actual development of curriculum and lesson material to support classroom and laboratory training.

The Curriculum Development Unit is directed by Dr. Jerry Wright. Dr. Wright has a D.Ed. in industrial education from Texas A&M University and served for four years on the North Carolina State Advisory Council on Education.

The Administrative Unit maintains records, compiles statistics and reports, produces the budget, maintains the technical library, and provides other administrative assistance to the Section.

Mr. Jim Millen supervises the Administrative Unit. Mr. Millen has a degree in business management from Coker College and has worked in several administrative capacities in his twelve year career with CP&L. Most recently, he was Senior Specialist - Administration working directly for the Vice President - Operations Training & Technical Services.

Currently, the Nuclear Training Section staff has 690 man-years of power plant experience of which more than 500 man-years are nuclear. Thirteen of our personnel have held or currently hold NRC SRO or Reactor Operator (RO) licenses and an additional 11 of our personnel are certified by the NRC as SRO instructors.

We believe that we have an effective organization and a well-qualified staff.

Q6. Describe how CP&L qualifies its instructors.

A6. To ensure that our instructors are well qualified in the techniques of teaching, we have developed an Instructor Certification Course which is administered by the Curriculum Development Unit. The 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. The course culminates with a ceremony in which the Company honors newly certified instructors in order to emphasize the importance of the instructor's role in training.

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.

Q7. Please review the technical training programs currently in place at CP&L.

A7. We provide a wide variety of courses for plant personnel, but the focus is on training of operators, maintenance personnel, radiation control technicians, and chemistry technicians. For the operator, mechanic, and electrician classifications, the training programs are designed to take an employee from entry level as a high school graduate to the top of the classification, <u>i.e.</u>, licensed SRO for operations personnel, or a first-class electrician or mechanic for employees in the maintenance area. For technicians, such as I&C, radiation control, and environmental and chemistry technicians, the program is designed to take a two-year technical school graduate to the top of classification, <u>i.e.</u>, Technician I. In addition, we have a variety of courses designed for shift technical advisors, engineers, management personnel, and general plant employees. The training program for the Harris plant is described in Section 13.2 of the Harris Final Safety Analysis Report (FSAR), Amendment 14 which is Applicants' Exhibit ____.

To illustrate the scope and depth of our programs we would like to focus on three areas — General Employee Training, Operator Licensing & Requalification Training, and Craft Technical Training.

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 Level I is a four hour course designed for all CP&L employees, contract employees and vendors working at CP&L's nuclear facilities. It provides basic knowledge in the areas of plant description and operation, personal safety, security, emergency alarms, alcohol and drug abuse and the fundamentals of radiation. GET Level II is an eleven hour course that provides basic knowledge and skills in radiation protection.

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. We 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.

Our Operator License and Requalification Programs are designed to produce highly trained operators to operate safely the controls of our nuclear units. We offer 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.

The auxiliary operator training is designed to provide knowledge and skills in the basic science and technology of power plant operation, including nuclear and reactor theory, heat transfer and fluid flow, mathematics and nuclear plant instrumentation and systems.

The reactor operator training provides skills and knowledge in the areas of advanced nuclear and reactor theory, advanced mathematics, chemistry, metallurgy, fluid flow, and advanced plant systems.

The senior reactor operator training provides advanced academics and fundamentals to prepare a licensed reactor operator to meet the requirements for passing an NRC SRO license exam. The course consists of training in plant operation and procedures, advanced components and systems, transient and accident analysis and a prelicense review.

Craft Technical Training is currently taught at the E&E Center in three levels — basic, intermediate, and advanced. These programs include classroom and laboratory training for nuclear, fossil and hydro plant electricians, mechanics, I&C technicians, radiation control technicians, and environmental and chemistry technicians. The basic courses are designed for recently hired employees who have completed plant orientation and are ready to learn the fundamentals of the tools, instruments, equipment, and procedures for the routine work they will encounter in their jobs. The intermediate courses get into more specialized maintenance procedures and repairs, and, for the employees in technical classifications, more sophisticated equipment and procedures. The advanced courses deal with the theory of operation of plant equipment, the interrelationship of plant systems, troubleshooting, and directing the work of others.

Finally, in preparation for commercial operation of Harris, we are presently conducting cold-license training.

All of our training programs are designed, implemented, and evaluated following the same guidelines and procedures. They incorporate and reflect our 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.

Q8. Would you describe the cold-license training at Harris in more detail?

A8. This program consists of several phases of training. We start with theory. This is a ten week course consisting of a math review, nuclear and reactor theory, heat transfer, fluid flow, thermodynamics, health physics, radiation protection and chemistry.

Following this is a seven day program at North Carolina State University utilizing the Pulstar reactor. Students perform precritical and critical operations of the training reactor, as well as reactor startups. The University gives an NRC-style written exam and operator test at the conclusion of this training.

Eighteen weeks of Harris plant system training is next. The students alternate in one week intervals between formal classroom presentations and system checkouts.

To prepare the trainees for simulator training, a four week pre-simulator course is provided. Topics include theory review; control systems review; emergency, abnormal and normal operating procedures; and a review of recent and related industry events. Another three weeks is devoted to transient and accident analysis and mitigating core damage.

Our simulator training is provided using the Harris simulator. It is approximately a nine week simulator training program designed to duplicate actual plant operations. Rotating shifts are manned by four trainees and two instructors per shift. The shift arrangement allows the trainee to experience realistic plant operations and also allows the training staff an opportunity to observe the trainee during varying conditions.

Q9. How does the Nuclear Training Section interact with and support the nuclear plants?

A9. Powell:

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. For example, at the Harris plant, I discuss training issues with Jim Willis, Plant General Manager, on an average of twice a week, and I attend weekly management meetings and speak for the Nuclear Training Section in those sessions.

The Manager-Nuclear Training, Mr. A. C. Tollison, 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.

Each year, Mr. Tollison holds an evaluation and planning meeting to discuss the medium- and long-range plans of the Section. This meeting is attended by the Section staff and management and by key members of the plant staffs. This year there was a separate meeting with each of the three nuclear plant staffs and with a group of senior management personnel which included each of the three nuclear Project Managers. At these meetings, the plans for nuclear training for the next three years were discussed.

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.

We have nine 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 our curriculum for the craft and technical classifications and any significant proposed changes to the curriculum.

In summary, there is a close relationship between the Nuclear Training Section and the plants.

Q10. What factors demonstrate the adequacy of CP&L's training programs?

A10. There are many indicators that demonstrate the success of our training programs.

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, thirteen passed all sections of it. Two others failed one section of the exam, which they passed after retraining.

Another positive indicator of our training success is the recent accreditation of Robinson operator training programs by the INPO Accreditation Board. The INPO accreditation procedure is similar in many respects to the accreditation program for colleges and universities. It 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. INPO accreditation teams are made up of qualified INPO training evaluators and peer evaluators from utilities. This team examines the training program in detail both at the plant site and at central training facilities. The INPO Accreditation Board is made up of five individuals who are nationally prominent in the field of training.

In addition to the Board members, in our case, four members of the alternate Board were present as was Mr. Hugh Thompson, Director - Division of Human Factors Safety of the NRC. As noted earlier, the INPO Accreditation Board in May 1984 considered the Robinson operator training programs, and granted accreditation. CP&L was only the fourth utility to have any of its programs accredited by INPO. We are currently beginning work toward accreditation of a second series of CP&L training programs.

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. We have 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.

In summary, we believe that current indicators demonstrate that our training program is strong. As with any program, no matter how good, we can make improvements. We are currently working on improvements in several areas in both scope and depth. Current efforts underway include development and implementation of the Craft & Technical Development Program which ties training to employee promotion, and development of improved plant-specific training at each of the nuclear plants, particularly for craft and technical personnel.

Q11. Is your training program in accordance with NRC and INPO guidelines and regulations?

A11. Yes. Our training programs comply with NRC regulations and guidelines and the intent of INPO guidelines and criteria. An integral component of our program development process is a review of regulations and guidelines in conjunction with the task analyses for identifying program content. Applicable regulations and guidelines are referenced in plant training instructions for each training program. We periodically evaluate and review our programs to determine whether there are any new or amended regulations which should be reflected in the program. Currently, our 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. Additionally, we are working to meet the accreditation criteria for Robinson and Brunswick and intend to have training programs at those plants accredited by 1986 and at Harris within two years after fuel loading. We use INPO training guidelines as we revise our training programs to ensure that we meet their intent.

Q12. How do you personally ensure that your training programs and instructors are effective?

A12. <u>Davis:</u>

It is my philosophy that the quality and success of our training program should be measured by the results that are obtained by the nuclear plants. The bottom line is how well our employees perform and how well our plants operate. To judge this result, I review the quality factors that were mentioned earlier, such as success rate on examinations, progress on INPO accreditation, and other quantifiable indicators. We have established a Corporate goal on passing rates for examinations and retention of qualified students in the training program. In addition to these direct measurements, I review other information such as the Systematic Assessment of Licensee Performance (SALP) assessment reports and INPO evaluations.

In addition to reviewing information relative to our training programs, I also obtain feedback first-hand. I think it is very important for all levels of management to stay directly involved in our training activities. I meet with the department manager each week in a staff meeting where I receive reports on our training activities. In addition, I attend a monthly senior management review where the status of our nuclear program including training activities is reviewed. I have visited our training facility at the E&E Center and each of our plant training units at the plant sites, and have sat in on classes conducted by our instructors so that I can view first-hand the material that we are presenting to our students. I also make visits to our plant facilities and talk directly to key plant managers. This helps me assess how well we are meeting our objective of supporting the nuclear plants with trained and qualified people.

Powell:

I try to assess the effectiveness of the training programs and the instructors in several ways. I periodically observe the instructors in the classrooms and at the simulator to see how well the two types of training complement each other.

Frequently, I meet with the Harris Training Unit staff to get their views on how training is progressing. I also review the students' evaluations of their courses and instructors, and I review statistics of test scores in order to ascertain any unusually high rate of error on particular questions.

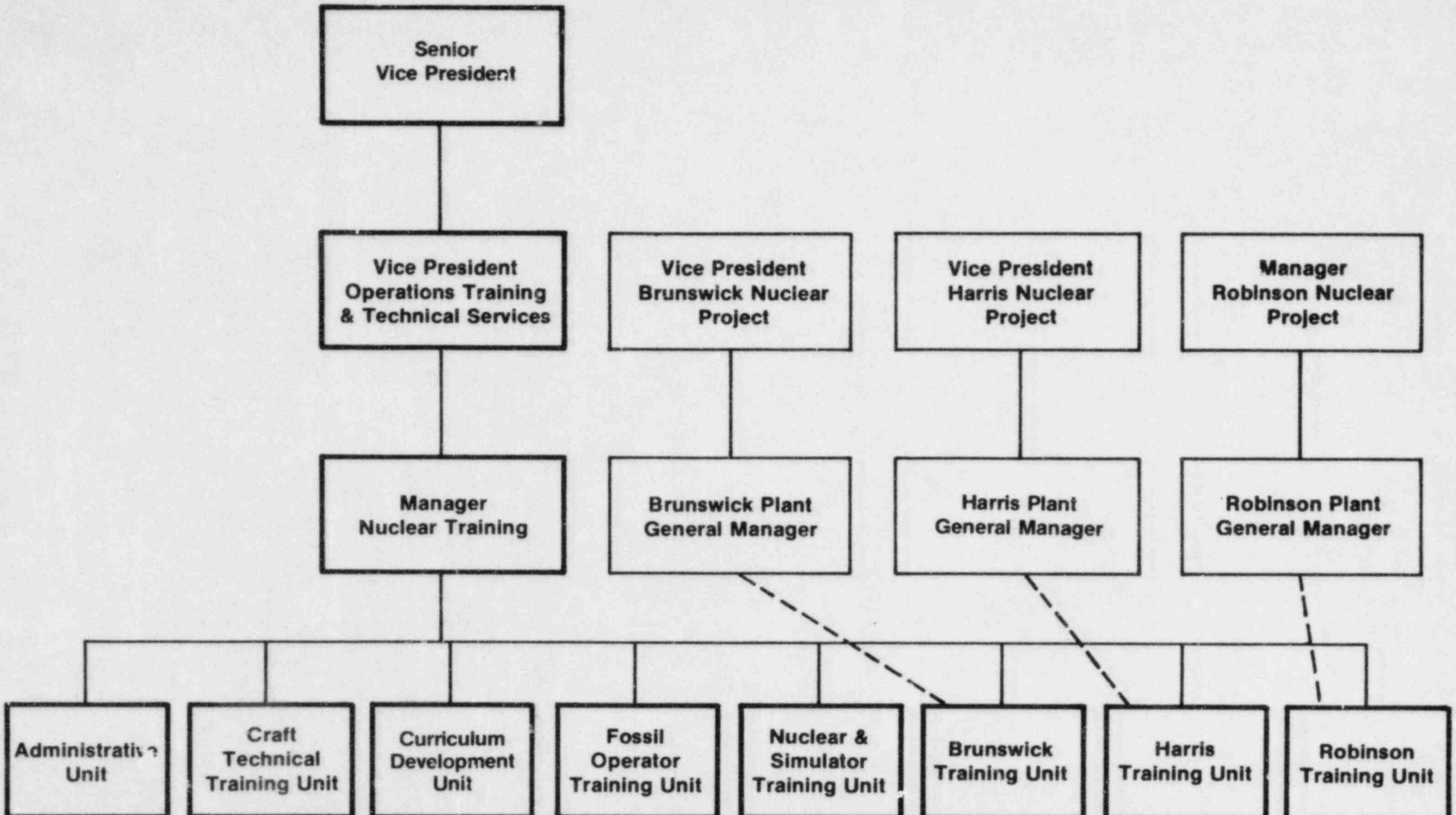
In order to ensure that courses meet the needs of the Harris staff, I encourage input on course development from plant managers and supervisors. In addition, I review industry and NRC publications for significant events that merit incorporation into our training programs.

Finally, I communicate with the training directors at Brunswick and Robinson to learn how their programs are being received and any changes they have made to improve their programs.

Q13. Does that conclude your testimony?

A13. Yes, it does.

DAVIS - POWELL
ATTACHMENT 1



Applicants' Exhibit ______
Joint Intervenors' Contention I
Docket No. 50-400

Shearon Harris Nuclear Power Plant
Final Safety Analysis Report
Section 13.2

13.2 TRAINING*

13.2.1 PLANT STAFF TRAINING PROGRAM

The objective of the SHNPP training program is to develop and maintain an operating organization capable of and responsible for the safe and efficient operation and maintenance of the plant. This training program is designed to comply with the requirements of Regulatory Guide 1.8, "Personnel Selection and Training," with exceptions as stated in Section 1.8. The program is designed to provide training based on individual employee experience and intended position in order to fulfill NRC licensing and personnel qualification requirements for the initial plant staff, replacement personnel, and maintenance and upgrading of plant personnel. Fire brigade training is described in Section 13.2.3. All plant personnel attend certain orientation programs and specialized courses like emergency preparedness, security, health physics, and safety courses in addition to participating in specialized training programs as required by their job positions. 14

13.2.1.1 Program Description

This section describes the formal training program for all initial plant management and supervisory personnel, licensed Senior Reactor Operator (SRO), and licensed Reactor Operator (RO) candidates, technicians, and general employees. An overview of the program schedule is presented in Figure 13.2.1-1.

13.2.1.1.1 Plant Management and Supervisory Personnel Training

The formal training program for the plant management and supervisory personnel provides these personnel with the qualifications necessary to assure that the plant will be operated in a safe and efficient manner. As personnel are designated to fill individual positions, their qualifications are reviewed and training is prescribed such that qualifications required by Section 13.1.3 are met at the time of Operating License issuance or appointment to the position, whichever is later.

Plant supervisory personnel not possessing technical training sufficient for their areas of responsibility will attend specialized training courses as described below. Diesel generator training will be given to operators, operator supervisory personnel, and maintenance supervisors and personnel as discussed in Section 8.3.1.1.1.5.

a) Chemistry - A training course will be taught by the Westinghouse Nuclear Services Division or the equivalent. This pressurized water reactor (PWR) chemist course provides PWR systems training and details of routine chemistry surveillance, and updates and extends knowledge in specific areas of chemistry. Topics covered in the program are listed below: 14

1) The PWR
2) Mathematics review
3) Reactor chemistry
4) Radiochemistry - theory

* Further information is contained in TMI appendix.

5) Radiochemistry - laboratory procedures
6) Operating plant training laboratory procedures

14 b) Instrumentation and Control - A training course will be taught by the Westinghouse Nuclear Services Division or the equivalent. This instrumentation and control engineer course provides an in depth understanding of the instrumentation and control systems used in the Westinghouse PWR. Topics covered in the program are listed below:

1) Introduction to nuclear power plants
2) Flux mapping system
3) Nuclear instrumentation system
4) Rod control system
5) Solid state protection system
6) Radiation monitoring system
7) Rod position indication system
8) Process instrumentation
9) System interfaces

14 c) Nuclear Engineering - The Senior Engineer (Reactor) will attend a training course taught by the Westinghouse Nuclear Services Division or the equivalent. This nuclear engineers' course provides detailed information in those areas for which the Senior Engineer (Reactor) is normally responsible, as well as less detailed discussions of those areas in which he interacts with the remainder of the plant staff. Topics covered in the program are listed below:

1) Review of reactor physics
2) Review of reactor systems
3) Fuel considerations
4) Core design
5) Initial reactor startup program
6) Physics testing
7) Measurement techniques and data reduction
14 8) Power distribution analysis
9) Plant computer
10) Load follow

d) Maintenance - A training course will be taught by the Westinghouse Nuclear Services Division or equivalent. This maintenance management program provides familiarization with those aspects of maintenance which are significantly different from that of a fossil-fired plant. Topics covered in the program are listed below:

1) Introduction to nuclear power plants
2) Radiation protection
3) Nuclear power plant equipment maintenance
4) Maintenance management

13.2.1.1.2 Licensed Operator Training

The formal training program for licensed SRO and licensed RO candidates provides a means of preparing these personnel for station operations and NRC license examinations. The program will be conducted by CP&L personnel with assistance from the Westinghouse Nuclear Services Division or other qualified organizations. The program is made up of a series of segments which are designed to train personnel with various backgrounds. The following plant personnel (as required to meet qualification requirements) will attend this course prior to initial fuel loading of Unit No. 1.

General Manager	(Selected Portions)	14
Manager - Plant Operations	(Selected Portions)	
Manager - Operations	(SRO Candidates)	
Operating Supervisors	(SRO Candidates)	14
Shift Foremen	(SRO Candidates)	
Senior Control Operators	(SRO Candidates)	
Control Operators	(RO Candidates)	14

Each section of the training program and its duration is detailed below:

a) Basic Auxiliary Operator Training Program - This course consists of nine weeks of classroom training interspersed with nine weeks of structured on-the-job/plant-specific training. The course is designed to provide theoretical training in and in-plant training to provide reinforcement of the basic science and technology of power plant operations. This course is 14
presently available and constitutes a major portion of the training program for operators at all of the Company's plants, both nuclear and fossil. The topics covered in the course are listed below:

1) Basic Power Plant Operations
2) Essentials of Mathematics (review through algebra)
3) Mathematics II Applications
4) Plant Science
5) Plant Cycle
6) Plant Auxiliary Equipment
7) Plant Systems
8) Basic PWR Plant Operation
9) Basic BWR Plant Operation
10) Basic Electricity
11) Plant Instrumentation 14
12) Basic Water Chemistry
13) Fuels and Combustion*
14) Boilers*
15) Water Treatment
16) Turbines
17) Environmental Protection Systems*
18) Instrument and Control Systems
19) Power Generation
20) Electrical Systems and Equipment
21) Plant Protection
22) Gas Turbines and Diesels

Examinations are given regularly throughout this phase of training to monitor the trainees' progress. Each trainee must achieve no less than a 80 percent 14

* Subjects not taken by nuclear or radwaste designated operators.

14 average grade in this course prior to entering the next phase of the training program.

b) Nuclear Auxiliary Operator Training Program - This program is designed to provide those persons with little or no nuclear background with the necessary theoretical knowledge to become proficient auxiliary operators. The program consists of approximately four weeks of formal classroom training interspersed with on-the-job training at the trainees' assigned plants. The
14 topics covered are listed below:

1) Math Review
2) Nuclear Theory
14 3) Heat Transfer
4) Radiation Protection
5) Instrumentation and Control
6) Reactor Protection

c) Control Operator Candidate Training Program - This program is designed to follow the Nuclear Auxiliary Operator Course for all new operator personnel with limited or no nuclear experience in nuclear operations. The program consists of approximately ten weeks of classroom training. The topics are listed below:

1) Math Review
2) Fluid Flow
3) Nuclear Theory
4) Reactor Theory
5) Chemistry
6) Metallurgy

14 d) SHNPP Cold License Theory Training - This is a formal, approximately 11-week training program. Reviews and examinations will be given regularly to evaluate the effectiveness of the training. To successfully complete this training requires a minimum average grade of at least 80 percent. The subject areas covered by this training are listed below:

1) Math Review
2) Nuclear and Reactor Theory
3) Heat Transfer, Fluid Flow, and Thermodynamics
4) Health Physics, Radiation Protection, and Chemistry
5) Pulstar Reactor Training at N. C. State

e) Cold License Systems Training and Systems On-The-Job Training - During this 18-week portion of the Cold License Training Program, the students will gain knowledge of actual plant systems configuration and operation. This course consists of nine weeks of systems classroom training alternating with nine weeks of systems research and systems tracing (where possible). Effectiveness of this training will be monitored through written examinations and systems checkouts. A record of systems checkouts will be kept on a Harris Plant Systems Qualification Card which will be completed over the duration of the course. To maintain standardization, Systems Qualification Guidelines outlining specific knowledge required for each system have been provided to all students and training personnel. To successfully complete system training requires a minimum average grade of 80 percent for written examinations. All system checkouts must have a grade of "satisfactory." Plant systems to be covered are listed below:

System

1) Reactor Coolant System
2) Reactor Vessel and Internals
3) Steam Generator
4) Pressurizer
5) Reactor Coolant Pumps
6) Chemical and Volume Control System
7) Safety Injection System
8) Residual Heat Removal System
9) Containment Spray System
10) Containment Coolant System
11) Auxiliary Feedwater System
12) Containment Isolation System
13) Component Cooling System
14) Normal and Emergency Service Water System
15) Hydrogen Recombiners
16) Post Accident Hydrogen Purge System
17) Post Accident Hydrogen Monitoring System
18) Cold Leg Accumulators
19) Control Room Ventilation System
20) Fuel Handling Building Ventilation System 14
21) Auxiliary Building Ventilation System
22) Boron Thermal Regeneration System
23) Fuel Pool Cooling System
24) Instrument and Service Air Systems
25) Fuel Handling and Storage
26) Demineralized Water System
27) Primary Makeup System
28) Boron Recycle System
29) Fire Protection System
30) Communication System
31) Sampling System
32) Trace Heating
33) Main Steam System
34) Auxiliary Steam System
35) Condensate and Feedwater Systems
36) Condensate Polishers and Demin
37) Main Turbine and Generator
38) T-G lube Oil
39) Main Turbine Sealing Steam and Exhaust
40) Generator Gas System
41) Hydrogen Seal Oil System
42) Electro Hydraulic System
43) Turbine Supervisory Control System
44) Main Condenser Evacuation System
45) Steam Dump System
46) Moisture Separator Reheaters and Feedwater Heaters
47) Cooling Tower
48) Ultimate Heat Sink

49) Essential Services Chilled Water System
50) Nonessential Services Chilled Water System
51) Waste Process Building Cooling Water System
52) Circulating Water System
53) Nuclear Instrumentation System
54) Reactor Protection System
55) Steam Generator Water Level Control System
56) Pressurizer Pressure Control System
57) Pressurizer Level Control System
58) Incore Instruments
59) Steam Dump Control System
60) Sequencer
61) Metal Impact Monitoring System
62) Seismic Monitoring System
63) Rod Control System
64) Offsite Power System
65) 6.9 Kv Auxiliary System
66) 480 Volt Auxiliary System
67) 208/120 Volt AC System
68) 120 Volt Uninterruptable AC System
69) Standby AC Power Supply (Diesel)
70) DC Power System
14 71) Control Room Area Ventilation System
72) Fuel Handling Ventilation System
73) Auxiliary and Radwaste Area Ventilation System
74) Turbine Building Area Ventilation System
75) Engineered Safety Feature Ventilation System
76) Containment Ventilation System
77) Control Rod Drive Mechanism Ventilation System
78) Containment Atmosphere Purge Exhaust System
79) Diesel Generator Fuel Oil System
80) Diesel Generator Cooling Water System
81) Diesel Generator Air Starting System
82) Diesel Generator Lubrication System
83) Diesel Generator Combustion Air Intake and Exhaust
84) Diesel Engine
85) Liquid Waste Systems
86) Solid Waste Systems
87) Waste Gas System
88) Radiation Monitoring System
89) Subcooled Monitoring System

Knowledge of plant systems will be augmented by participating in procedures development, system acceptance testing, and hot functional testing.

f) Cold License Procedure, Theory Review, and Simulator Preparatory Training - This approximately five-week course is administered prior to going to the simulator. Review and examinations will be conducted regularly to evaluate training effectiveness. Topics covered in this course include: 1) Procedures; 2) Theory Review; 3) Mitigation of Core Damage; 4) Transient and Safety Analysis; 5) Safety and Control Systems Review; 6) Review of Industry Events; and 7) Station Blackout.

g) Cold License Simulator Training - The Cold License Simulator Training Program will be approximately nine weeks in length (eight weeks minimum). The training will include, but not be limited to: 1) control board familiarization; 2) control functions; 3) procedure usage (including Plant Emergency Procedure Implementation); 4) transient and accident analysis; and 5) control manipulations during normal, abnormal, and emergency conditions (include multiple failures). Emphasis will be placed on integrated system response under normal and emergency conditions including control room instrument response, diagnostics, and mitigation of core damage. During the training, shift relief will be included in order to provide experience in the areas of total plant operation and control under normal and emergency conditions in a realistic control room environment. The training staff will monitor progress and performance during the training and instruct as required through periodic critiques. Written and operating examinations patterned after NRC licensing examinations will be administered after completion of simulator training to certify cold license candidates at the Reactor Operator and/or Senior Reactor Operator level.

h) Cold License Review Series and Audit - This portion of the Cold License Training Program will be conducted at the SHNPP site during the period between the completion of hot functional testing and the administering of NRC licensing examinations. The review series consists of approximately 2 weeks of instruction including 5 hours per day of classroom work with the remainder of the day being used for special instruction, plant tours, and individual study. The topics covered in this lecture series include: 14

1) Reactor physics and kinetics
2) Reactor control and protection systems
3) Health Physics and plant chemistry
4) Technical Specifications
5) Transient, instrument failure, and accident analysis (PTS)
6) Normal and emergency operating procedures
7) Heat transfer, fluid flow and thermodynamics
8) Pressurized Thermal Shock

The audit phase of this portion of the Cold License Training Program will consist of written and oral examinations. The purpose of this audit will be to identify any areas requiring additional training effort. Individual or group weak areas identified by this audit will be corrected by intensive training efforts for those involved and training program modifications to minimize recurrence in future classes.

i) Cold License Pre-License Review - This approximately four-week phase of training is designed to improve the weak areas brought out from audits and to bring the License Candidates to a peak knowledge level for the NRC examinations. Plant procedures and subjects are listed below:

1) Procedures
2) Theory Review
3) Mitigating Core Damage
4) Transient and Safety Analysis
5) Safety and Control Systems Review

6) Review of Industry Events
7) Review of plant and procedure changes since initial training
8) Simulator Review

j) Other Cold License Training Required - Cold License Candidates will receive training in the following areas:

1) Fire Brigade Training
2) Emergency Plan Training
3) Security Training
4) Management Training for Licensed Supervisors (for personnel requiring SRO Licenses) 14

a) Leadership
b) Interpersonnel Communication
c) Command Responsibility
d) Motivation of Personnel
e) Problem and Decision Analysis
f) Administration Requirements
g) Aberrant Behavior Training

5) Specific Plant Experience
6) Fuel Handling Operations Training

k) Training on Special Low Power Testing - Each licensed reactor operator (RO) or senior reactor operator (SRO) who performs RO or SRO duties shall participate in the initiation, maintenance and recovery from natural circulation. All RO's and SRO's who perform license duties shall be scheduled for this event. However, if participation is prevented by unforeseen events, the affected RO or SRO shall participate in natural circulation on the simulator, complete a walk-thru, and review the test in its entirety with an SRO who participated in the test; these actions shall be completed before licensed duties are assumed.

13.2.1.1.3 Shift Engineer (Shift Technical Advisor) Training

Shift Engineers will be provided with training in the following areas, as a minimum:

1) Duties and responsibilities of the Shift Engineer
2) Plant design and layout
3) Accidents analyzed in this FSAR and their consequences
4) Thermodynamics and fluid flow
5) Integrated plant response
6) Capabilities and limitations of plant instruments and controls

Additionally, Shift Engineers will receive a minimum of two weeks of training on the SHNPP simulator to include asterisked [*] items in Section 13.2.2.1.2a.

13.2.1.1.4 Technical Personnel Training

Technical personnel who require specialized training to properly perform in their areas of responsibility will attend formal training courses in their particular specialities as well as receive on-the-job training at the plant site prior to start-up. This training is described below:

a) Radiation Control and Test (RC and Environmental & Chemistry (E&C) Technician Training - RC and E&C Technicians (not having the qualifications shown in Section 13.1.3.1) will be required to complete the applicable training programs described below:

1) Basic Course Series - RC and E&C Technician III

a) Basic Chemistry - 2 weeks
b) Basic Health Physics - 2 weeks
c) Basic Counting Room - 1 week
d) Basic Environmental - 1 week

2) Intermediate Course Series - RC and E&C Technician II

a) Intermediate Chemistry - 1 week
b) Intermediate Health Physics - 1 week
c) Intermediate Counting Room - 1 week
d) Intermediate Environmental - 1 week 14

At and above the RC and E&C Technician I level, specialized training will be provided as necessary by the Company or by vendors. Radiation Control and Environmental & Chemistry personnel will also receive on-the-job training by participating in systems checkout and start-up, preparing the laboratories for service, participating in initial radiation surveys, and participating in the writing, review, and study of radiological and chemical procedure manuals.

b) Instrumentation and Control (I&C) Technician Training - I&C Technicians not having the appropriate qualifications as shown in Section 13.1.3.1 will be required to complete the applicable training programs described below prior to appointment to their respective positions.

1) Basic I&C Course Series - I&C Technician III

a) Basic Electronic Instrumentation - 1 week
b) Basic Pneumatic Instrumentation - 2 weeks
c) Basic Electromechanical Devices - 1 week

2) Intermediate I&C Course Series - I&C Technician II

a) Intermediate Electronic Instrumentation - *
b) Intermediate Pneumatic Instrumentation - *
c) Intermediate Electromechanical Devices - *

At and above the I&C Technician I Level, specialized training will be provided
14 as necessary by Carolina Power & Light Company or by vendors. Additionally, Instrumentation and Control Technicians will receive on-the-job training prior to startup by participating in checkout and testing of control circuits, annunciator responses, computer inputs, calibration of controls and instruments, and troubleshooting various equipment problems.

c) Mechanic and Electrician Training - Mechanics and Electricians not having the qualifications shown in Section 13.1.3.1 will be required to complete 4-week basic and/or 4-week intermediate courses in their respective crafts. Additionally, Mechanics and Electricians will receive on-the-job training with the equipment on the plant site. Mechanics and Electricians may receive advanced or specialized training for their individual functions as necessary through attendance at CP&L or vendor courses.

d) Radwaste Operator Training - Radwaste Operations personnel not having the qualifications shown in Section 13.1.3.1 will be required to complete a training program in radwaste operations. This program will be conducted by CP&L personnel with assistance from vendors as necessary. The program will consist of the Basic Auxiliary Operator Training Program and applicable
14 portions of the Basic E&RC Training Program described above, augmented by classroom and structured on-the-job training in the areas of radwaste systems and procedures and related technical specifications. Additionally, radwaste operations personnel will receive on-the-job training in their area of responsibility through participating in system checkout and start-up. A
14 qualification card system will be utilized by all Radwaste Operators.

13.2.1.1.5 Auxiliary (Non-Licensed) Operator Training

Auxiliary Operators will participate in the Basic Auxiliary Operator Training Program and the Nuclear Auxiliary Operator Training Program as described in Section 13.2.1.1.2. This training, along with a qualification card system, will provide sufficient training and evaluation for these individuals to become qualified Auxiliary Operators.

13.2.1.1.6 General Employee Training

All permanently employed plant personnel (those assigned on a day-to-day basis) will participate in a General Employee Training Program consisting of, but not limited to, Radiological Health and Safety Quality Assurance,
14 Industrial Safety, Plant Security, Emergency Plan, Fire Protection, and other appropriate plant plans and procedures. General employee training will be provided to Company personnel at the time of employment at the plant or as soon thereafter as practicable. This training is designed to qualify personnel to be badged for unescorted entry into various parts of the

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* This series includes approximately four instructional weeks.

operating plant and to be able to function safely and recognize problems that need to be reported within these areas. There will be annual requalification training and testing to ensure that all plant personnel remain current in the areas of plant plans and procedures.

The Nuclear Operations Department has an orientation program for all new employees that is designed to acquaint the new employee with the policies, procedures, practices of the Company and the Department. Included in this orientation and review of the "Corporate Quality Assurance Program Policy Statement," "Corporate Nuclear Safety Policy," and "Corporate Health Physics Policy." These policy statements are contained in an orientation program manual that is provided to each new employee. 14

13.2.1.1.7 Previous Nuclear Training

Plant operating and supervisory personnel who must qualify for license examinations are categorized by experience into the following groups.

a) Individuals with no previous nuclear experience

b) Individuals with nuclear experience at facilities not subject to licensing.

c) Individuals holding or who have held licenses for comparable facilities.

Persons in category A) above will participate in all portions of the Licensed Operator Training Program described in Section 13.2.1.1.2.

Persons in category B) above will receive training as required based upon their experience on a case-by-case basis.

Persons in the third category will receive on-site training to prepare them for the NRC license examination.

13.2.1.2 <u>Coordination with Preoperational Tests and Fuel Loading</u>

Figure 13.2.1-1 presents the various training programs in relation to preoperational testing and fuel loading. In the event that fuel loading is delayed after the completion of the formal training program, a continuing review and update program, similar to the requalification program described in Section 13.2.2.1, will be conducted for, as a minimum, those individuals scheduled for cold license examinations.

13.2.2 REPLACEMENT AND RETRAINING

A training program will be utilized to maintain the proficiency of the plant operating organization after the initial plant start-up. This training program will include, as described below, requalification training for licensed personnel, and replacement training for replacement personnel.

13.2.2.1 Licensed Operator Requalification Training

Following the initial licensing of cold license candidates, a requalification training program will be initiated to maintain and demonstrate the continued competence of all licensed personnel. This requalification training program will be conducted on an annual basis and will include pre-planned lectures, on-the-job training, and regular and continuing operator evaluation. The SHNPP simulator will be used to fulfill appropriate portions of this retraining program.

13.2.2.1.1 Lectures

A minimum of six pre-planned lectures will be presented during each requalification cycle. These lectures will be scheduled throughout the year taking into account heavy vacation periods and infrequent operations such as refueling periods and forced outages. Lectures may be deferred due to unanticipated shutdowns. However, these lectures shall be conducted as soon as practicable thereafter. Content of the lectures shall take into consideration the categories as listed in 10CFR Part 55, Appendix A, heat transfer, fluid flow, thermodynamics, mitigation of accidents involving a degraded core, operating experiences from similar plants and the results of the annual examination. Training aids such as films, video tapes, and slides may be used and some self-study may be required in conjunction with the lectures. An instructor will present or attend as an auditor at least 50 percent of the lecture series.

All licensed individuals will be required to attend every pre-planned lecture except those specifically exempted. Exemptions will be allowed only for individuals scoring greater than 80 percent in the corresponding area on the previous examination.

13.2.2.1.2 On-the-job Training

The on-the-job training portion of the requalification program will consist of the following:

a) Control Manipulation -Licensed reactor operators shall manipulate and senior reactor operators shall manipulate or direct or evaluate the activities of those manipulating the station controls through a minimum of ten reactivity changes during each annual cycle. These manipulations may consist of any of the following, providing that asterisked items are performed annually and all other items are performed on a two year cycle:

*1) Start-up to the point of adding heat

2) Orderly shutdown

*3) Manual steam generator control during start-up and shutdown

4) Boration and/or dilution during power operation

*5) Any significant (>10 percent) power changes in manual rod control

6) Turbine start-up and shutdown

*7) Loss of coolant

(a) Including significant steam generator leaks

(b) Large and small including leak rate determination

(c) Resulting in saturated RCS

8) Loss of instrument air

9) Loss of electrical power and/or degraded power sources

*10) Loss of forced coolant flow/natural circulation

11) Loss of circulating water/condenser vacuum

12) Loss of service water

13) Loss of shutdown cooling

14) Loss of component cooling system or CCW to an individual component

15) Loss of normal feedwater or normal feedwater system failure

*16) Loss of all feedwater (normal and emergency)

17) Loss of protective system channel

18) Control rod misalignment or drop

19) Inability to drive control rods

20) Conditions requiring emergency boration

21) High activity in reactor coolant

22) Turbine or generator trip

23) Malfunction of automatic control system(s) which affect reactivity

24) Malfunction of CVCS system

25) Reactor trip

26) Main steam line break (inside or outside containment)

27) Nuclear instrumentation failure(s)

These control manipulations may be performed on the SHNPP simulator.

b) Knowledge of Plant Systems - Individuals licensed as reactor operators and senior reactor operators shall demonstrate an understanding of the operation of controls and equipment and shall be familiar with the operating procedures in each area for which they are licensed. | 14

Demonstration methods may include any of the following:

1) Manipulation of the systems and their associated equipment.

2) A walk-through of the procedural steps required to start, stop or change conditions of the system.

3) Use of the SHNPP simulator

c) Knowledge of Facility Design, Procedure, and Facility License Changes: Licensed reactor operators and senior reactor operators shall be made aware of safety-related facility design changes that affect station operation, operating procedure changes and facility license changes.

Demonstration methods include any of the following:

1) Brief lectures conducted by the Operating Supervisor or other appropriate personnel.

2) Staff meetings

3) Written communications to each licensed individual from facility management

4) Explanation of major changes as part of the pre-planned lecture series

d) Knowledge of Emergency Operating Procedures: Licensed reactor operators and senior reactor operators shall review the contents of emergency operating procedures periodically such that knowledge of these procedures is maintained.

Demonstration methods may include any of the following:

1) Actual performance under emergency conditions

2) Drills using the SHNPP simulator

3) A walk-through of the procedural steps necessary to cope with the situation

4) Brief lectures conducted by the Operating Supervisor or other appropriate personnel

5) Self-study combined with items 1) through 4) above.

13.2.2.1.3 Evaluation

The evaluation program for licensed personnel will include the following:

a) Annual Written Examination: Annual examinations comparable in scope and degree of difficulty to an NRC examination shall be given to each licensed reactor operator and senior reactor operator. The examination will contain categories of examination questions as follows:

1) Theory and principles of operation

2) Heat transfer, fluid flow and thermodynamics

3) General and specific operating characteristics

4) Plant instrumentation and control systems

5) Plant protection systems

6) Engineered safety systems

7) Normal and emergency operating procedures

8) Radiation control and safety

9) Technical specifications

10) Applicable portions of Title 10, Chapter 1, Code of Federal Regulations

11) Operating experience from similar plants

A grade of less than 70 percent in any category shall require accelerated requalification in that category. A grade of less than 80 percent overall requires accelerated requalification in all categories graded less than 80 percent.

b) Annual Observation and Written Evaluation: Observation and evaluation of the performance of licensed reactor operators and senior reactor operators by supervisors or training staff members will include evaluation of performance during actual or simulated emergency conditions. Observation and evaluation of the performance of licensed personnel during simulated emergency conditions may be conducted by simulator training staff personnel. Discussions of actions taken or to be taken during emergency situations may be used as evaluation tools in lieu of or in addition to the above methods. Any licensed reactor operator or senior reactor operator given an unsatisfactory overall evaluation shall require accelerated requalification.

13.2.2.1.4 Accelerated Requalification

Persons requiring accelerated requalification as a result of annual evaluation shall not perform licensed duties until sucessfully completing the program. Accelerated requalification shall be given in the categories required or areas identified in the annual observation and written evaluation. The Training Supervisor will tailor the scope and duration of the accelerated program to the individuals' demonstrated deficiencies. Successful completion of the program shall be measured by a reexamination of individual categories, repeating an entire written annual examination or reevaluation by observation or oral examination. Successful completion of an accelerated requalification program shall be by the grade criteria in Section 13.2.2.1.3.

13.2.2.1.5 Training Personnel

Training personnel who are licensed are exempt from the provisions of Section 13.2.2.1, for which they have primary responsibility for administering. For example, individuals responsible for preparing, administering, and grading the annual written examination will be credited with successfully completing the examination.

13.2.2.2 Nonlicensed Personnel Retraining

Nonlicensed personnel shall receive retraining on the topics listed in Section 13.2.1.1.4 on a regularly scheduled basis. In addition, retraining shall include familiarization with plant operating experience, modifications and design changes, revision to procedures and indoctrination in new procedures applicable to the personnel involved.

13.2.2.3 Replacement Training

Replacement training is conducted to fill vacancies and prepare individuals for increased responsibility in the supervisory, technical, operating, and maintenance staffs. Replacement personnel will receive training in areas in which they are not already qualified by reason of experience, technical training, and/or on-the-job training.

Radiological Control and Test Technicians, Instrumentation and Control Technicians, Electricians, Mechanics, and Radwaste Operators will receive general training in their job areas as part of the Company craft development program. This program provides sufficient training, as described in Section 13.2.1.1.3 to enable newly hired personnel to advance to become competent and proficient craftsmen.

Auxiliary operators may eventually qualify to enter a "hot" license training program designed to prepare them to become licensed Control Operators.

In the overall program, replacement personnel will receive training comparable to that received by the initial staff. This will ensure that the required level of proficiency is maintained in all positions.

13.2.3 FIRE BRIGADE TRAINING

13.2.3.1 Fire Brigade Members

13.2.3.1.1 Instruction

Instructions in the topics listed below will be administered to each individual prior to assignment as a fire brigade member. The instructions will include:

a) Identification of the location and types of fire hazards that could produce fires within the plant, including identification of the areas where breathing air will be required.

b) Identification of the location of installed and portable fire fighting equipment in each area, and familiarization with the layout of the plant, including access and regress routes to each area.

c) Proper use of available equipment, and the correct methods of fighting the following types of fire: electrical, cable and cable trays, hydrogen, flammable liquids, waste/debris, and record file.

d) Indoctrination to the plant fire fighting plan, with coverage of each individual's responsibilities and their changes.

e) Proper use of breathing, communication, lighting, and portable ventilation equipment.

f) A detailed review of procedures, with particular emphasis on what equipment must be used in particular areas.

g) A review of the latest modifications to the facility, procedures, fire fighting equipment, and fire fighting plan.

h) The proper method of fighting fires inside buildings and tunnels.

Refresher instructions will be provided to all fire brigade members on a regularly scheduled basis of not less than four sessions a year with sessions to be repeated at a frequency of not more than 2 years. Instructions will be provided by qualified individuals knowledgeable and experienced in fighting the fires that could occur in the plant with the equipment available at the plant. Special instructions will be provided for fire brigade leaders in directing and coordinating fire fighting activities.

13.2.3.1.2 Practice Sessions

Practice sessions will be held for fire brigade members to teach them the proper method of fighting various types of fires and to provide them with practice in extinguishing actual fires. These sessions will be conducted at facilities sufficiently remote from the nuclear plant so as not to endanger safety-related equipment, with the sessions provided at regular intervals not exceeding 1 year. These practice sessions will be conducted requiring fire | 2

2 brigade members to don protective quipment, including emergency breathing apparatus.

13.2.3.1.3 Drills

Drills will be performed in the plant so that the fire brigade will remain proficient in fire fighting techniques. These drills will include:

a) The simulated use of equipment for the various situations and types of fires which could reasonably occur in each safety-related area.

b) Conformance, where possible, to the established plant fire fighting plans.

c) Operation of fire fighting equipment, where practical, including self-contained breathing apparatus, communication equipment, and portable and installed ventilation equipment.

Drills will be performed at regular intervals, not to exceed three months, for each fire brigade to allow members of the brigade to train as a team. At least one drill per year for each fire brigade will be unannounced to determine the fire readiness of the plant fire brigade and plant fire protection systems and equipment. Drills will be planned to establish training objectives and will be critiqued to determine how well the training objectives were met. This critique will, as a minimum, assess: fire alarm effectiveness; response time; selection, placement and use of equipment; the fire brigade chief's direction of the fire fighting effort; and each fire brigade member's response to the emergency.

A drill will be held annually at which offsite fire department participation will be requested.

13.2.3.2 <u>Other Station Employees</u>

13.2.3.2.1 Instruction for All Non-Fire Brigade Members

Once a year all employees will be instructed on the fire protection plan, evacuation routes, and procedures for reporting a fire. Security personnel will be instructed in entry procedures for offsite fire departments, crowd control for people exiting the stations, and procedures for reporting potential fire hazards observed when touring the facility. Instruction will also be given to all shift personnel who will assist the fire brigade in the event of a fire. Temporary employees will be given instructions to familiarize them with the plant's evacuation signals, evacuation routes, and procedures for reporting fires.

13.2.3.2.2 Drills

A plant evacuation drill will be performed annually.

13.2.3.3 Fire Protection Staff

Fire protection staff members will be introduced to a program of specialized training. Instructions for the staff will include:

a) Analysis of building layout and system design with respect to fire protection requirements, including consideration of potential hazards associated with postulated design basis fires.

b) Design and maintenance of fire detection suppression and extinguishing systems.

c) Fire protection techniques and procedures.

d) Training in manual firefighting techniques and procedures for plant personnel and the fire brigade.

13.2.3.4 Offsite Fire Departments

In accordance with commitments for the use of offsite fire departments, the training offered these offsite fire fighting personnel will include courses in basic radiation principles and practices. Additional training will be offered to familiarize them with typical radiation hazards that may be encountered when fighting fires at a nuclear power plant. 2

13.2.3.5 Construction Personnel

Training for construction personnel will include instructions in reporting fires, responding to alarms, and locating evacuation routes.

13.2.3.6 Initial Training

The initial fire protection training program will be completed prior to receipt of fuel at the site. The Emergency Plan implementing procedures for fire protection will be completed at least three months prior to receipt of fuel. Sufficient fire protection drills will be performed immediately prior to fuel receipt to provide assurance that the plant staff is adequately trained to cope with fire-related emergencies.

13.2.4 APPLICABLE NRC DOCUMENTS

The applicable portions of the NRC regulations, RG's, and reports listed below will be used in providing guidance in the training of plant personnel.

a) 10CFR50, "Licensing of Production and Utilization Facilities"

b) 10CFR55, "Operators' Licenses"

c) 10CFR19, "Notices, Instructions, and Reports to Workers; Inspections"

d) RG 1.8, "Personnel Selection and Training"

e) RG 1.101, "Emergency Planning for Nuclear Power Plants"

f) RG 1.120, "Fire Protection Guidelines for Nuclear Power Plants"

g) RG 8.2, "Guide for Administrative Practices in Radiation Monitoring"

h) RG 8.8, "Information Relevant to Maintaining Occupational Radiation Exposure As Low As Is Reasonably Achievable (Nuclear Power Reactors)"

i) RG 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable"

j) RG 8.13, "Instruction Concerning Prenatal Radiation Exposure"

k) Utility Staffing and Training for Nuclear Power, "WASH-1130", revised June 1973.

l) NRC Operator Licensing Guide, NUREG-0094, July 1976.

m) H. R. Denton's NRC Letter of March 28, 1980, Subject Qualifications of Reactor Operators

n) NUREG 0737 "Clarification of TMI Action Plan Requirements."

o) NUREG 0694 "TMI Related Requirements for New Operating Licenses."

p) NRC Generic Letter 81-04 "Emergency Procedures and Training for Station Blackout Events."

q) RG 8.27, "Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants." 5

r) RG 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure"

Applicants' Exhibit ______
Joint Intervenors' Contention I
Docket No. 50-400

Shearon Harris Nuclear Power Plant
Final Safety Analysis Report
Sections 13.0 - 13.1.3.2
and
Sections 13.4.1 - 13.5.2.2

CHAPTER 13

13.0 CONDUCT OF OPERATIONS

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13.0 CONDUCT OF OPERATIONS

13.1 ORGANIZATIONAL STRUCTURE OF APPLICANT*

13.1.1 MANAGEMENT AND TECHNICAL SUPPORT ORGANIZATION

13.1.1.1 Design and Operating Responsibilities

The following paragraphs summarize the degree to which design, construction, and preoperational activities have been accomplished, and describe specific responsibilities and activities relative to technical support for operations.

a) Design and Construction Activities (Project Phase):

1) Principle Site-Related Engineering Work

(a) A preoperational meteorological monitoring program was established at the site on March 23, 1973. The instrumentation system was specified by Research Triangle Institute following review and approval by CP&L. Operation, maintenance, and data processing were conducted by the CP&L meteorological staff. System modification, in accordance with PSAR commitments were implemented in January 1979 by CP&L meteorologists.

(b) Geology and Seismology - The primary responsibility for geological and seismological investigation was assigned to Ebasco Services with Assistance from CP&L consultant, Dr. J. L. Stuckey. As a subcontractor to Ebasco Services, Dames & Moore conducted seismological studies and derived the seismic design parameters including the design response spectra.

(c) Hydrology - All hydrologic data, analyses, and conclusions were developed by Ebasco Services. They were reviewed and approved by CP&L.

(d) Demography - The Research Triangle Institute, a private consulting company, and CP&L performed demographic studies relative to population, size, density, and distribution within 50 miles of the plant, as discussed in Sections 2.1.3, and 2.2.

(e) Environmental Effects - Baseline environmental monitoring programs were initiated at the SHNPP site for CP&L by Aquatic Control, Inc., an ecological consulting company, during April, 1972. Terrestrial biology studies were conducted by Aquatic Control, Inc. through June, 1974, and aquatic ecology studies continued through March, 1975. After these dates, CP&L staff biologists assumed responsibility for environmental studies. Designs of environmental programs through December, 1978, are discussed in:

* Further information is contained in the TMI Appendix.

Carolina Power & Light Company, prepared by Aquatic Control, Inc. Baseline Biota of the Shearon Harris Nuclear Power Plant Area, North Carolina. Raleigh, N.C. - undated and prepared in 1974.

Carolina Power & Light Company, prepared by Aquatic Control, Inc. Baseline Biota of the Shearon Harris Nuclear Power Plant Study Area, June 1973 - May, 1974. Raleigh, N.C., 1975.

Carolina Power & Light Company, prepared by Aquatic Control, Inc. Aquatic Baseline Biota of the Shearon Harris Power Plant Study Area, North Carolina, 1974 - 1975. Raleigh, N.C., 1976.

Carolina Power & Light Company. Shearon Harris Nuclear Power Plant Pre-Construction Monitoring Report, Terrestrial Biology (June, 1974 - January, 1978), Water Chemistry (1972 - 1977). Raleigh, N.C., 1978.

Carolina Power & Light Company. Annual Report: Shearon Harris Nuclear Power Plant, Baseline Monitoring Program, Aquatic Biology Unit, 1976 and 1977. Raleigh, N.C., 1978.

Carolina Power & Light Company. Shearon Harris Nuclear Power Plant, Annual Environmental Monitoring Report, Water Chemistry, Aquatic Biology, Terrestrial Biology, 1978. Raleigh, N.C., 1979.

In January, 1978, the SHNPP Construction Permit Biological Monitoring Program was issued in compliance with the Construction Permit requirements. Environmental monitoring programs described in that document are performed by CP&L staff biologists and will continue until
15 | one year after the plant is in operation. Reporting requirements are limited to maintaining current data and procedures on file for access by the NRC Office of Inspection and Enforcement.

2) Design of Plant and Ancillary Systems - An evaluation of
15 | engineering progress for the plant as of September 30, 1983 indicated overall completion of 94.3 percent.

3) Review of Approval of Plant Design Features - Design control and review of plant design features are performed in accordance with the Engineering and Quality Assurance Program approved by the NRC during the Construction Permit Review.

4) Development of Safety Analysis Reports - Overall responsibility for the preparation of the Final Safety Analysis Report rests with CP&L. Preparation of individual sections was assigned to the cognizant technical groups within CP&L, Westinghouse, and Ebasco Services, Inc.

5) Review and Approval of Material and Component Specifications - All safety-related project specifications are reviewed in accordance with the Engineering and Construction Quality Assurance Program approved by the NRC during the Construction Permit Review.

6) Procurement of Materials and Equipment - Approximately
15 | 99.0 percent of the specifications for material and equipment for the plant has been awarded.

7) Management and Review of Construction Activities - Carolina Power & Light Company construction management has performed the following management and control activities at the construction site since the start of construction on January 26, 1978.

8) Engineering Modifications and Design Configuration Control for the Operating Unit - Engineering modifications and design configuration control for the operating unit will be the responsibility of the Harris Plant Engineering Section. The Section will obtain detailed design modifications required by the plant and will focus on generation and maintenance of design documents (drawings, specifications, design basis documents, etc.).

Carolina Power & Light Company provided the construction management for the construction phase of the project. The actual construction of the power block and associated facilities is being performed by Daniel Construction Company as a constructor under CP&L direction. Site excavation, main and auxiliary dam construction, land clearing, containment liner erection, cooling tower construction, and numerous other work items are being executed by other companies under direct contract to CP&L.

As construction manager, CP&L is responsible for job coordination and communication, planning, cost control, inspection, quality assurance, accounting, warehousing, procurement, site engineering, milestone scheduling, and establishing and monitoring the master schedule. This construction management responsibility includes making the actual determination as to the rate and sequence of construction as well as the determination as to which portions are better handled by contracts separate from the main constructor contract. In addition, CP&L retains and exercises authority to approve or disapprove constructor recommendations on construction methods and force levels, provides the communications link between the designer (Ebasco) and constructor (Daniel and others) and controls site delivery dates.

The general office Nuclear Plant Construction staff supports construction by: providing administrative support; providing contractor supervision and site coordination for short-term construction projects; providing construction engineering review and contract administration which occurs prior to site management control of associated projects; coordinating engineering activities relative to relocations of existing facilities at the site; preparing construction proposals, evaluating bids, preparing contracts and participating in contract administration; and planning, scheduling, and monitoring costs for materials and equipment use during construction.

b) Preoperational Activities

1) Development of Human Engineering Design Objectives and Design Phase Review of Proposed Control Room Layout - The human engineering concepts and objectives used in the control room design were developed by Westinghouse and Ebasco engineers, and CP&L operations personnel. | 15

Designers and design reviewers relied on past design and operating experience in arriving at the final control room configuration and panel arrangement.

The general criteria used in developing the control room configuration and panel arrangement follow:

(a) The appearance of the Control Room and the panels should be designed for most effective situation analysis maximizing human performance and limiting operators discomfort and fatigue.

(b) Panel-mounted equipment having similar functions should be similar in appearance. Where practicable, hardware should be identical.

(c) Groupings of related panel-mounted equipment are arranged for close proximity of components on a system basis or operational function. Such groupings minimize operator error and facilitate efficient control and interface. These functionally arranged displays include: Individual rod position indicators arranged to easily ascertain their proper alignment, valve and pump status lights and indicators by which the operator can analyze any given situation.

(d) Control room lighting is provided with group switching so as to reduce the illumination level of the Control Room to 75 percent, 50 percent and 25 percent of maximum (125 ft.-cdl.) to limit the glare on the indicator and to read identification of control panel equipment engraving without eye strain.

(e) Standard abbreviations are used for nameplate engraving on all panel mounting component.

(f) The structural shape of the control panels should enable the operator to easily read the recorders, indicators, and annunciator windows. The operator should not have to lean across the panel to reach controls.

These general design objectives were implemented by the use of many specific design features, examples of which follow:

(a) The control panels are divided into nine functional sections. The process control and Engineered Safety Features (ESF) systems are contained on the Main Control Board (panels A1, A2). Reactor Coolant System is on section C. Non-ESF Electrical Distribution and HVAC systems controls and indication are mounted on the MCB, Panels AA, B1, B2, BB, D1, D2.

(b) Three distinct types of horns are used. One audible alarm for first annunciator, 2nd audible alarm for normal NSSS/BOP systems and ring-back (chime) audible alarm.

(c) On all panels, to the extent possible, related idicators, recorders, control switches, and annunciator windows for the individual systems are mounted to one panel. This simplifies locating this equipment by the operator and minimizes error.

(d) Indicator scales are marked with multiplication factors of X10, X100, etc.

(e) Post-accident monitoring indicators and recorders are differentiated from the others by their yellow colored bezel.

(f) Where a parameter is measured by two or more channels, redundant indicators are mounted close by in order to enable the operator to compare redundant readings and disregard erroneous readings.

(g) Standardized means for identification were used throughout the plant for all the equipment using nameplate engravings, annunciator windows, control switches, and controllers, indicators, and recorders.

(h) Functional identification on the control switch modules is kept uniform.

(i) Panel-mounted equipment having similar functions are identical in make and model (e.g., NSSS and BOP 5 in. edgewise meters are the same make and model. This is also true of the control switches used for breaker control, equipment actuation, meter display selection, etc.).

(j) The arrangement of the control panels was developed using the average size of man to develop height requirements. The average operator will easily be able to reach all controls without leaning over the panels. Recorders and indicators are located to provide easy and accurate reading of instruments as far as practicable. The upper section of the panels where the annunciator windows are mounted is tilted downward 15 degrees to minimize glare.

(k) Containment and site evacuation alarm switches are provided on the MCB Section "C". These switches are mounted separately from the other control switches area on section C which the operators use during normal operation.

(l) A separate manual reactor trip switch is provided on the vertical Section C and Al. Section "C" switch has TRIP/CLOSE and Section Al has TRIP function.

(m) A turbine switch is provided on the vertical Section Bl.

(n) All the control switches are labeled with the system prefix in order to identify the control easily.

In addition to the human engineering-related objectives and features incorporated in the design, an extensive formal review of panel design was performed by CP&L, Westinghouse and Ebasco engineers and CP&L operating personnel. Several meetings were held to review the mark-up of the control panels for acceptability, primarily from a human engineering standpoint. Carolina Power & Light Company preferences and the past operating experience of Ebasco and Westinghouse were incorporated. A simulator was developed by CP&L and used as an adjust to the design as well as for operator training.

2) Development and Implementation of Staff Recruiting and Training Programs - The training programs to be utilized for SHNPP are described in Section 13.2. This program is being implemented in accordance with the schedule indicated in that Section. Recruiting of personnel to fill positions is currently taking place. A staffing plan for SHNPP is contained in Section 13.1.2.

3) Development of Plans for Initial Testing - The initial test program for SHNPP, including schedule, is described in Chapter 14.

4) Development of Plant Maintenance Programs - Organization of the resident maintenance forces is described in Section 13.1.2.

c) Technical Support for Operations

1) The engineering staffs of several CP&L departments provide the
technical services to support the testing and operation of SHNPP. The
Corporate Nuclear Safety and Research Department provides technical
support in the areas of health physics and nuclear safety. The Nuclear
Engineering & Licensing Department and Harris Plant Engineering Section
provide technical support in nuclear, mechanical, structural,
electrical, thermal-hydraulic, metallurgical and materials, and
13 instrumentation and controls engineering and licensing. The Fuel
Department provides technical support in the areas of fueling and
refueling operations support. The System Operations Department
provides technical support for plant maintenance. The Operations
Training & Technical Services Department provides technical support for
training, plant chemistry, health physics, emergency preparedness,
environmental monitoring, and seismic monitoring. The Corporate
Quality Assurance Department provides technical support for engineering
and construction quality assurance, operations quality assurance, and
quality assurance audit. Consultants are retained as needed to
supplement CP&L's technical expertise. These engineering staffs are
described in Section 13.1.1.2.

13.1.1.2 <u>Organizational Arrangement</u>

13 Since the first nuclear generating unit belonging to CP&L began commercial
operation in March 1971, the amount of nuclear generating capacity on the
Company's system derived from nuclear power has increased substantially.
Accordingly, the Company's responsibilities in connection with its nuclear

facilities have grown. During this period of time, the Company has developed and enhanced its capabilities with respect to the construction, operation, and maintenance of its nuclear facilities. The Company has safely managed H. B. Robinson Unit 2, and Brunswick Units 1 and 2 since they were placed into operation approximately 14, 7, and 8 years ago, respectively. The Company also managed the construction of the Brunswick facility and is in the process of constructing Unit 1 of the Harris Nuclear Project which is 85 percent complete.

The Company has been, and will continue to be totally committed to safety and quality in the construction and operation of our nuclear facilities.

The Company has reorganized its management structure several times during the past 12 years to accommodate and better manage the increased nuclear capacity and additional associated personnel. The most recent reorganization, announced on September 1, 1983, reflects the strengths developed and lessons learned from the Company's operating experience as well as from the experiences of the rest of the nuclear utility industry. It focuses the authority and responsibility for operation, engineering, and construction under one individual at each of CP&L's three nuclear plant sites. In addition, it ties many of the related offsite nuclear support organizations to the Shearon Harris Nuclear Power Plant (SHNPP) and H. B. Robinson Steam Electric Plant (HBR) plant organizations and places them under one individual, the Senior Vice President - Nuclear Generation. The Vice President, Brunswick Nuclear Project (BNP), who presently reports directly to the Executive Vice President, Power Supply & Engineering and Construction, also benefits from the support services that are under the Senior Vice President - Nuclear Generation (see Figure 13.1.1-1). 13

The Company's nuclear projects are supported by an extensive organization that provides expertise in a variety of areas. For the most part, the organizations are structured to focus nuclear activities within separate departmental and organizational structures. This philosophy ensures that the Company's other, nonnuclear activities will not divert appropriate management attention from the conduct of its nuclear activities. The Corporate support for nuclear activities is managed by the Executive Vice President - Power Supply and Engineering & Construction Groups who reports to the President/Chairman. Reporting to the Executive Vice President - Power Supply and Engineering & Construction are five officers and a department manager whose organizations further subdivide technical and managerial support into six areas: a) Senior Vice president - Nuclear Generation Group; b) Senior Vice President - Fossil Generation and Power Transmission Group; c) Senior Vice President - Operations Support Group; d) Vice President - Brunswick Nuclear Project Department; e) Vice President - Corporate Nuclear Safety and Research Department; and f) Manager - Corporate Quality Assurance Department (see Figure 13.1.1-2). The responsibilities of each of these groups and departments are described below:

a) Nuclear Generation Group - The Senior Vice President - Nuclear Generation Group reports to the Executive Vice President - Power Supply and Engineering & Construction. The major offsite support organization for nuclear operations is the Nuclear Generation Group which provides a source of offsite technical and managerial resources to assist and support the operating plants in areas of nuclear licensing, civil design, instrumentation and controls, computers, mechanical, electrical, nuclear engineering, metallurgical analysis, construction, operations, and industrial security.

The Nuclear Generation Group includes the Harris Nuclear Project Department, the Robinson Nuclear Project Department, the Nuclear Engineering & Licensing Department, the Nuclear Plant Construction Department, the Engineering and Construction Support Services Department, and the Nuclear Staff Support Section (see Figure 13.1.1-3).

1) The Harris Nuclear Project Department is responsible for managing the design, construction, startup, and operations of the Harris Plant. The department's mission is to manage the site activities in a manner which will promote the economic, safe, reliable, and effective operations of the plant over its lifetime. The organization, formed on September 1, 1983, represents the Company's concept of providing more direct on-site management control over all engineering, construction, startup, and operations activities at the plant. This department is headed by the Vice President - Harris Nuclear Project Department who reports to the Senior Vice President - Nuclear Generation Group. Other support functions are provided from other departments in Power Supply and Engineering & Construction.

3 The Vice President - Harris Nuclear Project is responsible for managing all aspects of engineering, construction, startup, operation, and maintenance of the Harris Nuclear Project. He is to conduct these activities in a manner which will protect the health and safety of the public, will be in compliance with the applicable governmental regulations, and will be within the policies and guidelines of the Company. Reporting to the Vice President - Harris Nuclear Project Department is the General Manager - Harris Plant Operations Section, Project General Manager - Harris Plant Construction Section, Manager - Harris Plant Engineering Section, Manager - Project Administration, and Manager - Planning and Controls (see Figure 13.1.1-4).

(a) The Harris Plant Operations Section is responsible for the operation, maintenance, and management of the nuclear generating facility at the Harris site.

(b) The Harris Plant Construction Section is responsible for construction management of the Harris site and for the control over the constructor, and contractors at the plant site. The Harris Plant Construction Section is responsible for providing construction engineering support, inspection, and review of design drawings and specifications to ensure ease of construction. The Section is also responsible for the administration of contracts, the coordination of Company-owned tools and equipment, participation in construction methods selection, planning, and direct supervision and inspection of the constructor and contractors.

(c) The Harris Plant Engineering Section (HPES) is responsible for providing engineering modifications and design configuration control for the operating unit. The Harris Plant Engineering Section, supported as required by Nuclear Engineering and Licensing and/or outside consultants, will produce detailed design modification packages as required by the plant. Construction and/or operation implementation of these modifications will be supported by HPES. The Section will focus on generation and maintenance of design documents and procurement documents (drawings, specifications, design basis documents, etc.). Technical support will be provided to the operations organization as required in areas such as spare parts, Q-list equipment, and equipment qualification. Harris Plant Engineering Section personnel will be available to participate in the review of plant operating, maintenance and surveillance procedures as requested. A major benefit of this process will be that the same technical staff that administered the design of the Harris Plant during its construction will be responsible for the technical support of plant operations.

(d) The Project Administration Section supports the administrative needs of the Harris Nuclear Project Department by providing a centralized source for these services. The Section provides these services either through its own central organization location or through satellite offices located with the various organizations it supports. These activities span a range of responsibilities from coordination of some activities, such as training and employee relations coordination, to management responsibility for activities such as document control and warehousing. 13

(e) The Planning and Controls Section aids management in ensuring that a consistent, coordinated structure of work activities is achieved which focuses on the objectives and goals of the Department. The Section monitors the resulting structure and reports information to other site management indicating compliance with or variances from the plan. Primary responsibilities of the Section are to identify, develop, and implement programs, systems, methods, and related documents for planning and scheduling, budgeting, cost control, site programs, cost assurance, and industrial engineering such that management visibility is maintained to historical accomplishments as well as anticipated variances. Information and forward visibility permits corrective action while managerial alternatives remain open.

2) <u>The Robinson Nuclear Project Department</u> operates and maintains the Company's nuclear generating facility at the H. B. Robinson Plant. Reporting to the Manager - Robinson Nuclear Project Department is the General Manager - Robinson Plant Section, Manager - Planning & Scheduling Section, Manager - Project Construction Section, Manager - Control & Administration Section, and Manager - Design Engineering Section (see Figure 13.1.1-5). The Robinson Plant Section organization and responsibilities are similar to those described for the General Manager - Harris Plant Operations Section in Section 13.1.2.2.1.

3) <u>The Nuclear Engineering & Licensing Department</u> is responsible for the licensing and engineering support of the Company's nuclear generating facilities. The Nuclear Engineering & Licensing Department is divided into four sections: the Nuclear Licensing Section, the Engineering Support, Nuclear Plants Sections I and II, and the Nuclear Engineering Projects Section. In addition to the four sections, the department Vice President has a Director - Nuclear Engineering Safety Review Unit on his staff (see Figure 13.1.1-6).

(a) The Nuclear Licensing Section acts as the Company's interface with the NRC Office of Nuclear Reactor Regulation and, for multiple plant activities, the Office of Inspection and Enforcement. The section is organized into four units with the following functional responsibilities:

The Project Nuclear Licensing Units are responsible for coordination of Office of Nuclear Reactor Regulation (ONRR) activities affecting the Company's three nuclear projects. This includes the coordination and preparation of responses to ONRR requests, and the preparation of license amendments and licensing documents such as the Harris Final Safety Analysis Report (FSAR). These units are responsible for the maintenance of operating licenses, revisions to the technical specifications, and updating of FSARs.

The Special Nuclear Programs Unit is responsible for coordination of generic licensing issues. This includes coordination and preparation of responses concerning generic ONRR activities
13 affecting the Company's four nuclear units. It advises Company management on critical licensing issues and ensures that incoming NRC correspondence is routed properly and that responses are prepared to address licensing issues accurately. In addition, Special Nuclear Programs coordinates the Company's regulatory related involvement in industry organizations including AIF, EEI, and EPRI. This Unit also participates in various utility owners' groups and supports other special projects of a technical or regulatory nature as required.

(b) The Engineering Support, Nuclear Plants Sections are responsible for providing engineering support for the Company's nuclear plants and for utilizing feedback received from the operating plants so as to prevent identified problems from recurring. The Sections' objectives are to provide engineering and procurement of engineered products on schedule with designs that are economical, safe, efficient, reliable, and compatible with the environment. The Engineering Support, Nuclear Plants Sections are organized into technical units along discipline lines which are headed by Principal Engineers. The Unit Heads are responsible to the Section Managers for ensuring the project work which falls into their areas of responsibility is accomplished in such a manner that the Sections' accountabilities are fulfilled. They provide the design engineering necessary to resolve those operating plant problems referred to their Units and are responsible for utilizing operating plant feedback and for identifying potential problems which might affect the design and engineering of current power plant construction projects. These Units are staffed with engineers and designers of required experience, education, and capability. Architect/Engineers and other consultants may also be retained to assist the Sections in meeting their objectives.

(c) The Nuclear Engineering Projects Section is divided into three units: Nuclear Projects Unit I, Nuclear Projects Unit II, and Engineering Administrative Unit. The Section is responsible, through its Nuclear Projects Units, for ensuring that the NELD provides the required design and engineering support for each nuclear project and that the nuclear projects appropriately utilize the resources of NELD. The nature of this support is reflected in defined written agreements with each of the projects and in accordance with other departmental procedures and/or guidelines. The Section establishes the scope, content, and magnitude of projects assigned to Architect/Engineers and manages the A/E engineering work throughout the final acceptability of the design project.

The Engineering Administrative Unit provides the technical support services required by the Sections in the Department. Priorities are set to meet the identified schedules established for the nuclear projects. The Unit serves as the focal point for collecting, processing, and disseminating required information to allow responsible management to monitor schedule and cost progress on all assigned plant modification projects and provides support in engineering schedule preparation, engineering, scheduling services during project implementation, supplement scope development, QA records support, and other engineering administrative support to in-house engineering design sections within the Department. 13

(d) The primary responsibilities of the Director-Safety Review, Nuclear Engineering are to review documents generated by the Company's nuclear organization and A/Es to identify problems in engineered safeguards systems and plant safety features; to assess activities and trends in the industry regarding design and operation of safety features; to provide feedback to preclude potential nuclear safety problems in ongoing plant designs and design of modifications; and to assure that ALARA concepts for radiation control are considered in engineered designs.

4) The Nuclear Plant Construction Department manages the procurement and contracting activities for all nuclear generating facilities and contains the Procurement and Contracting Section (see Figure 13.1.1-7).

The Construction Procurement and Contracting Section conducts all procurement and contracting activities required to support the completion of construction project assignments. The Construction Procurement and

Contracting Section provides both firm-price and reimbursable contracts, onsite procurement and expediting services, and construction equipment and tool management. Onsite procurement staffs have been established at the Harris, Robinson, and Brunswick Nuclear Projects.

5) The Engineering and Construction Support Services Department provides support services to the other Departments within the Company in the areas of estimating, budgeting, cost control, cost reporting, construction accounting, information management, and construction security (See Figure 13.1.1-8).

6) The Nuclear Staff Support Section is primarily responsible for coordinating the implementation and maintenance of operationally oriented programs that require high technical knowledge of methods and procedures and that should be relatively consistent among the plants. The Section is also responsible for preparing reports and documents, performing staff studies, providing administrative/technical support as required and coordinating the Company's involvement in Institute of Nuclear Power Operations (INPO). These efforts are coordinated with each project.

b) Fossil Generation and Power Transmission Group - The Senior Vice President - Fossil Generation and Power Transmission Group reports to the Executive Vice President - Power Supply & Engineering and Construction and is responsible for managing the Company's fossil and hydro generating facilities and the Company's transmission line facilities necessary to meet its bulk
13 power requirements. There are five departments and two sections which report to the Senior Vice President - Fossil Generation and Power Transmission Group: 1) the Fossil Engineering & Construction Department, 2) the Fossil Operations Department, 3) the Special Projects Department, 4) the System Operations Department, 5) the Transmission Department, 6) the Maintenance Support Section, and 7) the Assistant to Group Executive - Fossil Generation & Power Transmission (see Figure 13.1.1-9). The responsibilities of each of these departments are described below:

1) The Fossil Engineering & Construction Department provides engineering and construction support and management for additions and modifications to operating fossil and hydro-generating plants and for new fossil generating plants. The department is divided into three sections: (a) the Engineering Support, Fossil Plants Section, (b) the Fossil Plants Construction Section, and (c) the Special Projects Section (see Figure 13.1.1-10). While not primarily associated with the Company's nuclear generating facilities, this dep rtment represents a source for feedback of potential problems common to all types of plants and is also a reservoir of engineering and construction talent and experience which could be applied to problems at nuclear facilities if required.

2) The Fossil Operations Department is responsible for the startup, testing, operation, and maintenance of the Company's fossil and hydro generating facilities (except those at the Robinson Plant). The department ensures that plants are operated in a safe, economical, and

reliable manner to meet system demand and that the equipment is maintained in good order in accordance with accepted maintenance practices. The plants maintain staffing levels sufficient for routine operation and maintenance activities; however, additional maintenance support is provided when needed from the Maintenance Support Section. The department depends on the Fossil Engineering & Construction Department for engineering and construction services associated with plant modifications and additions; however, the department retains responsibility for checkout, startup, and testing of new facilities or modifications. The department is responsible for planning and conducting outages when required; outage plans are coordinated with the System Operations Department. The department is organized into ten sections and one unit: eight Plant Sections, Operating Plants Technical Support Section, Administrative Section, and Office Services Unit.

3) The Special Projects Department - The Vice President - Special Projects serves as a technical consultant to all operating nuclear, fossil, hydro, and IC plants on operations and maintenance related matters.

The Vice President - Special Projects is also available for consultation to departments in the Nuclear Generation and Fossil Generation & Power Transmission Groups as well as the BNP on engineering matters where operations input will result in improved operating plant performance. The Vice President - Special Projects must be highly qualified technically and must have extensive operating plant experience to provide the necessary guidance in solving power plant problems. 13

4) The System Operations Department is responsible for load dispatch and the operation and maintenance of transmission lines and substations (see Figure 13.1.1-12).

5) The Transmission Department is responsible for the planning location, design, and construction of transmission line facilities necessary to meet the bulk power requirements of the Company (see Figure 13.1.1-13). The department is also responsible for the planning, design, and construction of Company-owned communications facilities.

6) The Maintenance Support Section provides support to the maintenance programs at the Company's operating power generating plants. These functions include coordinating the scheduling of generating equipment outages with the System Operations Department and providing maintenance manpower and technical support activity.

7) The Assistant to the Group Executive - Fossil Generation & Power Transmission provides a focal point for coordinating group or corporate activities that require cooperation among multiple departments. The section is responsible for supporting the group executive and department managers in developing and applying techniques and methods for identifying and evaluating the performance of organizations within the group. The section is responsible for providing support in rate cases

and other regulatory proceedings in areas related to plant and/or system performance. The section has internal resources which enable it to carry out many of its assignments without disrupting the activities of other organizations; however, the section has authority to direct other organizations in the group with regard to providing certain types of information relating to operating performance. The section works with the group executive to design management systems that facilitate group and department planning and performance evaluation and coordinates the implementation of such systems with the department managers in the group.

c) Operations Support Group - The Senior Vice President - Operations Support Group reports to the Executive Vice President - Power Supply and Engineering & Construction. He is responsible for the management of the materials and fuel needs of the generating and transmission facilities in addition to the training and technical support of those personnel. There are three departments and two sections in the Operations Support Group: 1) the Fuel Department, 2) the Materials Management Department, 3) the Operations Training & Technical Services Department, 4) the Environmental Services Section, and 5) the Contract Services Section (see Figure 13.1.1-14). Their responsibilities are summarized below:

1) The Fuel Department ensures the proper management of nuclear and fossil fuels used for the production of electrical power. The department is organized into three sections: (a) the Nuclear Fuel Section, (b) the Fossil Fuel Section, and (c) the Administration and Analysis Section (see Figure 13.1.1-15). The Nuclear Fuel Section is staffed with personnel having both the technical and managerial expertise required to ensure a timely and adequate supply of nuclear fuel, to review fuel and core
13 design, to support nuclear plant outages (including refuelings) and operations, and to provide for spent fuel management. The Nuclear Fuel Section meets with members of the Company's operating nuclear plants on a continuing basis to plan and optimize the fuel operation strategy.

2) The Materials Management Department is responsible for corporate purchasing, inventory control, warehousing, and salvage of the Company's material needs (see Figure 13.1.1-16).

3) The Operations Training & Technical Services Department supports nuclear and fossil plant construction, operations, and operator training. There are two sections and one unit within the Operations Training & Technical Services Department: (a) the Nuclear Training Section, (b) the Radiological and Chemical Support Section, and (c) the Emergency Preparedness Unit (see Figure 13.1.1-17).

(a) The Nuclear Training Section provides support to the Nuclear Project Departments in the areas of Operations, Technical and Craft Training, and the operation of the simulators and other training facilities at the HE&EC and at the respective nuclear projects. The primary purpose of the Nuclear Training Section is to assure that the Company has highly qualified personnel available to maintain and operate its nuclear generating plants in a safe and efficient manner. These responsibilities and services are provided by an organization consisting of eight units which support nuclear projects: the Nuclear and Simulator Training Unit, the Fossil Operator Training Unit, the Craft and Technical Training Unit, the Administrative Unit and the Curriculum Development Unit at the HE&EC; and the Robinson Training Unit, the Brunswick Training Unit, and Harris Training Unit located at the respective nuclear plants.

(b) The Radiological and Chemical Support Section (R&CSS) provides staff support in the areas of health physics, chemistry, and radiological environmental activities and for the effective operation of the environmental, dosimetry, and chemistry laboratories. The R&CSS has responsibilities identified in the Corporate Emergency Plan to provide health physics and environmental support to the nuclear plants in the event of an accident. These responsibilities and services are provided by an organization consisting of three units, headed by two principal specialists and a director: the Health Physics Unit, the Environmental Unit, and the Chemistry Unit.

(c) The Emergency Preparedness Unit is responsible for: directing and coordinating Corporate Emergency Planning to ensure regulatory compliance; assessing the readiness of all CP&L emergency plans and programs; serving as interface with regulatory agencies on emergency preparedness matters; providing emergency preparedness support for CP&L nuclear plants; maintaining training qualifications of plant personnel in emergency response; testing emergency preparedness by preparing and conducting exercises; ensuring the availability and 13
operational readiness of emergency facilities, equipment, and supplies; developing dam failure emergency plans for the hydro plants and providing coordination with federal, state, and local agencies.

4) <u>The Environmental Services Section</u> conducts the Company's environmental monitoring assessments and performs analytical chemistry and metallurgical laboratory services at the Harris Energy & Environmental Center (HE&EC) in New Hill, North Carolina. The Analytical Chemistry, Air Quality, Biology, and Metallurgy Laboratories provide an array of services and technical support to generating plants, engineering activities, quality assurance and construction programs within the Company. One subunit of the Biology Unit is located at BSEP. The Permits Unit is responsible for obtaining non-radiological permits for all generating plants. The Unit established and currently operates the Harris seismic monitoring program and the Harris, Brunswick, and Robinson meteorological data collection programs. It also has lead responsibility in acquiring the National Pollutant Discharge Elimination System (NPDES) permits and any federal, state, and local permits not required by the NRC.

5) <u>The Contract Services Section</u> supports Company departments in obtaining outside labor and services at favorable cost, terms, and conditions. Contract Services Section is responsible for providing

contract support services to all departments of CP&L except for the Nuclear Projects, Corporate QA, Corporate Nuclear Safety and Research, and the Fuel Department. Also, the Contract Services Section develops and maintains all system contracts covering work in both nuclear and fossil plants.

d) Brunswick Nuclear Project Department - The Vice President - Brunswick Nuclear Project Department reports to the Executive Vice President - Power Supply & Engineering and Construction. His responsibilities are similar to those of the Vice President - Harris Nuclear Project Department, and he is supported in these responsibilities by the General Manager Brunswick Plant, the Engineering and Construction Section, the Site Planning and Control Section, and the Brunswick Nuclear Project Outages Section (see Figure 13.1.1-18). These sections are responsible for the operation, maintenance, engineering, construction, and management of the Brunswick Plant.

e) Corporate Nuclear Safety and Research Department - The Vice President of the Corporate Nuclear Safety and Research Department reports to the Executive Vice President - Power Supply and Engineering & Construction (see Figure 13.1.1-20). He is responsible for the management of the functions of corporate health physics, corporate nuclear safety, and research in support of Company activiti

The Corporate Nuclear Safety Section, the Corporate Health Physics Section and the Research Section report directly to the Vice President - Corporate Nuclear Safety and Research. These sections conduct the independent nuclear safety reviews and health physics assessments of the Company's nuclear facilities. Their responsibilities are summarized below:

13

1) The Corporate Nuclear Safety (CNS) Section monitors the Company's operating nuclear plants to ensure that the associated nuclear safety programs are carried out in an effective manner.

The CNS independent review activity addresses the following:

(a) Procedures and changes meeting 10 CFR 50.59 review criteria,

(b) Licensing actions,

(c) Test or experiments not described in the facility FSAR,

(d) Plant operational occurrences (LERs),

(e) Regulatory violations (IE Reports),

(f) Technical Specification changes,

(g) Plant Nuclear Safety Committee (PNSC) meeting minutes, and

(h) Any item deemed appropriate for review relative to safe operations.

2) The Corporate Health Physics Section consists of personnel with education and/or work experience in fields of radiation hygiene or health physics. The section is also responsible for formulating and recommending corporate level health physics policies and programs, evaluating health physics programs and recommending any needed improvements and modifications in those programs, and providing health physics expertise throughout the Company. The Section provides support to the licensing and corporate nuclear safety activities of the Company, is responsible for the development and distribution of the Corporate ALARA Program, and makes periodic assessments of various ALARA programs developed to comply with the Corporate ALARA Program.

3) The Research Section undertakes research either with its own resources or through funding outside organizations such as EPRI and DOE in areas approved by senior management. This section is also responsible for maintaining awareness of other research into technologies that could impact CP&L and for advising management of new developments.

f) Corporate Quality Assurance Department - The Manager of the Corporate Quality Assurance Department reports to the Executive Vice President - Power Supply and Engineering & Construction (see Figure 13.1.1-19). This department was organized to consolidate the quality assurance, quality control, and audit functions which were previously performed separately for engineering and construction activities, operations activities, and corporate quality assurance audit activities. In this manner, the Manager - Corporate Quality Assurance oversees the QA/QC activities of both the Power Supply and the Engineering & Construction organizations while maintaining independence from any responsibilities within those organizations. The Corporate Quality Assurance Department is organized in three major divisions: 1) the Harris Plant QA/QC Section, 2) the Brunswick and Robinson Plants QA/QC Section, and 3) the QA Services Section. Their responsibilities are summarized below: 13

1) The Harris Plant QA/QC Section has the primary responsibility for the Harris Plant Quality Assurance/Quality Control in the engineering and construction phase and during start-up, and through operations. Its purpose is to anticipate and preclude safety-related nonconformances. This section is also responsible for the preparation of the ASME "N" Stamp QA Manual.

2) The Brunswick and Robinson Plants QA/QC Section is responsible for assuring proper application of quality standards, practices, and procedures associated with plant operation, maintenance or modification at CP&L operating plants (H. B. Robinson Unit No. 2 and Brunswick Units 1 and 2).

3) The QA Services Section is responsible for supporting CP&L's nuclear plants in the areas of QA Engineering, vendor qualification/surveillance and training. This section is also responsible for conducting an independent corporate audit program.

13.1.1.3 Qualifications

Carolina Power & Light Company will depend upon the engineering staffs of
several departments. These staff positions are filled by individuals with
several years of experience. Table 13.1.1-1 lists key CP&L personnel
currently working on the SHNPP and their educational background and
13 experience. The Manager, Harris Plant Engineering Section is the
"Engineer-in-Charge" as specified in ANS 3.1, September 79 Draft.

Resumes of key engineering personnel involved in SHNPP are provided in this section. Carolina Power & Light Company organizational charts are provided as figures at the end of Section 13.1.

E. E. Utley, Executive Vice President, Power Supply and Engineering & Construction

I. Education

A. College: Louisburg College and N. C. State University

B. Courses: Massachusetts Institute of Technology - "Nuclear Plant Design & Operation Course"

Georgia Institute of Technology - "Public Utility Executive Course"

Edison Electric Institute - "Executive Management Program"

Basic Radiological Health Course Conducted by the Public Health Service, Winchester, Massachusetts

II. Experience

A. Joined CP&L in 1951 in the Operating & Engineering Department

B. 1959, appointed Superintendent of the W. H. Weatherspoon Plant - CP&L

C. 1963, appointed Superintendent of the H. F. Lee Plant - CP&L

D. 1965, appointed Superintendent of the Roxboro Plant - CP&L

E. 1966, promoted to Production & Results Engineer in the General Office - CP&L

F. 1968, named Manager of Production - CP&L

G. May 1, 1970, named Manager of the Generation & System Operations Department - CP&L

H. 1972, named Manager, Bulk Power Supply Department - CP&L

I. September 1972, elected Vice President - CP&L

J. January 1, 1977, appointed Senior Vice President and head of the Power Supply Group - CP&L

K. May 1979, named Executive Vice President - CP&L

L. June 1, 1979, appointed in charge of the Power Supply & Customer Services Groups - CP&L

M. May 1, 1980, appointed in charge of the Power Supply and Engineering & Construction Groups - CP&L

E. E. Utley

III. Professional Societies

A. American Society of Mechanical Engineers
B. North Carolina Society of Engineers
C. Raleigh Engineers Club
D. American Nuclear Society (National)
E. Eastern Carolinas Section of American Nuclear Society
F. Association of Edison Illuminating Companies - Committee on Power Generation

James M. Davis, Jr., Senior Vice President - Operations Support

I. Education & Training

B. S. Degree in Mechanical Engineering, North Carolina State University, Raleigh, NC - 1958

II. Experience

A. Companies (other than CP&L) and Military Experience

1. July 1958 - August 1961- Reserve Officer in U. S. Air Force

2. September 1961 - September 1965 - Test Engineer in the Experimental Engineering Department of Pratt and Whitney Aircraft, East Hartford, Connecticut

B. Carolina Power & Light Company

1. September 1965 - February 1968 - Employed as a Heating and Cooling Engineer in the Special Services Section of the Marketing Department.

2. February 1968 - November 1970 - Assistant to Director in the Rates and Regulation Department

3. November 1970 - December 1976 - Assistant Director in the Rates and Regulation Department 13

4. December 1976 - June 1979 - Manager of Rates and Service Practices Department

5. June 1979 - December 1980 - Vice President of Fuel and Materials Management Group

6. December 1980 - August 1983 - Senior Vice President of Fuel and Materials Management Group

7. August 1983 - Present - Senior Vice President of Operations Support Group

III. Professional Societies

North Carolina Society of Engineers - Director, District II
Professional Engineers of North Carolina
National Society of Professional Engineers
American Nuclear Society
North Carolina Chapter of the Health Physics Society
The Raleigh Engineers Club

L. W. Eury, Senior Vice President - Fossil Generation & Power Transmission 13

I. Education

A. B.S. Degree in Electrical Engineering - North Carolina State University - 1959

B. General Electric Protective Relaying School - 1963

C. Air Circuit Breaker School - 1966

D. Public Utility Reports Course - 1967

E. Phase I of Westinghouse Reactor Operator Training Course - 1968

F. Company Sponsored Management Development Courses: Basic Principles of Supervisory Management; Adversary Interviewing Workshop; Basic Principles of Management Review; EEO Workshop for Management; Financial Seminar for Non-Financial Personnel; GENCO; Performance Evaluation Training; PUR Guide; Purview; Effective Writing; Southern Industrial Relations Conference; Speed Reading; Public Utility Management Course; Orientation Program for Newly Appointed Department Heads; Fundamentals of Finance & Accounting for Non-Financial Executive; Managing Management Time; Effective Managerial Leadership 13

G. GE-BWR/6 Operating Fundamentals Course (September 1980)

H. EEI Executive Management Course - Hershey (4/82 - 5/82)

II. Experience

A. June 1959 to April 1960 - Junior Engineer, Carolina Power & Light Company, Northern Division Relay Office, Raleigh, North Carolina

B. April 1960 to October 1960 - United States Army

C. October 1960 to April 1961 - Junior Engineer, Carolina Power & Light Company, Northern Division Relay Office, Raleigh, North Carolina 13

D. April 1961 to May 1961 - Junior Engineer, System Relay Office, General Office, Raleigh, North Carolina

E. May 1961 to June 1962 - Engineer, System Relay Office, General Office, Raleigh, North Carolina

F. June 1962 to November 1962 - Electrical Engineer, System Relay Office, General Office, Raleigh, North Carolina

L. W. Eury

G. November 1962 to March 1966 - Electrical Engineer, Northern Division Relay Office, Raleigh, North Carolina

H. March 1966 to October 1967 - Senior Engineer, Northern Division Relay Office, Raleigh, North Carolina

I. October 1967 to July 1968 - Senior Engineer, System Planning Section, General Office, Raleigh, North Carolina

J. July 1968 to April 1970 - Senior Engineer, System Operations Section, Power Supply Department, Raleigh, North Carolina

K. April 1970 to January 1972 - System Operating Engineer, System Operations Section, Generation & System Operations Department, General Office, Raleigh, North Carolina

L. January 1972 to February 1972 - Manager - System Operations, Generation & System Operations Department, General Office, Raleigh, North Carolina

M. February 1972 to January 1, 1977 - Manager - System Operations & Maintenance, Bulk Power Supply Department, General Office, Raleigh, North Carolina

N. January 1, 1977 to May, 1979 - Manager - System Operations & Maintenance, System Operations & Maintenance Department, Power Supply Group, General Office, Raleigh, North Carolina

O. June 1979 to April 1980 - Vice President - System Planning & Coordination Department, Corporate Services Group, General Office, Raleigh, North Carolina

P. May 1980 to December 1980 - Vice President - Power Supply, General Office, Raleigh, North Carolina

13 Q. December 1980 to September 1983 - Senior Vice President - Power Supply, General Office, Raleigh, North Carolina

13 R. August 1983 - Title changed to Senior Vice President, Fossil Generation & Power Transmission, General Office, Raleigh, North Carolina

III. Professional Societies

A. Registered Professional Engineer - North Carolina & South Carolina
B. Institute of Electrical and Electronics Engineers
C. Professional Engineer of North Carolina
13 D. North Carolina Society of Engineers
E. American Nuclear Society
F. ANS - Eastern Carolinas Section
G. North Carolina Chapter of the Health Physics Society

M. A. McDuffie, Senior Vice President, Nuclear Generation Group 13

I. Education

A. B. S. Degree in Civil Engineering from North Carolina State University - 1948

II. Experience

A. 1948 - 1952 - Ebasco Services Incorporated, New York, New York

1. 1948-1949 - Instrumentman, then acting Party Chief on construction of Lumberton S.E.P. - Units 1 & 2, 88,000 KW Installation

2. 1949-1950 - Party Chief on construction of Lumberton S.E.P. - Units 1 & 2, 88,000 KW Installation

3. 1950-1952 - Construction Supervisor on construction H. F. Lee S.E.P. - Unit 2, 66,000 KW Installation

B. 1952 - 1955 - News & Observer, Raleigh, North Carolina

1. Reporter

C. 1955 - 1970 - Ebasco Services Incorporated, New York, New York

1. 1955-1956 - Office Engineer on construction of Cape Fear S.E.P. - Unit 5, 125,000 KW Extension

2. 1956-1958 - Field Engineer on construction of Cape Fear S.E.P. - Units 5 & 6, 281,000 KW Extension

3. 1958-1960 - Construction Engineer on construction of H. B. Robinson S.E.P. - Unit 1, 182,000 KW Installation

4. 1960-1962 - Resident Engineer on construction of H. F. Lee S.E.P. - Unit 3, 250,000 KW Extension

5. 1962-1964 - Construction Superintendent on construction of Asheville S.E.P. - Unit 1, 190,000 KW Installation

6. 1964-1965 - Construction Superintendent on construction of Roxboro S.E.P. - Unit 1 375,000 KW Installation

M. A. McDuffie

7. 1956-1966 - Project Superintendent on construction of Roxboro S.E.P. - Units 1 & 2, 1,025,000 KW Installation

8. 1966-1968 - Project Superintendent on construction of H. B. Robinson S.E.P. - Unit 2, 700,000 KW (e) Nuclear Installation

9. 1968-1970 - Construction Manager supervising construction of Fossil and Nuclear steam electric stations and switchyards on East Coast

D. June 1970 - Carolina Power & Light Company, Raleigh North Carolina. Employed as Manager of Construction in the Power Plant Design & Construction Department

1. September 1, 1973 - Promoted to Manager, Power Plant Construction Department - CP&L

2. December 5, 1974 - Promoted to Vice President, Power Plant Construction Department - CP&L

3. June 24, 1976 - Promoted to Senior Vice President, Power Plant Engineering & Construction - CP&L

13 4. September 1, 1983 - Title changed to Senior Vice President, Nuclear Generation Group - CP&L

III. Professional Societies

A. Registered Professional Engineer in State of North Carolina
B. Registered Civil Engineer in State of South Carolina
C. North Carolina Society of Engineers

A. B. Cutter - Vice President, Nuclear Engineering & Licensing Department 13

I. Education

A. B.S. Degree in Chemical Engineering; University of Rochester, Rochester, NY. - June 1956

B. M.S. Degree in Nuclear Science and Engineering; Carnegie-Mellon University, Pittsburgh, PA. - June 1972

C. Advanced Nuclear Power Training Course, U.S. Navy; New London, CT., and West Milton, NY. - October 1963

D. Several graduate courses in Nuclear Engineering at University of Idaho, National Reactor Test Site Extension 1966-1967

E. Tuck Executive Program, Amos Tuck School of Business, Dartmouth College, Hanover, NH. - 1976

F. Brookings Institute for Government Operation; Brookings Institute, Washington, DC. - 1978

G. Numerous short courses in Project Management, Architect-Engineer Management, and General Management Techniques - Westinghouse Electric Corporation, Pittsburgh, PA.

II. Experience

A. June 1956 - May 1967 - U.S. Navy

1. October 1962 - Advanced Nuclear Power School
2. April 1962 - Nuclear Power Training Unit, West Milton, NY.
3. October 1962 - Assistant Engineer (main propulsion) aboard ballistic missile submarine under construction, and during initial operations
4. January 1965 - Chief Engineer, S1W Prototype, Naval Reactor Facility, Idaho

B. June 1967 to March 1980 - Westinghouse Electric Corporation, Pittsburgh, PA.

1. June 1967 - Project Manager, Nuclear Steam Supply System. Total responsibility for schedule, technical adequacy, and profitability for Westinghouse on three pressurized water reactor projects (Prairie Island 1 and 2, Kewaunee).

A. B. Cutter

2. October 1971 - Program Manager, Fast Flux Test Facility

3. March 1973 - Program Manager, Clinch River Breeder Reactor.

4. June 1975 - Director, Iran Operations

5. October 1976 - Manager, Projects Operations

C. April 1980 to Present - Carolina Power & Light Company, General Office, Raleigh, N.C.

1. April 1980 - Employed as Manager, Nuclear Power Plant Engineering Department

2. March 1981 - Vice President, Nuclear Plant Engineering Department

13 3. September 1983 - Vice President, Nuclear Engineering & Licensing Department

III. Professional Societies

A. American Nuclear Society

13 B. Professional Engineer - State of North Carolina

T. S. Elleman, Vice President, Corporate Nuclear Safety & Research

I. Education

A. Denison University - Granville, Ohio - 1953 - B.S. in Chemistry

B. Iowa State University - 1957 - PhD in Physical Chemistry

II. Experience

A. 1957 - Nuclear Materials Scientist, Battelle Memorial Institute

B. 1964 - Assistant Chief of the Chemical Physics Division, Battelle Memorial Institute

C. 1964 - Associate Professor, Nuclear Engineering, North Carolina State University

E. 1972 - Head of Advanced Fuels Development Department, General Atomic (took one year leave of absence from North Carolina State University)

F. 1974 - Professor and Head of Nuclear Engineering Department, North Carolina State University

G. 1979 - Vice President, Nuclear Safety & Research Department, Carolina Power & Light Company, Raleigh, North Carolina

III. Professional Societies

A. Member of American Nuclear Society
B. Member of American Society for Engineering Education
C. Chairman-Elect of the Nuclear Division of American Society for Engineering Education, 1978
D. Chairman of the North Carolina Radiation Protection Council, 1976-1978

B. J. Furr, Vice President - Operations Training & Technical Services Department 13

I. Education and Training

A. B. S. Degree in Mechanical Engineering - North Carolina State University - 1962

B. Basic Surveying Course - 1965

C. Basic Radiological Health Course Conducted by the Public Health Service, Winchester, Massachusetts - 1966

D. Reactor Safety and Hazards Evaluation Conducted by the U.S. Public Health Service, Rockville, Maryland - 1968

E. Westinghouse Nuclear Reactor Training Program - 1968

II. Experience

A. June 1955 to July 1958 - U. S. Army - Instructor in Aviation Maintenance

B. Summer 1960 - Summer Student Worker - Substation Shops - Carolina Power & Light Company - Raleigh, North Carolina

C. Summer 1961 - Summer Student Worker - Cape Fear S. E. Plant - Carolina Power & Light Company - Moncure, North Carolina

D. June 1962 to May 1963 - Engineer - E. I. DuPont de Nemours Company

E. May 1963 employed as a Junior Engineer at the W. H. Weatherspoon Plant, Lumberton, North Carolina

F. February 1964 employed as a Junior Engineer at the H. B. Robinson Plant, Hartsville, South Carolina

G. July 1964 employed as a Mechanical Engineer at the H. B. Robinson Plant, Hartsville, South Carolina

H. January 1966 employed as a Mechanical Engineer at the Roxboro S. E. Plant, Roxboro, North Carolina

I. February 1966 employed as Operating & Results Supervisor at the H. B. Robinson Plant, Hartsville, South Carolina

J. September 1971 employed as a Principal Engineer in the Nuclear Generation Section of the Generation & System Operations Department in the General Office.

B. J. Furr

K. June 1972 employed as Plant Superintendent in the Nuclear Generation Section of the Generation & System Operations Department at the H. B. Robinson Plant, Hartsville, South Carolina

L. July 1974 employed as Manager - Nuclear Generation Services in the Nuclear Generation Section of the Bulk Power Supply Department in the General Office.

M. May 1976 employed as Plant Manager II (Temporary) in the Nuclear Generation Section of the Bulk Power Supply Department at Brunswick S. E. Plant, Southport, North Carolina

N. December 1976 employed as Manager - Nuclear Generation Services in the Nuclear Generation Section of the Bulk Power Supply Department in the General Office.

O. January 1977 employed as Manager - Generation Department in the Power Supply Group in the General Office.

P. October 1979 employed as Manager - Nuclear Operations in the Power Supply Group in the General Office

Q. December 1979 employed as Vice President - Nuclear Operations in the Power Supply Group in the General Office

R. September 1983 employed as Vice President - Operations Training
13 & Technical Services Department in the Operations Support Group
in the General Office

III. Professional Societies

A. Member of American Society of Mechanical Engineers
B. Member of American Nuclear Society

P. W. Howe, Vice President, Brunswick Nuclear Project | 13

I. Education

A. Bachelor of Science Degree in Chemistry from The Citadel, Charleston, South Carolina in 1951

B. Certificate - Engineering Management - UCLA - 1963

C. Member of U.S.A.E.C. Atomic Safety & Licensing Board from 1962-1966

II. Experience

A. September 1951 to February 1956 - Laboratory Supervisor - E. I. du Pont de Nemours & Company, Inc., Savannah River Plant, Aiken, South Carolina

B. February 1956 to August 1956 - Senior Nuclear Engineer - The Martin Company, Nuclear Division, Baltimore, Maryland

C. August 1956 to August 1957 - Superintendent - Olin Mathieson Chemical Company, Nuclear Fuels Division, New Haven, Connecticut

D. August 1957 to June 1966 - Department Head - Lawrence Radiation Laboratory, University of California, Berkely, California

E. September 1967 to March 1971 - Chief, Site Environmental and Radiation Safety Group - Division of Reactor Licensing, U.S. Atomic Energy Commission, Washingron, D. C.

F. March 1971 to November 1971 - Manager - Environmental & Technical Services Section of the Generation & System Operations Department, Carolina Power & Light Company

G. November 1971 to February 1974 - Manager-Environmental & Technical Services Section, Special Services Department - CP&L

H. February 1974 to February 1975 - Manager - Licensing & Technological Services Section, Special Services Department - CP&L

I. February 1975 - Manager - Special Services Department, Engineering, Construction & Operation Group - CP&L

J. June 1976 - Manager - Technical Services Department, Engineering, Construction & Operation Group - CP&L

K. December 1976 - Vice President - Technical Services Department, Engineering & Construction Group - CP&L

P. W. Howe

13 L. October 1982 - Vice President - Brunswick Nuclear Project - CP&L

III. Professional Societies

A. American Nuclear Society

E. S. Noell, Jr., Vice President, Transmission Department 13

I. Education

A. North Carolina State University, 1949, Bachelor of Electrical Engineering Degree (with honors)

B. Westinghouse Protective Relaying School - 1962

C. Public Utility Executive Course, Georgia Tech, 1965

II. Experience

A. August, 1949 through March, 1951 - Cadet Engineer Substation Section, Operating & Engineering Department, Carolina Power & Light Company, Raleigh Office

B. March, 1951 through December 1952 - Cadet Engineer, Substation Construction Operating & Engineering Department - CP&L

C. January, 1953 thorugh March, 1958 - Engineer, Relay Group, Florence, South Carolina - CP&L

D. March, 1958 through August, 1962 - Electrical Engineer & Senior Engineer, Relay Group, Operating & Engineering Department, Raleigh Office - CP&L

E. August, 1962 through June, 1968 - System Relay Engineer, Operating & Engineering Department, Raleigh Office - CP&L

F. June 1968 through February, 1972 - Manager-Substation, Relay and Communications Engineering, Engineering Department, Raleigh Office - CP&L

G. February, 1972 through October 1, 1976 - Manager-Substation Engineering & Construction, System Engineering & Construction Department, Raleigh Office - CP&L

H. October 1, 1976 through January 30, 1978 - Manager-Transmission Line & Substation Engineering & Construction Department, Raleigh - CP&L

I. January 30, 1978 - Manager-Transmission System Engineering & Construction Department, Raleigh, North Carolina - CP&L

J. May 1981, - Vice President - Transmission & Communication Planning, Engineering & Construction Department, Raleigh, North Carolina - CP&L

E. S. Noell

13 K. May 1981 - Vice President - Transmission & Communication Planning, Engineering & Construction Department, Raleigh, North Carolina - CP&L

L. November 1982 - Vice President - Transmission Department, Raleigh, North Carolina - CP&L

III. Professional Societies

A. Institute of Electrical & Electronic Engineers (Senior Member)
B. Power Engineering Society of the IEEE
C. Raleigh Engineers Club
D. Registered Professional Engineer - State of North Carolina, 1959; State of South Carolina, 1981

Sheldon D. Smith, Vice President, Nuclear Plant Construction Department

I. Education

A. B. S. Degree in Civil Engineering, University of Maine - Graduated 1948

II. Experience

A. 1948 to 1966 - Ebasco Services, Incorporated, New York, New York (18 years)

1. Design Engineer, New York Office (1 year)

2. Field Engineer (6 1/2 years) - Houston Lighting and Power Company, Webster, Texas - fossil fuel electric generating plant; Union Carbide Company, Texas City, Texas - topping unit producing low pressure steam and electricity; Kansas City Power and Light Company, Kansas City, Missouri - fossil fuel electric generating plant

3. Resident Engineer (7 years) - Florida Power and Light Company, Sanford, Florida - fossil fuel electric generating plant; Rayonier, Incorporated, Jesup, Georgia - construction and installation of 300 ton-per-day pulp mill; Houston Lighting and Power Company, San Bertron plant - fossil fuel electric generating plant; Texas Electric Service, Colorado City, Texas - fossil fuel electric generating plant

4. Project Manager (3 1/2 years) - Responsible for overall management and supervision of major construction projects, primarily in the nuclear power plant field

B. 1966 to 1973 - Walter Kidde Constructors, New York, New York (7 1/2 years)

1. European Manager (1 1/2 years) - Responsible for engineering and construction of European activity

2. Vice President, Construction (6 years) - Responsible for corporate direction and administration of all construction activities

Sheldon D. Smith

C. 1973 - 1974 - Rust Engineering Company - Vice President of Construction, including some work at Oakridge, Tennessee, for the NRC.

D. 1974 to 1976 - The A. Epstein Cos., Incorporated, Vice President of Construction Operations

E. 1976 - Carolina Power & Light Company - Employed as Manager, Power Plant Construction Department

F. 1979 - Elected Vice President, Power Plant Construction Department - CP&L

III. Professional Societies

A. Registered professional engineer in the states of Georgia, Maine, Missouri and Texas
B. American Society of Civil Engineers
C. American Society of Professional Engineers
D. Panel of Arbitrators, American Arbitration Association

R. A. Watson, Vice President, Harris Nuclear Project 13

I. Education

A. B. S. Degree in Nuclear Engineering - North Carolina State University - 1955

B. Oak Ridge School of Reactor Technology - Oak Ridge, Tennessee - 1956-57

C. M. S. Degree in Physics - Union College, Schenectady, New York - 1961

D. General Electric Company Courses: Electronic Circuits, Fortran II, Servomechanisms

II. Experience

A. 1955-56 - General Electric Company - Schenectady, New York - Program Engineer

B. 1956-57 - Knolls Atomic Power Laboratory - Schenectady, New York - Educational Leave

C. 1957-61 - Nuclear Engineer - Knolls Atomic Power Laboratory

D. 1961-63 - Experimental Physicist - Knolls Atomic Power Laboratory

E. 1963-65 - Reactor Physicist - Knolls Atomic Power Laboratory

F. 1965-66 - Supervising Physicist - Knolls Atomic Power Laboratory

G. 1966-69 - Senior Physicist - Knolls Atomic Power Laboratory

H. May 1969 - August 1971 - Nuclear Fuel Engineer - Power Supply Department, Carolina Power & Light Company, Nuclear Generation Section, General Office, Raleigh, North Carolina

I. August 1971 - January 1977 - Director - Nuclear Fuel, Nuclear Bulk Power Supply Department, Fuel Section - CP&L

J. January 1977 - May 1977 - Director - Nuclear Fuel, Nuclear Fuel Department, Nuclear Fuel Section - CP&L

K. May 1977 - March 1980 - Manager - Fuel, Power Supply Group, Fuel Department - CP&L

R. A. Watson

L. March, 1980 - September 1983 - Vice President - Fuel, Power Supply Group, Fuel Department - CP&L

13 M. September 1983 - Vice President - Harris Nuclear Project, Nuclear Generation Group - CP&L

III. Professional Societies

A. Registered Professional Engineer - California, 1976

H. R. Banks, Manager, Corporate Quality Assurance Department

I. Education

A. Graduated from Indiana High School, Indiana, Pennsylvania - 1948

B. Class "A" Engineman School from 9/48 to 1/49 - U. S. Navy

C. Class "C" Instructor Training School - 1954 - U. S. Navy

D. Basic Nuclear Power Engineering School from 7/59 to 1/60 - U. S. Navy

E. Nuclear Power Training Unit from 1/60 to 6/60 - U. S. Navy

F. Naval Officers', Limited Duty, Candidate School - 10/64 to 12/64

G. Completed PUR Guide Home Study Course (CP&L) - 3/74

II. Experience

A. June 1948 - Dec. 1948 - Recruit Training and Engineman School Student - U. S. Navy

B. Dec. 1948 - June 1951 - USS Catawba, ATA 210, assigned to the Engineering Department. Responsible for the operation, maintenance, and repair of diesel engines, refrigeration plant, winches, steam heating plant, and pumps

C. June 1951 - July 1954 - USS LSIL, 638 - Leading Petty Officer - Engineering Department

D. July 1954 - June 1957 - Naval Training Center, Recruit Training Command, Instructor - San Diego, California

E. June 1957 - Oct. 1958 - USS Montrose, APA 212 - Leading Petty Officer, Auxiliary and Boat Division

F. October 1958 - January 1959 - Enlisted Submarine School Student

G. January 1959 - June 1959 - USS Rasher, SSR 269 - Leading Petty Officer, Auxiliary Division

H. June 1959 - June 1960 - Nuclear Power Engineering School and Prototype Student

I. June 1960 - June 1962 - Chief Engineman, Nuclear Power Training Unit, (SIW) Nuclear Submarine Prototype - Idaho Falls, Idaho

H. R. Banks

J. June 1962 - October 1964 - USS Andrew Jackson, SSBN 619 - Leading Machinery Division Chief, supervisor in charge of operation of the nuclear power plant

K. October 1964 - January 1965 - Naval Officer's Candidate School

L. January 1965 - August 1968 - Nuclear Ship Superintendent - San Francisco Bay Naval Shipyard

M. August 1968 - July 1970 - Resident Project Engineer - H. B. Robinson Plant - Unit #2 - Carolina Power & Light, Power Supply Department, Hartsville, South Carolina

N. July 1970 - August 1971 - Resident Project Engineer - Brunswick Plant - Units 1 & 2 - Carolina Power & Light Company, Power Plant Design & Construction Department, Southport, North Carolina

O. August 1971 - February 1972 - Manager - Quality Assurance, Power Plant Design & Construction Department, CP&L, Raleigh, North Carolina

P. February 1972 - July 1973 - Manager - Quality Asurance Audit, Special Services Department - CP&L, Raleigh, North Carolina

Q. July 1973 - August 1975 - Manager - Quality Assurance & Training Audit, Special Services Department - CP&L, Raleigh, North Carolina

R. August 1975 - March 1976 - Manager - Nuclear Generation, Special Services Department - CP&L, Raleigh, North Carolina

S. March 1976 - October 1979 - Manager - Nuclear Generation, Bulk Power Supply Department, Nuclear Generation Section - CP&L, Raleigh, North Carolina

T. October 1979 - General Manager - Shearon Harris Nuclear Power Plant - CP&L, Raleigh, North Carolina

U. February 1981 - Present - Manager - Corporate Quality Assurance - CP&L, Raleigh, North Carolina

III. Professional Societies

A. ASME Standards Committee - N45-2.12 & N45.2.23
B. EEI Nuclear Manpower Committee
C. SEE Production Section
D. EPRI - Steam Generator Owners Group

W. V. Coley, Manager, Engineering & Construction Support Services

I. Education & Training

A. B.E.E. Degree in Electrical Engineering from North Carolina State University - 1958

B. "Public Utility Executive Course" - Georgia Institute of Technology - 1971

C. Various Management and Supervisory courses

II. Experience

A. February 1951 - February 1955 - U. S. Navy, Shipboard Electrical Work - Entered service as Seaman. Attended Class "A" Electrician School. At time of discharge was First Class Electrican

B. June 1955 - September 1955 and June 1956 - September 1956 - Patton Electric Company - Summer work in commercial, industrial and electrical wiring

C. June 1957 - September 1957 and December 1957 - April 1958 - CP&L Temporary Student Worker in District Operations

D. June 1958 - February 1959 - Florida Power & Light Company - Distribution Engineer

E. February 1959 - January 1960 - Cadet Manager - CP&L, Dunn District Office

1. January 1960 - April 1961 - Assistant to District Manager - CP&L, Dunn District Office

F. April 1961 - July 1962 - Assistant to District Manager - CP&L, Hartsville District Office

G. July 1962 - June 1963 - Assistant to District Manager - CP&L, Henderson District Office

H. June 1963 - May 1968 - Industrial Development Agent - CP&L, Industrial Development Section of Area Development in Florence, South Carolina

I. May 1968 - March 1972 - Director, CP&L Industrial Development for North Carolina. Located in General Office, Raleigh, North Carolina

J. March 1972 - June 1974 - Manager - CP&L, Area Development Department - Located in General Office, Raleigh, North Carolina

W. V. Coley

K. June 1974 - June 1977 - Assistant to Department Head - CP&L, Power Plant Construction Department. Located in General Office, Raleigh, North Carolina

L. June 1977 - Present - Manager - CP&L, Engineering & Construction Support Services Department. Located in General Office, Raleigh, North Carolina.

III. Professional Societies

None

Walter J. Hurford, Manager, Fuels Department

I. Education & Training

A. BS Degree in Metallurgical Engineering - Carnegie Institute of Technology, Pittsburgh, PA (1942)

B. SM Degree in Industrial Management - Massachusetts Institute of Technology - Boston, MA (1960)

II. Experience

A. 1949 - 1976 - Manager - Light Water Breeder Reactor Core Activity - Westinghouse Bettis Laboratory (Westinghouse Electric Corporation) 13

B. 1976 - 1981 - Vice President Corporate Production - Wyoming Mineral Corporation (Westinghouse Electric Corporation)

C. 1981 - 1982 - Manager of Production - Western Zirconium Division (Westinghouse Electric Corporation)

D. January 1983 - Employed at Carolina Power & Light Company as Manager - Technical Services Department in the Power Supply Group located in the General Office, Raleigh, NC

E. September 1983 - Manager - Fuels Department, General Office, Raleigh, NC

III. Professional Societies

A. American Society for Metals

R. B. Richey, Manager - Materials Management Department

I. Education

A. Purdue University, West Lafayette, Indiana - M.S. Industrial Engineering, 1970.

B. U.S. Naval Academy, Annapolis, Maryland - B.S. Engineering, 1964.

II. Experience

A. U.S. Navy

1. 1964 - 1969 - Nuclear Submarine Officer

B. Babcock & Wilcox Company

1. August 1970 - June 1971 - Senior Analyst-Capital, financial and marketing forecasting and analyses.

2. June 1971 - December 1972 - Manager, Product & Marketing Planning-Commercial development of new products.

3. December 1972 - May 1974 - Manager, Materials & Operations Control-Nuclear fuel production & materials management. 13

4. May 1974 - March 1975 - Manager, Business Analysis-Fuel cycle business evaluations and purchase negotiations.

5. March 1975 - April 1977 - Manager, Export Business-Marketing and sales of power equipment to Europe and Middle East.

6. April 1977 - November 1982 - Manager, Customer Parts & Services-Profit center management of maintenance materials to utilities.

C. Carolina Power & Light Company

1. November 1982 - September 1983 - Manager, Materials Control Section, Materials Management Department, Raleigh, N.C.

2. September 1983 - Present - Manager, Materials Management Department, Raleigh, N.C.

III. Professional Societies

A. North Carolina Society of Engineers

B. American Production & Inventory Control Society

C. International Materials Management Society

T. J. Allen, Manager - Planning and Control

I. Education

A. Oregon State University - Corvallis, Oregon - 1967 - B. S. Civil Engineering

B. Portland State University - Portland, Oregon - M.B.A., 1977

II. Experience

A. 1967 - Project Engineer and Maintenance Engineer - Shell Chemical Company

B. 1973 - Design Supervisor - Simpson Timber Company

C. 1974 - Planning and Scheduling Engineer - Trans-Alaska Pipeline System

D. 1977 - Supervisor - Schedule Control and Reporting - Trans-Alaska Pipeline System

E. 1977 - Personal Consulting - Risk Analysis of the Manageability of the Canadian Arctic Gas Field Plan for Construction of the Gas Line Project 13

F. 1978 - Associate - Theodore Barry & Associates - General Management Consulting to the Utility Industry

G. 1979 - Sr. Associate - Theodore Barry and Associates - Audits of Power Plant Construction for Both Utilities and State Utility Commissions

H. 1981 - Managing Associate - Theodore Barry & Associates

I. 1982 - Manager of Field Planning and Scheduling - Northwest Alaskan Pipeline Project

J. 1982 - Assistant to the Executive Vice-President - Special Assignment to the Brunswick Plant

K. 1983 - Manager - Planning and Control Section - Harris Nuclear Project

III. Professional Societies

A. Project Management Institute

B. Member - Sigma TAU - Engineering Honorary

C. Professional Engineer - Oregon - No. 9293

A. G. Bullard, Jr., Manager, Research Section

I. Education

A. N.C. State University, B.S. in Chemical Engineering - 1956

B. N.C. State University, M.S. in Nuclear Engineering - 1959

C. N.C. State University, Ph.D in Nuclear Engineering - 1967

D. United States Army Ordnance Guided Missile School, Redstone Arsenal, Alabama

Experience Prior to Joining CP&L

A. 1956 - 1958 - Graduate Study, N.C. State University; completed requirements for M.S. Degree in Nuclear Engineering

B. 1958 - 1959 - United States Ordnance Corps: Basic ordnance officer training and guided missile officer training schools

C. 1959 - 1961 - U.S. Army Officer, Nuclear Effects Engineer, United States Army Ordnance Corps: Conducted transient radiation effects studies on guided missile system and components 13

D. 1961 - 1963 - Reactor Engineer - USAEC: Participation in administration and planning of reactor start-up operations for the experimental gas cooled reactor

E. 1963 - 1966 - Graduate Study - N.C. State University: Completed requirements for Ph.D. Degree in Nuclear Engineering

F. 1966 - 1972 - Assistant Professor of Nuclear Engineering, Virginia Polytechnic Institute: Responsible for graduate and undergraduate instruction in Nuclear Engineering. Research in nuclear reactor design and nuclear fuel management. Reactor Operator Training Instructor in Special Program by VPI and B&W for Arkansas Power and Light Company

G. 1969 - USAEC Summer Research Participation Program

H. 1970 - 1972 - Technical Consultants, Inc.: Nuclear fuel management consulting in areas of computer code development and computer applications to nuclear reactor design analysis

I. 1972 - Present - Member of EPRI Fossil Fuels Task Force, EPRI Advanced Power Systems Division Committee, EPRI Nuclear Power Division Committee, EPRI Research Advisory Committee, and the North Carolina Energy Institute Board of Scientific Advisors

A. G. Bullard, Jr.

Experience with CP&L

A. 1972 - 1976 - Director of Research, Special Services Department; responsible for coordination of CP&L involvement in research

B. 1976 - 1979 - Manager, Technical and Research Services: Responsible for providing specialized technical expertise in support of Company activities, providing a program of Company research and development, and coordinating internal and external research involvement of the Company

13 C. 1979 - 1982 - Director of Research, Corporate Nuclear Safety & Research Department: Responsible for management and/or conduct of selected in-house research, coordination of CP&L involvement in research, and assessment of new power generation alternatives and alternate energy sources.

D. 1982 - Present - Manager of Research, Corporate Nuclear Safety & Research Department

III. Professional Affiliations & Achievements

A. American Nuclear Society
B. American Institute of Chemical Engineers
C. EPRI Advanced Systems Division Committee

R. M. Coats, Assistant to the Group Executive, Fossil Generation & Power Transmission | 13

I. Education & Training

A. B. S. Degree in Chemical Engineering from North Carolina State University, 1967

B. Attended graudate school at North Carolina State University until January 1968

C. Attended site lecture series of Westinghouse training program

II. Experience

A. June 1965 to August 1967 - Research Assistant in Nuclear Engineering Department, North Carolina State University

B. September 1967 to January 1968 - Graduate Student Laboratory Instructor, North Carolina State University, (Chemical)

C. January 1968 to February 1970 - Chemical Engineer, Carolina Power & Light Company, Design & Contruction Section, General Office, Raleigh, North Carolina.

D. February 1970 to July 1971 - Radiochemical Engineer, Technical Services Department - CP&L

E. July 1971 to April 1972 - Senior Chemical Engineer, Power Plant Design & Construction Department, Nuclear Design Section - CP&L

F. April 1972 to August 1975 - Principal Engineer, Power Plant Engineering & Construction Department, Nuclear Plant Engineering Section - CP&L

G. August 1975 to October 1976 - Principal Engineer, Staff Services Unit, Office of Assistant to Group Executive, EC&O Group - CP&L

H. October 1976 to January 1977 - Principal Engineer, Staff Services, System Planning & Coordinating Department - CP&L

I. January 1977 to October 1979 - Manager, Generation Service Section, Generation Department - CP&L

J. October 1979 - Manager, Nuclear Operations Administrative Section, Nuclear Operations Department - CP&L

R. M. Coats

K. January 1981 - Manager, Nuclear Operations Administrative Section, Technical Services Department - CP&L

13 L. September 1983 - Assistant to the Group Executive, Fossil Generation & Power Transmission - CP&L

III. Professional Societies

A. Registered Professional Engineer, 1972, North Carolina
B. Member of American Institute of Chemical Engineers

N. J. Chiangi, Manager, QA/QC Harris Plant | 13

I. Education

A. Graduate of Norwich Free Academy, Norwich, Connecticut

B. Special Schools: Nuclear Submarine Systems, Navyships 250-1500-1, Mil. Std. 271 D-271A, Navyships 250-693-1 693-3 (structural), Health Physics Monitoring, Management Schools - Electric Boat Company, Electronics School - U.S. Navy, Welding School - EBC, Radiography School, Magnetic Particle Testing School - EBC, Liquid Penetrant Test School - EBC, Ultra Sonic Testing Classes - EBC, Eastman Kodak School for Automatic Film Processing Equipment, Job Cost Estimating - EBC. Qualified: AEC Licensed Radiographer and Radiographer Supervisor

II. Experience

A. 1947 - 1952 - U. S. Navy, Sonar Man - Radar Man. Special Training, Electronics School, Sonar School, Radio School

B. 1952 - 1967 - Electric Boat Company, Groton, Connecticut

1. 1952 - 1954: Welding-Field Work-Piping-Structural

2. 1954 - 1967: Lead-Supervisor - Radiography Department. Responsible for all Nuclear Radiography-Structural-Piping-Castings, Polaris Missile Program, Radiographer, Film Readers. Set up, wrote and reviewed Radiography Test Procedures for Casting-Piping-Structural Radiography. Instructed Piping and Mechanical design personnel, instructed Radiography Classes for New Hires, reviewed and interviewed personnel for hire. Attended Management-Quality Control meetings.

C. 1967 - 1973 - Ebasco Services, Inc., New York, New York

1. 1967 - 1970: Quality Compliance-Quality Control Supervisor for Ebasco at H. B. Robinson NPS Unit No. 1. Responsible for implementation of the site for the H. B. Robinson project. This included supervising Ebasco site Quality Compliance Representatives in the performance of their inspection duties in the following areas: welding, civil, electrical, nondestructive testing, receiving, storage, and testing. Responsible for the review of site purchase orders for quality requirements and documentation to assure its adequacy. Responsible for maintaining Quality Assurance documentation.

N. J. Chiangi

2. 1970 - 1972: Site Quality Compliance Supervisor for Ebasco at St. Lucie No. 1 Nuclear Power Plant, with responsibility for implementing the site phase of the Ebasco Quality Program as modified for St. Lucie. Responsible for auditing field construction activities as required by the Quality Program, auditing the performance of construction quality control tasks through the Site Quality Compliance Staff, meeting with AEC representatives in performance of their site audits, and maintaining quality compliance files as as described in the Ebasco Quality Program for representation to the client at the completion of the project.

3. 1972 - 1973: Senior Quality Compliance Engineer for Ebasco at Chin-Shan Unit Nos. 1 and 2. Had overall responsibility for Ebasco Quality Compliance Program on site. Duties at Chin-Shan site included the following: instructed personnel in inspection of welding, mechanical, civil and electrical functions. Responsible for interpretation of all codes and specifications having to do with this project where compliance or control was required. Instructed and trained Taipower Personnel in Quality Compliance and Quality Control functions. Developed quality control and compliance programs for Taipower. Responsible for a vendor inspection. Interpreted all radiographs on site. Responsible for maintaining radiographs and quality assurance documentation.

D. October 1, 1973 - Carolina Power & Light Company, Raleigh, North Carolina - Employed as Quality Assurance Manager - Construction, Quality Assurance Section of the Power Plant Construction Department. Located in the General Office

E. November, 1976 - Manager, Engineering and Construction QA Section, Technical Services Department - CP&L

F. March 1983 - Manager, QA/QC Harris Plant Section of the
13 Corporate Quality Assurance Department - Harris Site, New Hill, NC

III. Professional Societies

A. Member - ASNT - ASME
B. Qualified ANST - Level III - 2/4/77
Radiographic - Magnetic Particle - Liquid Penetrate
C. Professional Engineer - State of California, January, 1977

William J. Hindman, Jr., Manager - Harris Project Administration

I. Education

A. BS Degree in Civil Engineering - Clemson University - Clemson, South Carolina, 1965

B. US Army Engineer School - Engineer Branch Officer Course, 1966

C. US Army Military Police School - Military Police Officer Course, 1971

D. US Army Engineer School - Engineer Officer Advanced Course, 1974

E. US Army Command & General Staff College - Diploma, 1978

II. Experience

A. 1965 - Officer, US Army Corps of Engineers

B. 1969 - Traffic Research Engineer, NC Department of Transportation 13

C. 1974 - Employed as Senior Engineer - Staff, CP&L Power Plant Construction

D. 1979 - Employed as Director - Project Analysis, CP&L Harris Site Management

E. 1983 - Employed as Manager - Harris Project Administration, CP&L Harris Nuclear Project

III. Professional Societies

A. Member of American Society of Civil Engineers
B. Member of American Nuclear Society
C. Registered Professional Engineer in North Carolina
D. Registered Professional Engineer in South Carolina

J. D. E. Jeffries - Manager - Corporate Nuclear Safety

I. Education & Training

A. BS Degree in Engineering - United States Naval Academy - 1964

B. MS Degree in Nuclear Engineering - Pennsylvania State University - 1970

C. PhD Degree in Nuclear Engineering - Pennsylvania State University - 1972

II. Experience

A. June 1964 - April 1965 - Lieutenant, USMC - Marine Corps Base, Quantico, Virginia

B. May 1965 - June 1968 - Captain, USMC - Operations Officer - Hawk Missile Battalion and Air Control Squadron

C. July 1968 - June 1971 - Research Reactor Operator, Pennsylvania State University

D. July 1971 - October 1972 - Research/Teaching Assistant, Nuclear Technology Program, Pennsylvania State University

E. November 1972 - June 1973 - Employed as Senior Engineer, Licensing & Technological Services Section, Special Services Department, Carolina Power & Light Company, Raleigh, NC 13

F. June 1973 - September 1975 - Employed as Project Engineer, Nuclear Plant Engineering Section, Power Plant Engineering Department, Carolina Power & Light Company, Raleigh, NC

G. September 1975 - June 1976 - Employed as Project Engineer, Corporate Nuclear Safety Section, Special Services Department, Carolina Power & Light Company, Raleigh, NC

H. June 1976 - December 1976 - Employed as Project Engineer, Corporate Nuclear Safety Section, Technical Services Department, Carolina Power & Light Company, Raleigh, NC

I. December 1976 - November 1977 - Corporate Nuclear Safety Section, System Planning & Coordination Department, Carolina Power & Light Company, Raleigh, NC

J. November 1977 - April 1978 - Employed as Project Engineer, Corporate Nuclear Safety & QA Audit Section, System Planning & Coordination Department, Carolina Power & Light Company, Raleigh, NC

J. D. E. Jeffries

K. April 1978 - Employed as Principal Engineer, Nuclear Safety, CNS&QAA Section, System Planning & Coordination Department, Carolina Power & Light Company, Raleigh, NC

L. August 1979 - Employed as Principal Engineer, Nuclear Safety, CNS&QAA Section, Nuclear Safety & Research Department, Carolina Power & Light Company, Raleigh, NC

M. June 1980 - Employed as Principal Engineer, Corporate Nuclear Safety Section, Corporate Nuclear Safety & Research Department, Carolina Power & Light Company, Raleigh, NC

13 N. August 1981 - Employed as Manager - Corporate Nuclear Safety Section, Corporate Nuclear Safety & Research Department, Carolina Power & Light Company, Raleigh, NC

III. Professional Societies

A. American Nuclear Society
B. Society of the Sigma Xi
C. Scientific Research Society of North America
D. Raleigh Engineers Club
E. Health Physics Society - North Carolina Section

J. W. Kirk, General Manager, System Operations

I. Education

A. NCSU - B.S. Degree in Electrical Engineering, 1968 | 13

II. Experience

A. June, 1967, to May, 1968, employed as a summer and part-time employee in the Transmission & Distribution Department, Raleigh District Engineering Office - CP&L

B. June 1968, to June, 1969, employed as a Junior Engineer in the Transmission & Distribution Department, Raleigh District Engineering Office - CP&L

C. July, 1969, to October, 1970, employed as an Electrical Engineer in the Transmission & Distribution Department, Raleigh District Engineering Office - CP&L

D. November, 1970, to July, 1971, employed as an Electrical Engineer in the Engineering Unit of the Transmission & Distribution Department. Located in Asheboro, N.C. - CP&L

E. August, 1971, to February, 1972, employed as an Electrical Engineer in the System Planning Section of the Engineering Department. Located in the General Office - CP&L

F. February, 1972, to September, 1973, employed as a Senior Engineer in the System Planning & Cost Control Section of the System Engineering & Construction Department. Located in the General Office - CP&L

G. September, 1973, to August 2, 1975, employed as Principal Engineer - Cost Control, in the System Planning & Cost Control Section of the System Engineering & Construction Department. Located in the General Office - CP&L

H. August 2, 1975, to September 18, 1976, employed as Principal Engineer - Generation Planning, in the System Planning & Cost Control Section of the System Engineering and Construction Department. Located in the General Office - CP&L

I. September 18, 1976, to January 1, 1977, employed as a Principal Engineer in the System Operations & Maintenance Section of the Bulk Power Supply Department. Located in the General Office - CP&L

J. W. Kirk

J. January 1, 1977, to April 22, 1978, employed as a Principal Engineer in the Administrative Unit of the System Operations & Maintenance Department located in the General Office - CP&L

K. April 22, 1978, to June 1, 1979, employed as Manager - Energy Control Center in the System Operations Section of the System Operations & Maintenance Department located at the Energy Control Center - CP&L

L. June 1, 1979, to November 3, 1979, employed as Manager - System Operations & Maintenance in the System Operations & Maintenance Department, Power Supply Group located in the General Office - CP&L

M. November 3, 1979, to Present, employed as General Manager - System Operations in the System Operations Department located in the General Office - CP&L

III. Professional Societies

A. North Carolina Society of Engineers
B. Raleigh Engineer's Club
13 C. National Society of Professional Engineers

L. I. Loflin, Manager, Engineering - Harris Plant | 13

I. Education

A. B. S. Degree in Electrical Engineering from Clemson University - February, 1964

B. Professional Degree in Nuclear Engineering from North Carolina State University - June, 1969

C. Reactor Operator Training Programs

1. Westinghouse Corporation, Saxton Plant: AEC Senior Reactor Operator License February, 1970

2. Virginia Electric and Power Company, Surry Plant: AEC Senior Reactor Operator License, April, 1972

II. Experience

A. 1960 to 1963 - Duke Power Company

1. Three summer work periods at Buck Steam Plant, Spencer, North Carolina

2. One summer work period at Greenville, South Carolina, Distribution Engineering Office

B. February, 1964 to June, 1973 - Virginia Electric and Power Company

1. Assistant Engineer, Yorktown Power Plant (two 165 MWe fossil fired units): February, 1964 to November, 1964

2. Assistant Engineer: November, 1964 to May, 1965
Associate Engineer: May, 1965 to May, 1967
Engineer: January, 1967 to May, 1967
Mt. Storm Power Plant (two 565 MWe fossil fired units)

3. Engineering Supervisor, Mt. Storm Power Plant: May, 1967 to September, 1968

4. Staff Engineer, Richmond, Virginia:
September, 1968 to June, 1969
Assigned to North Carolina State University

5. Assistant Operating Supervisor, Surry Nuclear Power Plant (two 2441 MWt Pressurized Water Reactors): June, 1969 to September, 1972

L. I. Loflin

6. Operating Supervisor, Surry Nuclear Power Plant (two 2441 MWt Pressurized Water Reactors): September, 1972 to June, 1973

C. June 1973 to July 1974 - Principal Engineer, Power Plant Engineering Department - CP&L

D. July, 1974 to August, 1975 - Principal Engineer, Brunswick Startup - CP&L

E. August, 1975 to June, 1976 - Manager - Corporate Nuclear Safety Section, Special Services Department - CP&L

F. June, 1976 to November 30, 1976 - Manager - Corporate Nuclear Safety Section, Technical Services Department - CP&L

G. December, 1976 - Manager - Corporate Nuclear Safety Section, System Planning & Coordination Department - CP&L

H. December 14, 1976 - Transferred to Power Plant Engineering Department as Manager - Nuclear Plant Engineering

I. January 13, 1977 - Reassigned as Manager of Engineering Pool Section of the Power Plant Engineering Department - CP&L

13 J. December, 1979 - Assigned as Manager, Harris Plant Engineering Section - CP&L

III. Professional Societies

A. ANS
B. P.E. - California - 1976

L. H. Martin, Manager, Nuclear Fuel Section

I. Education

A. B. S. Degree in Nuclear Engineering - North Carolina State University - 1965

B. M. B. A. Degree - University of South Carolina - 1971

II. Experience

A. 1965 to 1970 - Nuclear-related work - Savannah River Plant

B. April 1972 - July 1973 - Senior Engineer - Carolina Power & Light Company, Bulk Power Supply Department, Fuel Section, General Office, Raleigh, North Carolina

C. July 1973 - August 1974 - Principal Engineer - Surveillance & Accountability (In-Training) Bulk Power Supply Department, Fuel Section - CP&L

D. August 1974 - January 1977 - Principal Engineer - Surveillance & Accountability Bulk Power Supply Department, Fuel Section - CP&L

E. January 1977 - May 1977 - Principal Fuel Analyst, Fuel Department, Fuel Analysis Unit - CP&L

F. May 1977 - Present - Manager - Nuclear Fuel, Fuel Department, Nuclear Fuel Section - CP&L

III. Professional Societies

A. Registered Professional Engineer - North Carolina - 1975
B. Member of American Nuclear Society
C. Member of Institute for Nuclear Materials Management

R. L. Mayton, Manager, Corporate Health Physics | 13

I. Education

A. M. S. Degree in Nuclear Engineering - North Carolina State University - 1965

B. B. S. Degree in Nuclear Engineering - North Carolina State University - 1963

II. Experience

A. June, 1962 to September, 1962 - Engineering Assistant - L. E. Wooten & Company

B. June, 1963 to September, 1963 - Engineer - Nuclear Power Division - Charleston Naval Shipyard

C. June, 1964 to August, 1965 - North Carolina State University - Teaching nuclear physics laboratory while attending college

D. August, 1965 to June, 1968 - Engineer responsible for technical assistance to production department at Savannah River Project

E. June, 1968 to February, 1971 - Senior Engineer Carolina Power & Light Company, Raleigh

F. February, 1971 to November, 1971 - Principal Nuclear Licensing Engineer - Environmental & Technical Services Section, Generation & System Operations Department - CP&L, Raleigh

G. November, 1971 to June, 1976 - Principal Nuclear Licensing Engineer - Environmental & Technical Services Section, Special Services Department - CP&L, Raleigh

H. June, 1976 to December, 1976 - Manager - Corporate Health Physics - Technical Services Department - CP&L, Raleigh

I. December, 1976 to November, 1977 - Manager - Corporate Health Physics - System Planning & Coordination Department - CP&L, Raleigh

J. November, 1977 - Director - Corporate Health Physics - System Planning & Coordination Department - CP&L, Raleigh

K. August, 1979 - Director - Corporate Health Physics - Corporate Nuclear Safety & Research Department - CP&L, Raleigh | 13

R. L. Mayton

13 L. August, 1982 - Manager - Corporate Health Physics - Corporate Nuclear Safety & Research Department - CP&L, Raleigh

III. Professional Societies

A. Member of American Nuclear Society
B. Member of Health Physics Society
C. North Carolina Society of Engineers

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R. M. Parsons, Project General Manager - Harris Plant | 13

I. Education

A. BS Degree in Civil Engineering from Fresno State College, 1959

II. Experience

A. August, 1964 to November, 1966

1. U. S. Forest Service, Nevada City, California

a. Forest service representative on hydroelectric developments built on forest service land by others.

B. November, 1966 to September, 1973

1. Ebasco Services, Inc., Hartsville, South Carolina; and Jensen Beach, Florida

a. November, 1966 - Field Engineer on construction of H. B. Robinson Unit No. 2 (700 MW Westinghouse PWR nuclear power plant).

b. November, 1967 - Resident Engineer responsible for site engineering and quality control for construction of H. B. Robinson Unit 2.

c. April, 1971 - Senior Resident Engineer responsible for all site engineering for construction of St. Lucie Unit No. 1 (810 MW combustion engineering PWR nuclear power plant).

C. September, 1973 to May, 1974

1. Daniel Construction, Jenkinsville, South Carolina

a. Site Manager of Engineering responsible for all site engineering for construction of V. C. Summer Nuclear Power Plant.

D. June, 1974 to September, 1976

1. Ebasco Services, Elma, Washington

a. Senior Resident Engineer responsible for all site engineering on 1300 MW PWR nuclear power plant.

R. M. Parsons

E. September 20, 1976, to Present

1. Carolina Power & Light Company

a. September 20, 1976 - Employed as Site Manager in the Nuclear Construction Section of the Power Plant Construction Department. Located at the Harris site, New Hill, N. C.

b. April 27, 1979 - Reclassified as Site Manager (Harris) in the Harris Site Management Section of the Power Plant Construction Department. Located at the Harris site, New Hill, N. C.

c. May 3, 1980 - Reclassified as Site Manager - Harris Plant Construction in the Harris Site Management Section of the Power Plant Construction Department. Located at the Harris site, New Hill, N. C.

d. January 31, 1981 - Reorganization - Site Manager - Harris Plant in the Harris Site Management Section of the Nuclear Plant Construction Department Located at the Harris Site, New Hill, N.C.

13 e. March 22, 1982 - Title changed to Project General Manager

III. <u>Professional Societies</u>

A. American Society of Civil Engineers

B. Registered Professional Engineer in North Carolina,
13 California, South Carolina, Florida, and Washington

R. L. Sanders, Manager, Engineering Support, Nuclear Plants Section I | 13

I. Education

A. B.S. Degree in Engineering, U.S. Military Academy, West Point, N.Y., 1953

B. M.S. Degree in Nuclear Engineering, North Carolina State University, Raleigh, N.C. 1958

C. Lynchburg College, Lynchburg, Virginia, 18 semester hours in the MBA Program, 1967 to 1969 (night school)

II. Experience

A. 1953 to 1956 - Commissioned 2nd Lt. regular army from West Point

B. 1958 to 1961 - Technical Engineer, General Electric Company, Aircraft Nuclear Propulsion Department, Cincinnati, Ohio

C. 1961 to 1966 - Senior Engineer, Babcock & Wilcox, Lynchburg, Virginia

1. 1966 to 1968 - Supervisor of Analytical Methods and Programs in the Fuel Analysis and Management Department, Babcock & Wilcox, Lynchburg, Virginia

2. 1968 to 1969 - Supervisor of Fuel Management - Babcock & Wilcox, Lynchburg, Virginia

3. 1969 to 1970 - Manager of Fuel Contracts Management, Babcock & Wilcox, Lynchburg, Virginia

D. 1970 to 1972 - Manager of Fuel Management Section, Nuclear Fuel Services, Rockville, Maryland

1. 1972 to 1973 - Manager of Projects, Nuclear Fuel Services - Rockville, Maryland

E. May 1973 to August 1973 - Staff Assistant, Environmental & Technical Services Section, Special Services Department, CP&L, Raleigh, North Carolina

F. August 1973 - Director of Nuclear Licensing, Environmental & Technical Services Section, Special Services Department - CP&L

G. June 1976 - Manager, Environmental Technology Section, Technical Services Department - CP&L

R. L. Sanders

H. June 1979 - Manager, Engineering Support Section, Technical Services Department - CP&L

I. December 1979 - Manager, Engineering Support Nuclear Power Plants Section - CP&L

13 J. December 1983 - Manager, Engineering Support, Nuclear Plants Section I

III. Professional Societies

A. ANS
B. Registered Professional Engineer

Scott Filmore Stidham, Manager - Contract Services

I. Education

A. B.S. Degree in Industrial Engineering from North Carolina State University - 1950

B. Graduate of Industrial Management Course, LaSalle Extension Institute, LaSalle University, Danville, VA - 1952

C. Graduate of Executive Development Program, University of Richmond, Richmond, VA - 1958

D. Graduate of Senior Seminar in management, Hershey, PA - 1976

II. Experience

A. June 1950 - September 1953 - Dan River Mills, Danville, VA

1. Employed as Industrial Engineer (1950)

2. Promoted to Labor Relations Representative (1952)

B. September 1953 - October 1972 - Reynolds Metals Company - Louisville, KY & Richmond, VA 13

1. Employed as Industrial Engineer (1953)

2. Promoted to Sr. Industrial Engineer in Charge of Facility Planning (1958)

3. Promoted to Operations Manager, Fabricated Products (1964)

4. Promoted to Administrative Manager of Sheet, Plate, Wire, Rod & Bar Plants (1969)

C. November 1972 - July 1980 - Texasgulf, Inc. - Washington, NC & Raleigh, NC

1. Employed as Assistant General Manager for Administration, Phosphate, Operations (1972)

2. Promoted to Administrative Manager of Agricultural Products Division (1975)

3. Promoted to Administrative Manager of the Texasgulf Chemicals Company (1979)

Scott Stidham

D. January 1981 - Present, Carolina Power & Light Company, General Office, Raleigh, North Carolina:

1. Employed as Project Specialist - Special Projects in Nuclear Operations Administration Section of the Nuclear Operations Department - January 1981

2. Transferred to the Technical Services Department as Project Specialist - Administration in the Nuclear Operations Administration Section and appointed Unit Head - Administrative - February 1981

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3. Transferred as Project Specialist - Administration to the Power Supply Group Staff in charge of the Contracts Unit - March 1982.

4. Appointed Project Manager - Contracts Study Team to design a new centralized contracting organization - June 1982

5. Promoted to Manager - Contract Services Section, Fuel & Materials Management Group - January 1983

6. Manager - Contract Services Section, Operations Support Group - August 1983

A. C. Tollison, Jr., Manager - Nuclear Training Section

I. Education & Training

A. U. S. Navy Schools

1. Navy Nuclear Power Program Submarine School - 1964

B. Industry Training

1. SRO (PWR) - 1971

C. Marion High School, Marion, SC - 1960

D. University of South Carolina - BS Chemical Engineering - 1964

II. Experience

A. U. S. Navy - 1964 to 1970 (Commander)

1. 1966 to 1968, USS Daniel Webster (SSBN-626) - Supply Officer, E/RC Officer, Main Propulsion Assistant

2. 1968 to 1970, USS Grayling (SSN-646) - Communications Officer, Main Propulsion Assistant, Weapons Officer

B. Carolina Power & Light Company 13

1. 1970 - 1971 employed as Senior Engineer at H. B. Robinson Steam Electric Plant, Hartsville, SC

2. 1971 - 1974 employed as Engineering Supervisor at H. B. Robinson Steam Electric Plant, Hartsville, SC

3. 1974 to 1975 employed as Operations Supervisor at the H. B. Robinson Steam Electric Plant, Hartsville, SC

4. 1976 employed as Maintenance Supervisor at the H. B. Robinson Steam Electric Plant, Hartsville, SC

5. 1976 employed as O&M Superintendent at the Brunswick Steam Electric Plant, Southport, NC

6. 1976 to 1981 employed as General Manager at the Brunswick Steam Electric Plant, Southport, NC

7. 1981 to 1983 on loan to Institute of Nuclear Power Operations (INPO)

a. 1981 - Evaluator, Evaluation Team Manager, Manager - Organization & Administration Department

A. C. Tollison

b. 1982 to 1983 - Director - Evaluation & Assistance Division

13

8. September 1983 employed as Manager - Nuclear Training, Operations Training & Technical Services Department, Shearon Harris Energy & Environmental Center, New Hill, NC

III. Professional Societies

A. American Nuclear Society

B. H. Webster, Manager, Radiological & Chemical Support Section

I. Education

A. B.S. Degree in Physics from Georgetown College, 1958

II. Experience

A. August, 1958, Associate Health Physicist at gaseous diffusion plant for Union Carbide Nuclear Company

B. December, 1960, Health Physicist at General Atomic Company, hot cell facility

C. October, 1962, Shift Health & Safety Engineer, Plum Brook Reactor, Controls for Radiation, Inc.

D. December, 1966, Health Physicist, Piqua Nuclear Power Facility, Piqua, Ohio

E. June, 1968, employed as a Senior Engineer in the Production & System Operations Section, Operating & Engineering Department, Carolina Power & Light Company, Raleigh, NC

F. February, 1971, employed as a Principal Radiation Control Engineer in the Environmental & Technical Services Section of the Generation & System Operations Department - CP&L

G. December, 1971, employed as a Principal Engineer - Health Physics in the Environmental & Technical Services Section of the Generation & System Operations Department - CP&L

H. July, 1972, employed as a Principal Engineer - Radiation Control in the Nuclear Generation Section of the Bulk Power Supply Department - CP&L

I. January, 1977, employed as a Director - Environmental & Radiation Control in the Generation Services Section of the Generation Department - CP&L

J. May, 1979, employed as a Generation Services Manager - SHEEC in the Generation Services - SHEEC Section of the Generation Department (Located at the Harris Energy & Environmental Center) - CP&L

K. November, 1979, employed as Manager - Environmental & Radiation Control in the Nuclear Operations Department. (Located at the Harris Energy & Environmental Center) - CP&L

B. H. Webster

L. February, 1982, employed as Manager - Radiological & Chemical Support Section in the Technical Services Department. (Located at the Harris Energy & Environmental Center) - CP&L

M. January, 1981, employed as Manager - Environmental & Radiation Control in the Technical Services Department. (Located at the Harris Energy & Environmental Center) - CP&L

III. Professional Societies

A. North Carolina Chapter - Health Physics Society
B. American Nuclear Society of East Carolina Section
C. Power Reactor Health Physics Group

J. L. Willis, General Manager, Harris Plant Operations 13

I. Education and Training

A. B. S. Degree in Electrical Engineering - 1955 - U. S. Naval Academy - Annapolis, MD

B. Navy Nuclear Power School - 1958

II. Experience

A. June 1951 - June 1979 - U. S. Navy

B. August 1979 - September 1980 - Project Manager, System Development Corporation Santa Monica, CA

C. September 1980 - September 1981 - Manager, Nuclear Training - Southern California Edison Company

D. October 1981 - employed as Manager - Plant Operations in the Nuclear Operations Department, Harris Plant Section.

E. April 1982 - employed as General Manager, Harris Plant Section.

III. Professional Societies

A. Member of American Nuclear Society 13

B. Member of N.C. Society of Engineers

Mohammed Gamal Zaalouk, Manager - Nuclear Engineering Projects Section

I. Education

A. B.S.. Degree in Electrical Engineering, "Electronics", Cairo University, Cairo, Egypt, 1957

B. M.S. Degree in Nuclear Engineering, NCSU, 1962

C. Ph.D. in Nuclear Engineering, NCSU, 1966

II. Experience

A. 1957 - 1959 - UAR Atomic Energy Establishment, Cairo, UAR - Reactor Construction Engineer

B. 1966 - 1968 - UAR Atomic Energy Establishment, Cairo, UAR - Assistant Professor

C. 1968 - 1969 - A leave of study at the Institute for Atomic Energy, Kjeller, Norway. Conducted research in the area of reactor physics.

D. 1969 - 1972 - Visiting Assistant Professor, Department of Electrical Engineering, N. C. State University

E. November 1972 - September 1981 - Carolina Power & Light Company - Employed as Senior Engineer, Nuclear Plant Engineering Section, Power Plant Engineering & Construction Department, General Office 13

F. January 1974 - Carolina Power & Light Company - Promoted to Project Engineer, Nuclear Plant Engineering Section (I) of the Power Plant Engineering Department, General Office

G. January 1977 - Carolina Power & Light Company - Transferred to the Engineering Pool Section, Power Plant Engineering Department, General Office

H. May 1977 - Carolina Power & Light Company - Promoted to Principal Engineer, Mechanical/Nuclear, in the Engineering Pool Section, Power Plant Engineering Department, General Office

I. December 1979 - Carolina Power & Light Company - Transferred as Principal Engineer to the Engineering Support, Nuclear Power Plants Section, Nuclear Power Plant Engineering Department, General Office

J. September 1981 - December 1983 - Houston Lighting & Power - Manager of Nuclear Engineering Division, responsible for nuclear engineering design of the Ellen's Creek and South Texas projects.

Mohammed Gamal Zaalouk

K. December 1983 - Present - Carolina Power & Light Company - Employed as Manager, Nuclear Engineering Projects, Nuclear Engineering & Licensing Department

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III. Professional Societies

A. American Nuclear Society
B. Registered Professional Engineer, NC - 1975

Sherwood R. Zimmerman - Manager, Nuclear Licensing Section

I. Education

A. U.S. Naval Academy
B. S. in Engineering - 1963

II. Experience

A. December 1963 - December 1969 - U.S. Navy - Lieutenant

B. December 1969 - June 1972 - Baltimore Gas and Electric Company - Employed as an Engineer in the Nuclear/Mechanical Group, Engineering Department.

C. June 1972 - Carolina Power & Light Company

a. Employed as a Senior Engineer in the Special Services Department, Environmental & Technical Services Section, located in the General Office.

b. June 1973 - Promoted to Project Engineer in the Special Services Department, Environmental & Technical Services Section, located in the General Office. 13

c. June 1976 - Promoted to Director of the Nuclear Licensing Unit, Technical Services Department, Licensing & Siting Section, located in the General Office.

d. January 1977 - Promoted to Manager of the Licensing & Siting Section, Technical Services Department, located in the General Office.

e. December 1979 - Manager of Licensing & Permits Section (Section name change), Technical Services Department, located in the General Office.

f. September 1983 - Transferred as Manager of Nuclear Licensing Section to the Nuclear Engineering & Licensing Department, located in the General Office.

III. Professional Societies

A. N. C. Society of Engineers
B. American Nuclear Society
Eastern Carolinas Section (Executive Board Member)
C. Professional Engineer - N. C.
D. Chairman, Wake County School Board Advisory Committee
(Apex attendance area)

H. W. Bowles, Director - Onsite Nuclear Safety (SHNPP)

I. Education & Training

A. BS Degree in Physics - Engineering - Washington and Lee University, 1969

B. Graduate of US Navy Nuclear Power School - Mare Island, California, 1970

C. Graduate of US Navy Nuclear Power Prototype Training Facility - Idaho Falls, Idaho, 1971

II. Experience

A. May 1971 - December 1973 - US Navy, USS Henry L. Stimson (SSBN-655) and Newport News Shipbuilding and Drydock Company. Electrical Officer, Auxiliary Division Officer, Damage Control Assistant, Ship's Diving Officer - Engineering Officer of the Watch during 18-month overhaul and refueling operation.

B. January 1974 - Employed as Nuclear Engineer, Nuclear Plant Engineering Section II, Power Plant Engineering Department, Carolina Power & Light Company, Raleigh, NC

C. January 1975 - September 1975 - Employed as Nuclear Engineer, Fuel Section, Bulk Power Supply Department, Carolina Power & Light Company, Raleigh, NC 13

D. September 1975 - May 1976 - Employed as Engineer III, Fuel Section, Bulk Power Supply Department, Carolina Power & Light Company, Raleigh, NC

E. May 1976 - January 1977 - Employed as Senior Engineer, Fuel Section, Bulk Power Supply Department, Carolina Power & Light Company, Raleigh, NC

F. January 1977 - April 1979 - Employed as Senior Engineer, Nuclear Fuel Section, Fuel Department, Carolina Power & Light Company, Raleigh, NC

G. April 1979 - September 1981 - Employed as Project Engineer, Nuclear Fuel Section, Fuel Department, Carolina Power & Light Company, Raleigh, NC

H. September 1981 - November 1982 - Employed as Project Engineer, Corporate Nuclear Safety Section, Corporate Nuclear Safety & Research Department, Carolina Power & Light Company, Raleigh, NC

I. November 1982 - Present - Employed as Director - Onsite Nuclear Safety (SHNPP), Corporate Nuclear Safety Section, Corporate Nuclear Safety & Research Department, Carolina Power & Light Company, Raleigh, NC

H. W. Bowles

13 III. Professional Societies

A. American Nuclear Society
B. Professional Engineer of North Carolina

S. McManus, Director, Nuclear Engineering Safety Review

I. Education

A. B. S. Degree in Industrial Engineering - North Carolina State University - 1953

B. B. S. Degree in Nuclear Engineering and Engineering Mathematics - North Carolina State University - 1960

II. Experience

A. January, 1956 to June, 1958 - Development Engineer - Automatic Recorder Company

B. June, 1960 to May, 1964 - Carolinas-Virginia Nuclear Power Associates, Inc.

1. Three months at North Carolina State University in operations and analysis training on NCSCR-3 heterogeneous research reactor

2. Nine months operations training at MTR Testing Reactor, NRTS, Idaho (on loan to Phillips Petroleum Company from CVNPA)

3. Thirteen months writing original plant operating procedures, supervising shift during preoperational tests, writing preoperational test procedures and evaluation of plant systems

4. Conducted six weeks training program for operations supervisor, three shift supervisors and six technicians to prepare them for operators hot license examination

5. Completed term at CVTR as Shift Supervisor responsible for operation of the nuclear plant

C. May, 1964 to January, 1968 - Reactor Test Engineer - AEC, Space Nuclear Propulsion Office - Jackass Flats, Nevada

1. Site Representative at the Nuclear Rocket Development Station of Cleveland Extension of the Space Nuclear Propulsion Office

S. McManus

2. Participated in development of test plans, facility requirements, facilities activation plans, and preparation and review of the necessary documentation for testing of nuclear reactor engines for Nerva Project

3. Member of Test Specification and Procedure Review and Test Review Boards which have jurisdiction over NTO testing Test Article Design Changes

4. Reviewed and/or approved AEC required Safety Analysis Reports, Programmatic Test Plans, Test Specifications, Operational Procedures, and other documentation SNPO-C/NRDS Resident Office input as required

D. January, 1968 to September, 1970 - Staff Engineer - AEC Division of Reactor Licensing, Operating Reactor Branch #2.

E. September, 1970 to August, 1973 - Manager - Nuclear Design Section, Power Plant Design and Construction Department - CP&L Raleigh

F. August, 1973 to December, 1976 - Manager - Nuclear Plant Engineering Section - Power Plant Engineering Department - CP&L

G. December, 1976 - Manager - Corporate Nuclear Safety Section - System Planning & Coordination Department - CP&L Raleigh

H. November, 1977 - Manager - Corporate Nuclear Safety & Quality Assurance Audit Section - System Planning & Coordination Department - CP&L Raleigh

I. February, 1981 - Director - Nuclear Engineering Safety Review - Nuclear Plant Engineering Department - CP&L Raleigh

III. Professional Societies

A. American Nuclear Society

B. Registered Nuclear Engineer - California

C. E.I.T. - North Carolina

Table 13.1.1-1

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
Materials Management			
R. B. Richey	Manager, Materials Management	BS, Engineering MS, Industrial Engineering	19 Years
Corporate Nuclear Safety & Research			
T. S. Elleman	Vice President, Corporate Nuclear Safety & Research	BS, PhD - Physical Chemistry	27 Years
A. G. Bullard	Manager of Research	BS Chemical Engineering MS, PhD Nuclear Engineering	26 Years
Robert L. Mayton, Jr.	Manager - Corporate Health Physics	BS Nuclear Engineering MS Nuclear Engineering	19 Years
John G. Hammond	Director - Nuclear Safety Review	BS, Mechanical Engineering MS, Industrial Management	17 Years
J. D. E. Jeffries	Manager - Corporate Nuclear Safety	BS, Engineering MS, Nuclear Engineering PhD, Nuclear Engineering	16 Years
Harold W. Bowles	Director - Onsite Nuclear Safety, SHNPP	BS, Physics Engineering	14 Years
Harris Nuclear Project			
R. A. Watson	Vice President, Harris Nuclear Project	BSNE, MS Physics	27 Years

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Table 13.1.1-1 (Continued)

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
Harris Plant Engineering			
L. I. Loflin	Manager, SHNPP Engineering Section	BSEE, Professional NE	20 Years
E. M. Harris, Jr.	Principal Engineer - Mechanical	BSME	13 Years
J. F. Nevill	Principal Engineer - Civil	BSCE	14 Years
R. W. Prunty, Jr.	Principal Engineer - Electrical	BSEE	13 Years
Harris Plant Construction			
R. M. Parsons	Project General Manager	BSCE	18 Years
P. F. Foscolo	Assistant Project General Manager	BAS & BSME	32 Years
M. F. Thompson, Jr.	Senior Resident Engineer	BSNE & MSNE	19 Years
H. A. Shamblin	Principal Engineer - Construction Contracts	BSCE	28 Years
S. N. Hamilton	Manager, Construction Procurement & Contracting	BS Science	31 Years
R. W. Via	Director - Construction Services	BSEE	14 Years
R. K. Stephens	Director - Electrical Construction	High School Diploma	27 Years
A. H. Rager	Site Superintendent - Night Shift	High School Diploma	15 Years
T. H. Perdue	Principal Engineer - Outlying Structures	BSCE	29 Years
G. M. Simpson	Principal Construction Specialist - Inspection	High School Diploma	15 Years

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Table 13.1.1-1 (Continued)

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
Harris Plant Construction (Continued)			
E. E. Willet	Resident Engineer - Mechanical	BSME	23 Years
R. Hanford	Resident Engineer - Metallurgy/Welding	BS Met	25 Years
A. Cockerill	Resident Engineer - Electrical	BSEE & MSEE	22 Years
W. E. Seyler	Resident Engineer - Civil (Start-up)	BSCE & MS San Eng	13 Years
J. W. McKay	Principal Engineer - Civil	BSCE	13 Years
T. W. Johnson	Resident Engineer - Instrumentation/Equipment	BSEE	19 Years
R. R. Johnson	Construction Manager	BSCE	21 Years
Harris Plant Operations			
J. L. Willis	Plant General Manager, Harris	BSEE	26 Years
Harris Project Administration			
W. J. Hindman, Jr.	Manager - Harris Project Administration	BSCE	18 Years
R. E. Gurganus	Director - Project Analysis	MBA	11 Years
Harris Project Planning and Controls			
T. J. Allen	Manager - Planning and Controls	BS Civil Engineering	17 Years
Engineering & Construction Support Services			
W. V. Coley, Jr.	Manager - E&C Support Services	BEE in Elect. Engineering	10 Years

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Table 13.1.1-1 (Continued)

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
Nuclear Engineering & Licensing			
A. B. Cutter	Vice President, Nuclear Engineering & Licensing	BSCE MS Nuclear Science & Engineering	22 Years
S. R. Zimmerman	Manager, Nuclear Licensing Section	BS Engineering	21 Years
G. S. Cashell	Principal Licensing Engineer	BA Chemistry/Biology	12 Years
Samuel McManus	Director, Nuclear Engineering Safety Review	BS, Industrial Engineering BS, Nuclear Engineering	24 Years
R. L. Sanders	Manager, Engineering Support Nuclear Plants Section I	BS, Engineering MS, Nuclear Engineering	25 Years
W. W. Price	Principal Engineer, Electrical	BS, Electrical Engineering	13 Years
W. P. Tomlinson	Principal Engineer, Mechanical	BS, Nuclear Engineering	13 Years
M. L. Bridges, Jr.	Principal Engineer, Mechanical	BS, Nuclear Engineering	16 Years
M. G. Zaalouk	Manager, Nuclear Engineering Projects	BS, Electrical Engineering MS, Nuclear Engineering PhD, Nuclear Engineering	27 Years
H. Hines	Principal Engineer, Mechanical/Electrical	BS, Chemistry BS, Nuclear Engineering	22 Years
D. Koss	Principal Engineer, Civil	BS, Civil Engineering MS, Water Resources Engineering	11 Years

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Table 13.1.1-1 (Continued)

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
Transmission			
E. S. Noell, Jr.	Vice President-Transmission	BSEE	34 Years
Operations Training & Technical Services			
B. J. Furr	Vice President, Operations Training & Technical Services	BS Mechanical Engineering	22 Years
R. G. Black, Jr.	Director, Emergency Preparedness	BS Industrial Engineering	14 Years
B. H. Webster	Manager, Radiological & Chemical Support Section	BS Physics	26 Years
A. C. Tollison, Jr.	Manager, Nuclear Training Section	BS Chemical Engineering	19 Years
Nuclear Staff Support Section			
J. L. Harness	Manager - Nuclear Staff Support Section	BS Physical Science (Physics & Math) MS Radiation Biology	24 Years
Environmental Services Section			
Russell B. Starkey	Manager - Environmental Services Section	BS Physics	20 Years
T. J. Crawford	Principal Engineer - Permits	BS Civil Engineering MS Civil Engineering	10 Years
B. J. Ward	Principal Scientist, Biology	BS, MS, PhD	11 Years
L. L. Ball	Principal Scientist, Analytical-Air Quality	BA	32 Years

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Table 13.1.1-1 (Continued)

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
System Operations			
J. W. Kirk	General Manager, System Operations	BS Electrical Engineering	16 Years
C. M. Clark	Manager, System Operations	High School Diploma	36 Years
J. M. Robinson	Manager, Transmission Line Maintenance	BS Electrical Engineering	16 Years
C. E. Gustafson	Manager, Transmission Substation Maintenance	Bachelor of Engineering	35 Years
Fuel			
W. J. Hurford	Manager - Fuel Department	BS Metallurgical Engineering SM Industrial Management	36 Years
L. H. Martin	Manager - Nuclear Fuel Section	BS Nuclear Engineering MBA	18 Years
W. M. Stocks	Manager - Administration and Analysis	BS Nuclear Engineering MS Nuclear Engineering	17 Years
B. J. Gitnick	Principal Engineer	BS Nuclear Engineering MS Nuclear Engineering	11 Years
R. K. Kunita	Principal Engineer	BS Physics MS Nuclear Science & Engineering	18 Years
R. G. Matthews	Principal Engineer	BS Electrical Engineering	25 Years

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Table 13.1.1-1 (Continued)

Education and Experience Summaries for
Key Personnel Supporting SHNPP
(as of 1984)

Name	Title	Education	Applicable Experience
Corporate Quality Assurance Department			
H. R. Banks	Manager	High School Diploma	34 Years
J. M. Johnson	Assistant to the Department Head for Special Projects	High School Diploma	33 Years
N. J. Chiangi	Manager, QA/QA Harris Plant	High School Diploma	32 Years
G. L. Forehand	Director QA/QC - Harris Plant	High School Diploma	28 Years
L. E. Jones	Director QA/QC - Brunswick Plant	BS Metallurgical Engineering	15 Years
C. R. Osman	Principal QA/QC Specialist (NDE)	BS Engineering Physics	15 Years
K. V. Hate'	Principal QA/QC Engineer	MS Materials Engineering MS Management	13 Years
J. V. Galley	Principal Vendor Surveillance Specialist	H. S. Diploma	24 Years
C. A. Rosenberger	Principal QA Specialist - Performance Evaluation	BS Agricultural Engineering	31 Years
D. A. McGaw	Superintendent QA	BS Mechanical Engineering	11 Years
M. Vernon	Superintendent QA	High School Diploma	22 Years
Howard Love	Principal QA Specialist - Training and Administration	BS Chemistry BS Electrical Engineering	29 Years
C. L. McKenzie	Principal QA Engineer	BS Industrial Engineering	12 Years
R. E. Lumsden	Manager QA Services	BS Marine Engineering	26 Years

13

13.1.2 OPERATING ORGANIZATION*

13.1.2.1 Introduction

The SHNPP organization is based on the considerable experience that CP&L has operating its three nuclear units, Robinson Unit No. 2 and Brunswick Units 1 and 2. Carolina Power & Light Company will comply with ANSI N18.7-1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," as indicated in Section 1.8, in the operation and administration of the Shearon Harris Nuclear Power Plant. The succession of responsibility in the event of absences, incapacitation of personnel, or other emergencies are outlined by the organization chart (Fig. 13.1.2-1). The staff loading schedule is shown in Table 13.1.2-1.

13.1.2.2 Personnel Functions, Responsibilities, and Authorities

13.1.2.2.1 General Manager - Harris Plant Operations

The General Manager - Harris Plant Operations Section is responsible for all phases of plant management, including administration, operation, maintenance, and technical support. He manages and controls the organization through personal contact with the five unit heads and through written reports, meetings, conferences, and in-plant inspections. He is responsible for adherence to all requirements of the operating license, technical specifications, Corporate Quality Assurance Program, and Corporate Health Physics and Nuclear Safety policies. He is responsible for reviewing incoming and outgoing correspondence with the NRC Office of Nuclear Reactor Regulation and the Office of Inspection and Enforcement concerning the Harris Plant; the establishment and approval of qualification requirements for all Harris Plant Operations staff positions; the personal review of the qualifications of specific personnel for managerial and supervisory positions in the Harris Plant Operations Section; and the review of and concurrence in the plant radiation protection, radiological security, quality assurance, fire protection, training, operations, and maintenance programs. He is supported in these responsibilities by the Assistant to the General Manager, Manager - Plant Operations, Manager - Technical Support, the Manager - Startup and Test, and Director - Regulatory Compliance. He has the authority to issue procedures, standing orders, and special orders. In the planned absence of the General Manager, he will designate either the Manager - Plant Operations, the Manager - Technical Support, or the Assistant to the General Manager to assume his authority and responsibilities. Otherwise, the Manager - Plant Operations will assume these authorities and responsibilities. The General Manager - Harris Plant Section reports directly to the Vice President - Harris Nuclear Project Department. 13

13.1.2.2.2 Administration Unit

The Administration Unit provides support functions such as security, procedure control, and emergency preparedness.

*Further information is contained in the TMI appendix.

The Assistant to the General Manager provides direct support to the Plant General Manager in the areas of security, emergency preparedness, procedure development and control, personnel administration and plant administrative coordination; directs plant security planning and activities; directs emergency preparedness planning and activities at the plant staff level; supervises the preparation, review, approval and distribution of plant procedures and directives. He is assisted in these duties by an Administrative Supervisor, Senior Specialist - Security, and a Senior Specialist - Emergency Preparedness. The Assistant to the General Manager reports to the General Manager - Harris Plant.

The Administrative Supervisor supervises the administrative functions of the plant including incoming correspondence screening and action assignment; action tickler development and follow-up; outgoing correspondence preparation, screening and coordination; supervision and coordination of plant procedure preparation, review, and approval; and distribution functions and supervision of personnel administration functions at the plant level.

The Senior Specialist - Security develops, implements, and maintains a security program which ensures that the security of the plant is maintained in accordance with NRC requirements. He maintains a close working relationship with local law enforcement agencies to ensure compliance with NRC regulations. He provides input to the Training Unit so that employees
13 requiring access to the plant are properly trained and badged. He ensures that equipment and guards are available and in a state of readiness. The Senior Specialist - Security is assisted by Technical Aides and a contract security guard force. The Senior Specialist - Security reports to the Assistant to the General Manager.

The Senior Specialist - Emergency Preparedness is responsible for the continuing refinement of the plant Emergency Preparedness Program which ensures that a "state of readiness" is maintained at the plant to cope with any classification of emergency. He incorporates the provisions of the plant Emergency Plan in the program and revises the program and related procedures as changes are made in the plant Emergency Plan. He coordinates the training of Technical Support Center participants and the annual Emergency Drill. The Senior Specialist - Emergency Preparedness reports to the Assistant to the General Manager.

13.1.2.2.3 Plant Operations Unit

The Manager - Plant Operations manages the operation, chemistry radiation control, environmental support, and maintenance support of all operating units and those in startup. He has the authority to issue procedures, standing orders, and special orders. He is also responsible for refueling operations. This is accomplished through a staff which includes the Manager - Environmental & Radiation Control, Manager - Maintenance, and Manager - Operations. The Manager - Plant Operations reports to the General Manager - Harris Plant Operations Section and assumes all responsibility and authority of the General Manager in his absence

13.1.2.2.3.1 Environmental & Radiation Control Subunit

The Manager - Environmental & Radiation Control (E&RC) is responsible for the plant radiation safety and control (health physics) programs, the plant chemical control programs, and the environmental programs. These programs are designed to ensure that environmental and radiation control is maintained in a manner which will protect the plant, employees, visitors, general public, and the surrounding community. He has the authority to issue special orders. His primary responsibility is organizing, planning, and controlling E&RC resources to provide the required support while ensuring compliance with plant Technical Specifications, the ALARA concept, and all applicable state and federal regulations and permit requirements.

Some of his major responsibilities include: (1) ensuring that programs and related procedures are developed and administered to meet plant needs and regulatory requirements; (2) maintaining an awareness of current and pending regulations in the areas of radiation control, chemistry, and environmental matters concerning plant operations; and (3) providing adequate documentation pertaining to individual radiation exposures, radioactive effluents, chemical control of plant systems and environmental surveillance and ensuring that these records are maintained in an up-to-date, retrievable manner. He is assisted in these functions by an Environmental & Chemistry Supervisor, a Radiation Control Supervisor, a Project Specialist - Environmental and Chemistry, a Project Specialist - Radiation, and a staff of radiation control and environmental and chemistry specialists, foremen, and technicians. The Manager - Environmental & Radiation Control reports to the Manager - Plant Operations. The Manager - Environmental & Radiation Control does have direct access to the Plant General Manager on any aspect of the radiation protection program or its implementation. 13

The Environmental & Chemistry Supervisor plans, organizes, and directs chemistry control and environmental surveillance programs, maintains laboratory procedures, test results and records, and adheres to the requirements of the operating license and technical specifications. He accomplishes these responsibilities through foremen and technicians. The Environmental and Chemistry Supervisor reports to the Manager - Environmental & Radiation Control Subunit.

The Radiation Control Supervisor is responsible for the plant Radiation Control (Health Physics) Program and for ensuring that all plant activities are conducted in a manner which will protect the plant, employees, visitors, general public, and the surrounding community. His primary responsibility is organizing, planning, and controlling Radiation Control Subunit resources to provide the required support while ensuring compliance with plant Technical Specifications and all applicable state and federal regulations and permit requirements. He accomplishes this through foremen and radiation control technicians. The Radiation Control Supervisor reports to the Manager - Environmental & Radiation Control Subunit.

The Project Specialist - Environmental & Chemistry provides technical advice and recommendations for program enhancement to the Manager - E&RC, and ensures that the Environmental and Chemistry Programs support efficient, reliable plant operations. He is the Environmental Chemistry technical expert for the Manager - E&RC. He is supported by a staff of specialists and technicians and reports to the Manager - Environmental & Radiation Control Subunit.

The Project Specialist - Radiation Control provides technical advice and recommendations for program enhancement and ALARA program considerations to the Manager - E&RC, and ensures that the Radiation Control Programs support efficient and reliable plant operations. He is the Radiation Control technical expert for the Manager - E&RC. He is supported by a staff of specialists, technicians, and clerks and reports to the Manager - Environmental and Radiation Control Subunit.

13.1.2.2.3.2 Maintenance Subunit

The Maintenance Subunit performs all corrective and preventive maintenance on plant systems and equipment. The Manager - Maintenance is responsible for corrective and preventive maintenance for the equipment of the unit and in the support facilities. This includes ensuring that the equipment and associated instrumentation and controls, mechanical, and electrical systems in the unit and support facilities are maintained at optimum dependability and operating efficiency. He is responsible for the coordination of these functions and for approval of Special Orders, working procedures and standards. He is assisted by the Mechanical Maintenance Supervisor, Electrical Maintenance Supervisor, Project Engineer - Maintenance, Project Specialist - Maintenance, Project
13 Engineer - Computer, and a staff of engineers and specialists, foremen, mechanics, electricians, painters/pipe coverers, planner/analysts, and technicians. The Manager - Maintenance reports to the Manager - Plant Operations.

The Maintenance Supervisor - Electrical ensures that equipment, instrumentation, controls, and electrical systems are maintained at optimum dependability, safety, and operating efficiency to comply with plant technical specifications, QA, Security, Radiation Control and plant procedures, and regulatory requirements. He accomplishes this by planning, directing, and controlling a trained staff, inspecting maintenance work, providing effective maintenance procedures and standards, and developing improvements in the Preventive and Corrective Maintenance Program. He is assisted in these functions by a staff of foremen, technicians, and electricians. The Maintenance Supervisor - Electrical reports to the Manager - Maintenance Subunit.

The Maintenance Supervisor - Mechanical ensures that mechanical systems are maintained at optimum dependability, safety, and operating efficiency to comply with plant technical specifications, QA, Security, Radiation Control, and plant procedures and regulatory requirements. He is responsible for all required painting and pipe covering activities necessary to maintain neat, properly insulated plant systems. He accomplishes this by planning, directing, and controlling a trained staff, inspecting maintenance work, providing effective maintenance procedures and standards, and developing improvements in the Preventive and Corrective Maintenance Programs. He is assisted by a staff of foremen, mechanics, and painter/pipe coverers. The Maintenance Supervisor - Mechanical reports to the Manager - Maintenance Subunit.

The Project Engineer - Maintenance provides technical support to plant electrical and mechanical maintenance and assists the Manager - Maintenance in assuring that plant instrumentation, control, electrical systems and mechanical systems are maintained at optimum dependability, safety, and operating efficiency, and remaining in compliance with all technical specifications and regulatory requirements. He is responsible for administration of the Maintenance Management System to accomplish the planning and scheduling of maintenance, ensuring parts availability, and establishing clearances necessary for preplanned work; he is assisted by a staff of engineers, specialists, technicians, and planner/analysts. The Project Engineer - Maintenance reports to the Manager - Maintenance Subunit.

The Project Engineer - Computer provides process computer system maintenance support and technical expertise to ensure that all plant process computer systems are fully operational for the safe, reliable, and efficient operation of the plant. He is assisted by a staff of specialists and technicians. The Project Engineer - Computer reports to the Manager - Maintenance Subunit.

13.1.2.2.3.3 Operations Subunit

The Manager - Operations ensures that the safe and efficient operation of the unit and required support facilities. He is responsible for primary and secondary system performance and the timely completion of the scheduled periodic tests, and for adherence to the requirements of the operating license and technical specifications. He is also responsible for coordinating and 13
overseeing the duties of the Operating Supervisor assigned to the plant, the Radwaste Supervisor, and the Principal Engineer - Operations. He is responsible for orderly and safe operations, turnovers, and compliance with operating instructions. He shall hold a Senior Operator's License. He has the authority to issue Special Orders. He is supported in these responsibilities by a staff of the Operating Supervisor, Radwaste Supervisor, Principal Engineer - Operations, engineers/specialists, Shift Technical Advisors, Shift Foremen, and Operators. The Manager - Operations Subunit reports to the Manager - Plant Operations Unit.

The Operating Supervisor supervises plant operations and implementing the radiation protection program during normal day shift. He is responsible for adherence to the requirements of the operating license and technical specifications. The Operating Supervisor is responsible for all personnel assigned to the back shifts, including operators, radwaste operators, mechanics, electricians, RC technicians, and I&C technicians. The Operating Supervisor is the designated individual in charge of the plant on back shifts unless specifically relieved of this responsibility by either the Manager - Operations, Manager - Plant Operations, or the General Manager. He shall hold a Senior Operator's License. He accomplishes this through the various foremen and personnel assigned to him. The Operating Supervisor reports to the Manager - Operations Subunit.

The Harris Plant Operations Section will have six Shift Operating Crews assigned. Each shift will be supervised by a Shift Foreman (SRO license), and at a minimum, will be composed of an additional Senior Control Operator (SRO license), two Control Operators (SRO license), and four Auxiliary Operators. Each Shift Operating Crew will be charged with the responsibility of operating the unit in a safe and economical manner within the plant's technical specifications, operating procedures, Corporate Nuclear Safety Policy, Corporate Quality Assurance Program, Corporate Health Physics Policy, Corporate ALARA Program, and NRC and other applicable regulatory requirements.

Four of the Shift Operating Crews will work on three rotating shifts to operate the unit; one crew will be used as a relief shift for vacationing and sick operators, and the remaining crew will be in training. Each shift will periodically rotate to the relief or training shift. With the rotating shifts, relief shift, and training shift, there will be ample opportunities for all personnel to accomplish training and retraining without any requirements for excessive or unusual working hours. An additional seventh Shift Foreman and three additional Senior Reactor Operators will be available to supplement any shift as required.

Each Shift Operating Crew in the Harris Plant Section shall meet the following requirements:

a) When the unit has fuel in the reactor core, there shall be a Shift Foreman with an SRO license on site at all times.

b) When the unit has fuel in the core, there shall be a licensed operator in the control room at all times.

c) When the reactor is operating, there shall also be a licensed SRO in
13 the control room at all times.

d) When the reactor is being operated, there shall be an additional licensed operator in the control room to provide relief for the control room operator and to perform duties outside the control room that need to be performed by a licensed operator.

e) When the reactor contains fuel, there shall be an auxiliary operator in addition to the individuals required in (a) through (d) above. An additional auxiliary operator is required for the control room when the reactor is being operated.

f) For all core alterations, there shall be a licensed SRO or SRO limited to Fuel Handling to directly supervise the core alteration. This SRO shall not be assigned any other concurrent operational duties.

g) The Shift Foreman shall be assigned only the minimal administration duties required to operate his shift.

An extensive training program has been established to ensure that each onsite crew collectively has the requisite technical qualifications in reactor physics and control, nuclear fuel, thermal hydraulics, transient analysis, instrumentation and control, mechanical and structural engineering, radiation control and health physics, electric power, chemistry, and plant operation and maintenance.

The Shift Foremen ensure the safe, dependable, and efficient operation of the plant during their assigned shift and are the designated individuals in charge of the plant on that shift unless specifically relieved by the Operations Supervisor or his superior. They are responsible for adherence to the operating procedures, the operating license, and technical specifications. It is the responsibility and authority of the Shift Foreman to maintain the broadest perspective of operational conditions affecting the safety of the plant and to keep this as the highest priority at all times when on Control Room duty. The Shift Foreman shall hold a Senior Operator's license. The Shift Foreman, until properly relieved, remains in the Control Room at all times during an accident to direct the activities of Control Room Operators. He may be relieved only by qualified persons holding SRO licenses. During routine operations when the Shift Foreman is temporarily absent from the Control Room, a Senior Control Operator will be designated to assume the Control Room command function. He is supported by and supervises Senior Control Operators, Control Operators, and Auxiliary Operators. The Shift Foreman reports to the Operating Supervisor.

The Shift Foreman is the designated individual in charge of the plant on back shifts unless specifically relieved of the responsibility by either the Operating Supervisor, Manager - Operations, Manager - Plant Operations, or the Plant Manager. They are responsible for all personnel assigned on the back shifts including operators, mechanics, electricians, RC technicians, and I&C technicians.

a) Licensed Operators - The licensed control operators are responsible for performing shift operations in accordance with the procedures, instructions, set points, limitations, and precautions contained in the Plant Operating 13
Manual and the Technical Specifications. Licensed control operators (SROs) have the responsibility and authority to assume the control room command function during the temporary absence of the Shift Foreman. They exercise continuous monitoring of plant conditions and system parameters. They manipulate the controls and equipment to start up, change output, and shut down the plant as required by operating schedules and load demands. They initiate the immediate actions necessary to maintain the plant in a safe shutdown condition during abnormal and emergency situations. They maintain required records of plant data, shift events, and performance checks. They initiate plant corrective maintenance to report and document equipment problems. The licensed control operators report to the Shift Foreman.

b) Non-Licensed Operators - The non-licensed auxiliary operators are responsible to the Shift Foreman for assisting in the performance of assignments associated with shift operations or refueling. The non-licensed operators' duties are normally associated with the operation of auxiliary systems and equipment outside the control room. Non-licensed radwaste operators perform shift operations of the Waste Processing Systems. Non-routine operations are performed under the direction of a licensed control operator or Shift Foreman. Radwaste Operators report to the Radwaste Shift Foreman.

c) Radwaste Supervisor - The Radwaste Supervisor supervises the shift operations of the Waste Processing System. This includes the working procedures for the maintenance and implementation of the waste process equipment, and the operation of the equipment necessary to generate all the process water utilized within plant systems. The Supervisor is responsible for ensuring safe and efficient handling and storage of plant-generated contaminated wastes until final disposition. He is assisted by the Radwarte Shift Foremen, Radwaste Operators, Project Specialist - Radwaste, Engineers, and Radwaste Auxiliary Operators. The Radwaste Operations Supervisor reports to the Manager - Operations Subunit.

d) Shift Foremen Radwaste - The Shift Foremen - Radwaste ensure the safe, dependable, and efficient operation of the Waste Processing System. It is the responsibility and authority of the Shift Foremen Radwaste to direct the activities of the Radwaste Operators to ensure efficient handling, processing, storage, and shipment of plant generated contaminated wastes. They are supported by and supervise Radwaste Control Operators and Radwaste Auxiliary operators. The Shift Foremen-Radwaste functionally report to the Radwaste Supervisor but are under the direction of the Shift Foreman to ensure that radwaste operations support is compatible with overall plant operations.

e) Principal Engineer - Operations - The Principal Engineer - Operations provides technical and engineering support to the plant operating personnel. He is responsible for the implementation and efficient operation of the shift technical advisor (STA) program at the plant as well as for providing direct technical support in the areas of: (1) Plant Operations; (2) Fire Protection as necessary to support safe, efficient, reliable operations; and (3) reactor core management to meet system load demands and compliance with regulatory requirements. He is assisted by Shift Technical Advisors, a Fire Protection
13 Specialist, and a staff of engineers, technical aides, and technicians. The Principal Engineer - Operations reports to the Manager - Operations.

f) Senior Specialist - Fire Protection - The Senior Specialist - Fire Protection is responsible for fire detection equipment, fire protection equipment, and general safe working conditions for employees. He is responsible for keeping current on "Fire Protection Guidelines for nuclear power plants," Regulatory Guide 1.120, and Branch Technical Position APCSB 9.5-1 and 9.5-1 Appendix A, and informing plant management of changes affecting the plant. He will evaluate damage to plant fire protection equipment under warranty and make recommendations as to course of action. He will coordinate plant inspections for insurance purposes. He is assisted by a Specialist and Fire Protection Technical Aides. The Senior Specialist - Fire Protection reports to the Principal Engineer - Operations.

g) Shift Technical Advisor - The Shift Technical Advisor provides accident assessment and technical advice concerning plant safety to shift operations personnel. He performs 10 CFR 21 evaluations for the shift operations personnel. He accomplishes this by performing engineering evaluations of plant operations, maintaining and broadening his knowledge of normal and off-normal operations, and diagnosing off-normal events. The Shift Technical Advisors report to the Principal Engineer - Operations.

13.1.2.2.4 Startup and Test Unit

The Manager - Startup and Test is responsible for successfully implementing and accomplishing, on schedule, the Harris Nuclear Project preoperational and startup test program in accordance with the Startup Manual. The Manager - Startup and Test Unit reports to the General Manager - Harris Plant Operations Section.

The Manager - Startup and Test is responsible for the following:

a) Supervises the activities of the Startup Organization through the Startup Supervisors.

b) Prepares and updates the startup schedule.

c) Assigns overall test responsibility to the Startup Supervisors.

d) Reviews and approves requests for vendor assistance as recommended by the Startup Organization.

e) Reviews and approves/recommends approval of test procedures, test procedure modifications, and test data in accordance with the Startup Manual instructions.

f) Reviews and recommends approval of startup requests for construction and engineering modifications or changes required during the test program.

g) Issues periodic progress reports and work schedules for the Startup Organization. 13

h) Issues special reports concerning startup activities as he deems necessary.

i) Reviews progress of startup activities with contractors, vendors, and Company management.

j) Maintains liaison with the plant management, keeping them informed of the test program status, and coordinates with them the activities of plant personnel assigned to startup activities in conjunction with their training program.

k) Represents the Startup Organization on interdepartmental and interorganizational committees associated with the test program.

l) Maintains liaison with contractors and vendors to coordinate their activities relating to the test program.

m) Is responsible for the preparation and maintenance of the Startup Manual.

n) Accepts release for tests from Harris Plant Construction Section.

He is supported in the accomplishment of these tasks by a staff of Startup Supervisors, Engineers, specialists, technicians, and clerks. The Manager - Startup reports to the General Manager - Harris Plant.

The Startup Supervisors are responsible for checking out and starting up on schedule the systems assigned in their areas in accordance with the Startup Manual and regulatory requirements. Each supervisor is assigned engineers and technicians and reports to the Manager - Startup and Test Unit.

13.1.2.2.5 Regulatory Compliance

The Regulatory Compliance Unit provides staff functions to the entire plant for regulatory compliance activities and routine reporting of all noncompliance items. The unit is responsible for the continual updating of the FSAR and Technical Specifications, and it serves as the on-site contact for the NRC.

The Director - Regulatory Compliance coordinates activities at the plant to ensure that commitments, responses, records, and reports are prepared, submitted, and maintained in accordance with regulatory requirements. He also maintains a tracking system for the resolution of all plant safety and environmental concerns. He serves as the on-site contact with NRC and provides the expertise necessary to support plant activities in accordance with the operating license and technical specifications. He is assisted by a staff of technicians and specialists. The Director - Regulatory Compliance
13 reports to the General Manager - Harris Plant Operations Section.

13.1.2.2.6 Technical Support Unit

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 keep the plant in compliance with new regulations or to improve efficiency of operation.

The Manager - Technical Support Unit develops and tests maintenance modifications and provides technical support for plant outages, plant operation, and maintenance and manages the plant Inservice Inspection (ISI) and performance programs. He is responsible for preparing, reviewing, approving, and verifying design documents such as design input and criteria, design drawings, design analysis, computer programs, and specifications. The Manager - Technical Support has the authority to issue procedures, Standing Orders and Special Orders. He is supported by the Engineering Supervisors and a Principal Engineer. The Manager - Technical Support Unit reports to the General Manager - Harris Plant Operations Section.

The Engineering Supervisors and a Principal Engineer are responsible for providing technical direction and coordination for plant engineering studies. They develop and implement the inservice inspection program and plant performance programs as well as procedures, instructions, and guidelines for plant engineering functions. They are supported in these tasks by a staff of engineers, specialists, engineering technicians, and draftsmen. The Principal Engineer and the Engineering Supervisors report to the Manager - Technical Support.

ASSIGNMENT OF ON-SITE SHIFT OPERATIONS

The Operating Supervisor is responsible for all operating activities at the plant. The shift complement consists of one Shift Foreman (SRO), one Senior Control Operator (SRO), two Control Operators (RO), four Auxiliary Operators, and at least one Radiation Control Technician qualified in radiation protection measures. Each shift will also have personnel fulfilling roles in Fire Protection and Radwaste Control (normally five). It is planned that six crews of reactor operations personnel will be assigned. Additional support, for example the I&C Technicians, Mechanics, Chemistry Technicians, and Plant Storekeepers, will be available on a normal two shift basis, but this schedule will be subject to change as plant conditions require. On-call personnel will be available at all times to support emergencies. Reactor and Performance Engineers will also be available as required, although they will normally work a regular schedule.

During fuel movement operations or core alterations there will be one Senior Reactor Operator in Reactor Containment and an operator in the Fuel Handling Building. This Senior Reactor Operator will direct and supervise the operation and will report to the Shift Foreman.

The following chart contains the minimum shift assignments of the Operation Unit:

MINIMUM SHIFT CREW COMPOSITION
Operating Mode

13

LICENSE CATEGORY	APPLICABLE OPERATIONAL MODES 1, 2, 3, 4	5 & 6
SRO	2	1*
RO	2	1
Non-Licensed	2	1

Shift crew composition, including a Radiation Control technician qualified in radiation protection procedures, may be less than the minimum requirements for a period of time not to exceed 2 hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the minimum requirements. In the unlikely event an unexpected absence occurs that would involve the health physics technician on duty, it is possible this position would be covered by the individual qualified in radiation protection procedures for short periods of time, e.g., a few hours.

Operational Modes listed above are defined in the Technical Specifications. It is expected that the number of personnel as outlined in Table 13.1.2-1 will be used to support the operation of the plant. In the event that additional health physics personnel are required, it is projected that contract health physics services will be used. The number of contract health physics personnel required and their ANSI qualifications will be situationally dependent.

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* Does not include the licensed Senior Reactor Operator or Senior Reactor Operator limited to Fuel Handling, supervising core alterations.

TABLE 13.1.2-1

PROJECTED SHNPP STAFF LOADING

TITLE	NO. OF POSITIONS
GENERAL MANAGER	1
ASSISTANT TO GENERAL MANAGER	1
ADMINISTRATION	
Administrative Supervisor	1
Senior Specialist - Emergency Preparedness	1
Senior Clerk	3
Senior Specialist - Security	1
Technical Aide - Security	2
Secretary	1
OPERATIONS	
Manager - Plant Operations	1
Operating Supervisors	1
Shift Foreman	7
Senior Control Operators	15
Control Operators	12
Auxiliary Operators	54
Principle Engineer - Operations	1
Shift Technical Advisor	8
Operations Engineer	1
Technician - Operations	1
Senior Specialist - Fire Protection	1
Specialist - Fire Protection	1
Technical Aide - Fire Protection	6
Radwaste Supervisor	1
Radwaste Shift Foreman	5
Radwaste Project Specialist	1
Radwaste Senior Engineer	2
Radwaste Control Operators	5
Radwaste Auxiliary Operators	15
MAINTENANCE	
Manager - Maintenance	1
Maintenance Supervisor (Mechanical)	1
Mechanic Foreman	3
Senior Mechanic	6
Mechanic I/C	15

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TABLE 13.1.2-1 (Cont'd)

PROJECTED SHNPP STAFF LOADING

TITLE	NO. OF POSITIONS
MAINTENANCE (Cont'd)	
Mechanic 2/C	12
Plant Service Foreman	1
Paint & Pipe Coverer Foreman	1
Painter & Pipe Coverer A	3
Painter & Pipe Coverer B	3
Project Engineer	1
Maintenance Planner/Analyst	8
Maintenance Engineer	4
Maintenance Specialist	2
Technician - Maintenance	4
Senior Clerk	4
Maintenance Supervisor (Electrical)	1
I&C Foreman	3
Electrical Foreman	1
I&C Technician 1	15
I&C Technician 2	12
Electrician 1/C	9
Project Specialist - Maintenance	1
Electrician Foreman	1
Electrician 1/C	5
I&C Technician 1	5
Mechanic Foreman	1
Mechanic 1/C	11
Project Engineer - Computer	1
Senior Specialist - Computer	2
Technician 1 - Maintenance	2
REGULATORY COMPLIANCE	
Director - Regulatory Compliance	1
Senior Specialist	2
Technician	2
Clerk	1

13

TABLE 13.1.2-1 (Cont'd)

PROJECTED SHNPP STAFF LOADING

TITLE	NO. OF POSITIONS
STARTUP & TEST	
Manager - Startup & Test	1
Startup Supervisor	4
Startup Engineer	29
Engineering Technician 1	8
Senior Clerks	4
ENVIRONMENTAL & RADIATION CONTROL	
Manager - Environmental & Radiation Control	1
Supervisor - Environmental & Chemistry	1
Environmental & Chemistry Foreman	2
Environmental & Chemistry Technician 1	9
Environmental & Chemistry Technician 2	4
Project Specialist - Environmental & Chemistry	1
Senior Specialist - Environmental & Chemistry	1
RADIATION CONTROL	
Supervisor - Radiation Control	1
Project Specialist - Radiation Control	1
Radiation Control Senior Specialist	1
Senior Specialist - ALARA	1
Traveling Radiation Control Foreman	1
Radiation Control Foreman	3
Radiation Control Technician 1	14
Radiation Control Technician 2	9
Senior Clerk	1
Traveling Radiation Control Technician I	4
Traveling Radiation Control Technician II	3
TECHNICAL SUPPORT	
Manager - Technical Support	1
Engineer - Supervisor	2
Principal Engineer	1
Project Engineer	6
Engineer	19
Senior Specialist	9
Co-Op Engineer	3
Co-Op Technician	1
Engineering Technician 1	11
Senior Draftsman	2

13

Table 13.1.2-1 (Continued)

Manager - Plant Operations - 1

Operations

	Manager Operations	Operating Supervisors	Operations Engineer	Shift Foreman	Senior Control Operators	Control Operators
Unit 2	1	6	2	12	16	26
Unit 1	1	1	2	6	8	14

5

	Auxiliary Operators	Principle Engineer Operations	Shift Technical Advisor	Technician Operations	Radwaste Project Engineer	Radwaste Senior Engineer
Unit 2	24	1	6	2	1	2
Unit 1	12	1	6	1	1	2

	Senior Specialist Fire Protection	Specialist Fire Protection	Technical Aide Fire Protection	Radwaste Supervisor	Radwaste Shift Foreman	Radwaste Control Operators	Radwaste Auxiliary Operators
Unit 2	1	1	11	1	5	10	10
Unit 1	1	1	8	1	5	10	10

Table 13.1.2-1 (Continued)

Planning & Scheduling Director 1

	Senior Engineer or Specialist	Engineering Technician Planning	Technical Aide Planning	
				5
Unit 2	4	2	2	
Unit 1	4	2	2	

Manager Maintenance 1

	Maintenance Supervisor (Mechanical)	Maintenance Engineer	Maintenance Specialist	Mechanic Foreman	Senior Mechanic	Mechanic 1/C	Mechanic 2/C	Plant Service Foreman	Technician Maintenance	
Unit 2	2	3	2	6	12	30	30	2	5	5
Unit 1	1	2	1	3	6	15	15	1	3	

	Maintenance Planner/Analyst	Paint & Pipe Coverer Foreman	Painter & Pipe Coverer A	Painter & Pipe Coverer B	Technical Aide	
Unit 2	8	2	10	10	2	5
Unit 1	4	1	5	5	1	

Table 13.1.2-1 (Continued)

	Maintenance Supervisor (Electrical) 1	Senior Engineer	Maintenance Specialist	I&C Foreman	Electrical Foreman	I&C Tech. 1	I&C Tech. 2	Electrician 1/C	Electrician 2/C
Unit 2	2	3	2	6	2	36	24	12	8
Unit 1	1	2	1	3	1	18	12	6	4

5

	Technician Maintenance	Technical Aide Maintenance	Maintenance Planner/Analyst	Project Engineer	Project Engineer Computer	Senior Specialist Computer	Technician I Maintenance
Unit 2	5	2	8	1	1	2	2
Unit 1	3	1	4	1	1	2	2

5

<u>Startup</u> Manager 1

	Startup Supervisor	Startup Engineer	Engineering Tech. 1
Unit 2	4	20	8
Unit 1	4	20	8

Table 13.1.2-1 (Continued)

Environmental & Radiation Control — Manager 1

Environment & Chemistry — Supervisor 1

	Environmental & Chemistry Foreman	Chemistry Tech. 1	Chemistry Tech. 2	Project Specialist Environmental & Chemistry	Sen[illegible] Specialist Environmental & Chemistry
Unit 2	3	14	12	1	2
Unit 1	3	14	12	1	2

Radiation Control — Supervisor 1

	Project Specialist Radiation Control	Radiation Control Senior Specialist	Specialist ALARA	Traveling Radiation Control Foreman	Radiation Control Foreman	Radiation Control Tech. 1	Radiation Control Tech. 2
Unit 2	1	2	1	1	4	22	20
Unit 1	1	2	1	1	4	18	16

Table 13.1.2-1 (Continued)

<u>Manager</u> Technical Support 1

<u>Engineer</u> Supervisor 1

	Project Engineer	Director Regulatory Compliance	Senior Sepcialist Regulatory Compliance	Engineer	Senior Specialist	Co-op Engineer	Co-op Technician	5
Unit 2	4	1	2	22	4	3	3	
Unit 1	4	1	2	22	4	3	3	5

	Engineering Tech. 1	Senior Draftsman	Draftsman	Technician Regulatory Compliance
Unit 2	10	2	2	2
Unit 1	10	2	2	2

13.1.3 QUALIFICATION REQUIREMENTS FOR PLANT PERSONNEL*

13.1.3.1 Minimum Qualifications

Minimum qualifications for plant personnel are listed in CP&L's position on Regulatory Guide 1.8 in Section 1.8.

13.1.3.2 Qualification of Plant Personnel

Resumes for plant positions presently filled are provided in Tables 13.1.3-1 through 13.1.3-30. 13

*Further information is contained in the TMI Appendix.

TABLE 13.1.3-1 | 13

James L. Willis
General Manager - Harris Plant

Education and Training

A. B. S. Degree in Electrical Engineering - 1955 - U. S. Naval Academy - Annapolis, MD

B. Navy Nuclear Power School - 1958

Professional Societies

A. American Nuclear Society

B. N. C. Society of Engineers

Experience

June 1951 - June 1979 - U. S. Navy

August 1979 - September 1980 - Project Manager, System Development Corporation Santa Monica, CA

September 1980 - September 1981 - Manager, Nuclear Training - Southern California Edison Company

October 1981 - employed as Manager - Plant Operations in the Nuclear Operations Department, Harris Plant Section. Located in the General Office.

April 1982 - employed as General Manager, Harris Plant in the Nuclear Operations Department located at the Harris Plant, New Hill, NC | 13

September 1983 - General Manager - Harris Plant in Harris Nuclear Project Department located at the Harris Plant, New Hill, NC

TABLE 13.1.3-2 | 13

Charles Ray Gibson
Assistant to the General Manager

Education & Training

A. B. S. Degree in Chemical Engineering - University of South Carolina - 1952

B. M. S. Degree in Management - Naval Postgraduate School, Monterey, California - 1970

C. Special Training in Marine Corps, including: Basic Officers Training, Basic Engineer Officers Training, Supply Officers Training, and Intermediate Level Staff Officers Training.

Professional Societies

A. American Nuclear Society

B. Member - International City Managers Association

C. The Retired Officer Association

Experience

June 1947 - September 1947 - Helper Electrician - Underground Distribution Department, Ohio Power Company, Canton, Ohio

June 1948 - September 1948 - Operated liquid oxygen plant, Republic Steel Corp., Canton, Ohio

June 1952 - July 1974 - U. S. Marine Corps, Washington, D. C. - Responsibilities included: Managed the facilities maintenance department for major bases; directed military engineer organizations for construction projects. Instructed intermediate staff level officers and civilian top-level supervisors in development and utilization of facilities systems. Devised systems for adapting existing computer programs to improve maintenance control procedures of combat engineering department. Worked with and supervised the use, security, emplacement, and transportation of Marine ground nuclear weapons.

July 1974 - employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department in the General Office of Carolina Power and Light Company.

January 1977 - employed as a Director - Administration & Training in the Generation Services Section of the Generation Department in the General Office of Carolina Power and Light Company.

TABLE 13.1.3-2 (Cont'd) 13

Charles Ray Gibson
Assistant to the General Manager

Experience (cont'd)

May 1979 - acting as Superintendent - Technical & Administrative Services at Brunswick Plant, Southport, North Carolina.

December 1979 - employed as Director - Administration in the Harris Plant Organization in Raleigh, North Carolina.

October 1981 - employed as Assistant to the General Manager of the Harris Plant.

January 1982 - performed duties on temporary assignment as Assistant to the General Manager of the Brunswick Steam Electric Plant, Southport, N.C.

May 1982 - assumed duties as Assistant to the General Manager of the Harris Plant.

TABLE 13.1.3-3

Joseph R. Sipp
Manager - Environmental & Radiation Control

Education and Training

BS Degree - Chemistry, Geneva College, Beaver Falls, Pennsylvania

MBA Degree - Western New England College, Springfield, Massachusetts

Experience

June 1969 - February 1970 - Research Chemistry Technician, Mine Safety Appliance Research Corporation, Evans City, Pennsylvania 13

February 1970 - March 1973 - Chemistry & Health Physics Assistant, Vermont Yankee Nuclear Power Corporation, Vernon, Vermont:

March 1973 - April 1979 - Plant Chemist, Vermont Yankee Nuclear Power Corporation, Vernon, Vermont

April 1979 - May 1981 - Chemistry Department Supervisor, Public Service Company of New Hampshire, Seabrook Station, Seabrook, New Hampshire

May 1981 - November 1983 - Manager of Chemical Engineering, General Public Utilities Company, Parsippany, New Jersey

November 1983 - Present - Manager - Environmental & Radiation Control, Carolina Power & Light Company, Harris Nuclear Project, New Hill, North Carolina

TABLE 13.1.3-4 13

Lloyd R. Hancock
Administrative Supervisor

Education and Training

A. Associate in Applied Science Degree - Mechanical Technology from Davidson County Community College - 1971

B. Diploma in Mechanical Engineering from the International Correspondence School (ICS), Scranton, Pennsylvania - 1974

Professional Societies

Member of American Society of Mechanical Engineers

Experience

September 1970 through June 1971 - Draftsman, Croft, Inc.

June 1971 employed as an Engineering Aide I in the Power Plant Engineering Department in the General Office

June 1972 employed as a Technician II in the Power Plant Engineering Department in the General Office

October 1973 employed as a Technician I in the Power Plant Engineering Department in the General Office

June 1974 employed as a Junior Engineer in the Power Plant Engineering Department located in the General Office and at the Brunswick Plant, Southport, North Carolina

October 1975 employed as an Engineer in the Power Plant Engineering Department located in the General Office and at the Brunswick Plant, Southport, North Carolina

February 1977 employed as an Engineer in the Generation Services Section of the Generation Department in the General Office

January 1979 employed as a Senior Engineer in the Generation Services Section of the Generation Department in the General Office

May 1979 employed as a Senior Engineer in the Generation Services - O&M Section of the Generation Department in the General Office

June 1979 employed as a Senior Engineer in the Nuclear Generation Section of the Generation Department in the General Office

November 1981 employed as an Administrative Supervisor in the Nuclear Operations Department located at the Harris Plant, New Hill, North Carolina

September 1983 employed as an Administrative Supervisor in the Harris Nuclear Project Department, Harris Plant, New Hill, NC 13

TABLE 13.1.3-5 13

Edward M. Steudel
Manager - Technical Support 13

Education and Training

B. S. Degree in Electrical Engineering - University of South Carolina - 1964

M. B. A. Degree - Golden Gate University - 1977

U. S. Naval Nuclear Power Training - 1965

Professional Societies

National Society of Professional Engineers
Registered Professional Engineer - Maryland, Ohio, Florida
Institute of Electrical and Electronics Engineers
American Nuclear Society
Association of Energy Engineers
Member IEEE Subcommittee SC-6, Related Systems and
Chairman of Working Group 6.5, Safe Shutdown System

Civic Organizations

Member of National Association of Regional Councils Steering Committee
on Natural Resources and Environment
Toastmasters Club
Commander - U. S. Naval Reserves

Experience

June 1964 to May 1970 - U. S. Navy - Submarine Officer

May 1970 - August 1980 - Engineering Supervisor - Bechtel Power Corporation, Gaithersburg, MD

September 1980 employed as a Principal Engineer - Special Projects in the Environmental & Radiation Control Section of the Nuclear Operations Department. Located at the Harris Energy & Environmental Center, New Hill, NC

September 1981 employed as Manager - Technical Support in the Harris Plant Section of the Nuclear Operations Department. Located at New Hill, NC.

September 1983 employed as Manager - Technical Support in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-6 | 13

Charles Samuel Bohanan
Director - Regulatory Compliance

Education

A. B.S. Degree in Physics - Georgia Institute of Technology - 1966

B. M.S. Degree in Nuclear Engineering - Georgia Institute of Technology - 1967

C. One year of graduate study in Business Administration - University of Pittsburgh

D. Separate courses in Reactor Physics, Reactor Design, Heat Transfer and Fluid Flow, Bettis Reactor Engineering School

Professional Societies

A. 1975 - Professional Engineer

B. American Nuclear Society

Experience

October 1967 to May 1972 - Scientist, Bettis Atomic Power Laboratory

June 1972 to July 1975 employed as a Senior Engineer in the Fuel Section of the Power Supply Department located in the General Office.

July 1975 to May 1979 employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department located in the General Office.

May 1979 to September 1979 employed as a Project Engineer - Regulatory Compliance in the Generation Services Administration Section of the Generation Department located in the General Office.

September 1979 to January 1980 employed as a Project Specialist - Regulatory Compliance in the Nuclear Operations Administration Section of the Nuclear Operations Department located in the General Office.

January 1980 to March 1981 employed as a Principal Specialist - Regulatory Compliance in the Nuclear Operations Administration Section of the Nuclear Operations Department located in the General Office.

March 1981 to May 1981 employed as a Principal Specialist - Regulatory Compliance in the Licensing & Permits Section of the Technical Services Department located in the General Office.

TABLE 13.1.3-6 (Cont'd) 13

Charles Samuel Bohanan
Director - Regulatory Compliance

Experience (Cont'd)

May 1981 to November 1981 acting as head of the Regulatory Compliance subunit at the Brunswick Steam Electric Plant.

November 1981 to July 1982 Employed as a Principal Specialist - Regulatory Compliance in the Licensing & Permits Section of the Technical Services Department located in the General Office.

July 1982 Employed as Director - Regulatory Compliance in the Nuclear Operations Department, Shearon Harris Nuclear Power Plant located in New Hill, North Carolina.

September 1983 Employed as Director - Regulatory Compliance in the Harris Nuclear Project Department, New Hill, NC 13

TABLE 13.1.3-7

Helm Lipa
Environmental & Chemistry Supervisor

Education

A. B. S. Degree in Physics - University of Virginia - Charlottesville, Virginia - 1967

B. U. S. Navy Nuclear Power Training - Bainbridge, Maryland

C. U. S. Navy Nuclear Propulsion Plant Prototype Training - West Milton, New York

D. Course in Environmental Radiation Surveillance for Nuclear Power - Harvard School of Public Health - Boston, Massachusetts

Professional Societies

A. Sigma Pi Sigma

B. Health Physics Society

Experience

December 1959 to February 1960 - Retail Clerk - National Shirt Shops, Pleasure Ridge Shopping Center - Pleasure Ridge, Kentucky

June 1960 to July 1962 - Cashier and Retail Clerk - Carlisle Food Market, 100 N. Hanover St., Carlisle, Pennsylvania

May 1962 to August 1962 - Retail Clerk and Cashier - Army - Air Force Exchange - Carlisle, Pennsylvania

June 1967 to May 1972 - Officer on Nuclear Powered Attack Submarine - U. S. Navy, Norfolk, Virginia

July 1972 employed as a Nuclear Engineer in the Nuclear Generation Section of the Bulk Power Supply Department in Raleigh, North Carolina

June 1973 employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department in Raleigh, North Carolina

May 1976 employed as a Project Engineer in the Nuclear Generation Section of the Bulk Power Supply Department located at the Shearon Harris Energy & Environmental Center in New Hill, North Carolina

January 1977 employed as a Project Engineer in the Generation Services Section of the Generation Department located at the Shearon Harris Energy & Environmental Center in New Hill, North Carolina

TABLE 13.1.3-7 (Cont'd)

Helm Lipa
Environmental and Chemistry Supervisor

Experience (Cont'd)

September 1978 employed as an Environmental & Radiation Control Laboratory Supervisor in the Generation Services Section of the Generation Department located at the Shearon Harris Energy and Environmental Center in New Hill, North Carolina

June 1979 employed as a Startup & Test Supervisor in the Nuclear Generation Section of the Generation Department in the Harris Startup Organization in Raleigh, North Carolina

December 1979 employed as Assistant to the Vice President - Nuclear Operations in the Nuclear Operations Department, Raleigh, NC

January 1982 employed as Environmental & Chemistry Supervisor in the Harris Plant Section of the Nuclear Operations Department. Located at New Hill, NC

TABLE 13.1.3-8

Clayton Scott Hinnant
Manager - Startup & Test 13

Education & Training

A. BS Degree in Electrical Engineering - North Carolina State University, 1968.

B. Nuclear Orientation and Basic Nuclear Reactor Theory - Newport News Shipbuilding, Atomic Power Division, January, 1969.

C. Undergraduate courses required for Masters in Business Administration Program - Christopher Newport College, June, 1971.

D. Graduate Work - College of William and Mary, January, 1972.

Professional Societies

Institute of Electrical and Electronics Engineers
American Nuclear Society

Experience

June 1962 - Television Repairman - Kyle Radio and Television, Lucama, NC

June 1968 - Engineer - Newport News Shipbuilding and Drydock, Electrical Design Section - Newport News, VA

October 1972 - employed as an Electrical Engineer in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC

May 1974 - employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC

July 1974 - employed as Startup and Test Supervisor in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC

April 1975 - employed as Maintenance Supervisor in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC

May 1976 - employed as Engineering Supervisor I in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC

July 1976 - employed as an Engineer at Babcock and Wilcox, Lynchburgh, VA

September 1977 - employed as Project Engineer - Electrical in the Nuclear Construction Section of the Power Plant Construction Department. Located at the Harris Site, New Hill, NC

TABLE 13.1.3-8 (Cont'd) 1

Clayton Scott Hinnant
Manager - Startup & Test

August 1978 - employed as Principal Engineer - Electrical in the Nuclear Construction Section of the Power Plant Construction Department. Located at the Harris Site, New Hill, NC

August 1979 - employed as Resident Engineer - Electrical in the Harris Site Management Section of the Power Plant Construction Department. Located at the Harris Site, New Hill, NC

February 1981 - employed as Superintendent - Startup & Test in the Harris Plant Section of the Nuclear Operations Department.

September 1982 - employed as Manager - Startup and Test in the Harris Plant Section of the Nuclear Operations Department.

September 1983 - employed as Manager - Startup & Test in the Harris Nuclear Project Department, New Hill, NC 1

TABLE 13.1.3-9 13

L. J. Woods 13
Startup & Test Supervisor

Education

A. B.S. Degree in Mechanical Engineering; University of Nebraska, Lincoln, NB - January 1968

B. Nuclear Power Training, U.S. Navy; Vallejo, CA and Idaho Falls, ID - August 1969.

Experience

February 1962 - June 1982 U.S. Navy

October 1963 - Enlisted Nuclear Power School, Bainbridge, MD

February 1969 - Officer Nuclear Power School, Mare Island, CA

August 1969 - Nuclear Power Training Unit, S1W, Idaho Falls, ID

November 1969 - Damage Control Assistant aboard a fast attack submarine

August 1972 - Assistant Engineer (main propulsion) aboard a fast attack submarine and overhaul coordinator during a refueling overhaul.

April 1975 - Department Head of a Maintenance and Monitoring Unit, attached to a submarine squadron.

November 1980 - Executive Officer aboard a Ballistic Missile Submarine.

June 1982 - Employed as Project Engineer - Nuclear Staff Support Section in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant located in New Hill, North Carolina

February 1983 - Employed as Startup & Test Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant in New Hill, North Carolina 13

September 1983 - Employed as Startup & Test Supervisor in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-10 | 13

Steven L. Mabe
Start-Up Supervisor

Education and Training

A. B.S. Degree in Mechanical Engineering, North Carolina State University, 1973

Professional Societies

A. American Society of Mechanical Engineers - Associate Member

B. Registered Professional Engineer - North Carolina

Experience

Summer months of 1968, 1969, 1970, 1971 - Knitter - Russell's Hosiery Mill and Clayson Knitting Company in Star, N.C. and at Pine Hosiery Mill, Ether, N.C

May 1972 to August 1972 - Engineering Trainee - Special projects in Engineering Maintenance, and Design, Weyerhaeuser Plywood, Jacksonville, N.C.

May 1973 - Employed as a Junior Engineer in the Fossil & Hydro Generation Section of the Bulk Power Supply Department. Located in the General Office.

June 1974 - Employed as a Mechanical Engineer in the Fossil & Hydro Generation Section of the Bulk Power Supply Department. Located in the General Office.

September 1975 - Employed as an Engineer II in the Fossil & Hydro Generation Section of the Bulk Power Supply Department. Located in the General Office.

January 1976 - Employed as an Engineer III in the Fossil & Hydro Generation Section of the Bulk Power Supply Department. Located in the General Office.

January 1977 - Employed as an Engineer III in the Generation Services Section of the Generation Department. Located in the General Office.

December 1977 - Employed as a Senior Engineer in the Generation Services Section of the Generation Department. Located in the General Office.

May 1979 - Employed as a Senior Engineer in the Generation Services - O&M Section in the Generation Department. Located in the General Office.

TABLE 13.1.3-10 (Cont'd) 13

Sceven L. Mabe
Start-Up Supervisor

Experience (Cont'd)

November 1979 - Employed as a Senior Engineer in the Harris Plant Section of the Nuclear Operations Department.

July 1982 - Employed as Start-up Supervisor, Balance of Plant Systems, in the Harris Plant Section of the Nuclear Operations Department.

September 1983 - Employed as Start-Up Supervisor, BOP Systems in the Harris Nuclear Project Department, New Hill, NC 13

TABLE 13.1.3-11 | 13

Girard Thomas Lew
Start-Up Supervisor

Education

Rose Polytechnical Institute, No degree - Terre Haute, Indiana - September, 1955 to June 1956

United States Naval Academy - B.S. Engineering/Science - July, 1956 to June, 1960 - Annapolis, MD

United States Post Graduate School M.S. Mechanical Engineering - August, 1970 to December, 1972 - Monterey, CA

Catholic University - Advance Management courses - September - December, 1979

Experience

July, 1960 - September, 1961 - Division Officer aboard USS Franklin D. Roosevelt - U.S. Navy

September, 1961 - January, 1968 - Division Officer and Engineering Officer aboard Nuclear Submarines

January, 1968 - July, 1970 - Director, Engineering Division, Officer's Training Department, U.S. Naval Submarine School.

January, 1973 - July, 1980 - Engineering Duty Officer; various positions in Submarine Construction Conversion, and Repair; Research and Development; and Ship Silencing

July, 1980 employed as a Senior Engineer in the Shearon Harris Nuclear Power Plant Section of the Nuclear Operations Department. Located in New Hill, North Carolina.

January, 1982 promoted to Start-Up Supervisor in the Shearon Harris Nuclear Power Plant Section of the Nuclear Operations Department. Located in New Hill, North Carolina.

September 1983 employed as Start-Up Supervisor in the Harris Nuclear Project Department, New Hill, NC | 13

TABLE 13.1.3-12

James Laverne Dority
Start-Up & Test Supervisor

Education and Training

A. High School: Hartsville High School, Hartsville, SC
Graduated 1961

B. College: Clemson University, Clemson, SC
One Year: 1961-1962

C. US Navy: Electronics Technician (ETA) School
42 Weeks: 1963-1964

D. Seminars/Special Courses:

1. Hagan Instruments (3 weeks) - 1969
2. BWR Nuclear Instruments (3 weeks) - March 1972
3. GE 4010 Computer School (2.5 months) - May-July 1972
4. Basic Instrumentation & Installation, Cape Fear Tech., (78 hours) - May 1973
5. Maintenance & Testing of Electrical Protective Devices, Multiamp Co., January 1979 13
6. Instructor Training Workshop (Bill Underwood)
7. Criterion Referenced Instruction (Bill Underwood) February 1981
8. Criterion Referenced Instruction (Arville Stanley) February 1982

Professional Societies

Instrument Society of America

Experience

September 1962 - September 1966 - Electronics Technician, US Navy

October 1966-March 1967 - Instrumentation Mechanic, Klopman Mills, Inc., Society Hill, SC

March 1967 employed as Helper, Carolina Power & Light Company, O&E Dept., Production & System Operations Section, Robinson Plant, Hartsville, SC

June 1967 employed as Electrician Third Class, CP&L, O&E Dept. Production & System Operations Section, Robinson Plant, Hartsville, SC

May 1968 employed as Electrician Second Class, CP&L, O&E Dept. Production & System Operations System, Robinson Plant, Hartsville, SC

TABLE 13.1.3-12 (Cont'd)

James Laverne Dority
Start-Up & Test Supervisor

November 1969 employed as I&C Technician Second Class, CP&L, Production Section, Power Supply Group, Robinson Plant, Hartsville, SC

April 1970 employed as I&C Technician First Class, CP&L, Power Supply Group, Production Section, Robinson Plant Hartsville, SC

June 1972 employed as I&C Technician First Class, CP&L, Bulk Power Supply Dept., Nuclear Generation Section, Brunswick Plant, Southport, NC

December 1973 employed as I&C Foreman, CP&L, Generation Department, Nuclear Generation Section, Brunswick Plant, Southport, NC

September 1978 employed as Senior Specialist - Technical Training, Nuclear Operations Department, Nuclear Training Section, SHE&EC, New Hill, NC 13

February 1981 employed as Senior Specialist - Technical Training, Technical Services Department, Nuclear Training Section, SHE&EC, New Hill, NC

November 1982 employed as a Senior Specialist - Electrical in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant located in New Hill, NC

February 1983 employed as Start-up and Test Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant located in New Hill, NC

September 1983 employed as Start-Up & Test Supervisor in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-13 |13

Robert Brian Van Metre |13
Manager - Maintenance

Education and Training

BS Degree in General Engineering - U. S. Naval Academy, Annapolis, Maryland - 1961

MS Degree in Personnel Management - George Washington University, Washington, DC - 1967

U. S. Navy Nuclear Power Training

Experience

1961 - 1981 - U. S. Navy - Extensive experience in the overall management of a nuclear propulsion plant. Directly involved in all aspects of training, quality assurance, safety, and operations during a twenty-year career as a Naval officer. Extensive experience in planning, fiscal and technical management while in command of a nuclear powered strategic missile submarine and as a senior action officer on the Submarine Force Commander's staff.

October 1981 - Employed as Manager - Maintenance in the Nuclear Operations Department, Harris Plant Section, located at New Hill, NC.

September 1983 - Employed as Manager - Maintenance in the Harris Nuclear Project Department, New Hill, NC |13

TABLE 13.1.3-14 13

W. H. Batts, Jr.
Maintenance Supervisor - Mechanical

Education

A. B.S. Degree in Naval Science; United States Naval Academy, Annapolis, MD - June 1959

B. Afloat Engineer Officer Course, U.S. Navy; Newport, RI - May 1961

C. Nuclear Power Training, U.S. Navy; Vallejo, CA and Idaho Falls, ID - October 1964

D. M.S. Degree in Mechanical Engineering; U.S. Navy Postgraduate School, Monterey, CA - December 1975

Experience

June 1955 - July 1980 U.S. Navy

July 1955 - February 1961 - Damage Control Assistant aboard Destroyer.

May 1961 - June 1963 - Engineer Officer aboard Destroyer, including Shipboard Major Modernization.

October 1964 - April 1967 - AlW Prototype, Naval Reactor Facility, Idaho with assignments as Shift Engineering Duty Officer, Electrical Maintenance Officer, Training Officer, and Reactor Control Maintenance Officer.

May 1967 - December 1968 - Engineer Officer aboard cruiser, including period of Shipping Overhaul.

April 1976 - October 1977 - Executive Officer aboard Repair Ship.

August 1980 - Employed as Senior Engineer in the SHNPP Section of the Nuclear Operations Department, New Hill, North Carolina

October 1981 - Employed as Senior Engineer in the Nuclear Opeations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina

May 1982 - Employed as Maintenance Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina 13

September 1983 - Employed as Maintenance Supervisor in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-15 |13

Terry C. Morton
Maintenance Supervisor - Electrical |13

Education & Training

A. B. S. Degree in Electrical Engineering from North Carolina State University, Raleigh, North Carolina - 1974

Professional Societies

A. Institute of Electrical and Electronic Engineers

Experience

December 1972 employed as a Co-op Student Engineer in the Nuclear Generation Section of the Bulk Power Supply Department in the General Office

June 1973 employed as a Temporary Student Worker in the Nuclear Generation Section of the Bulk Power Supply Department in the General Office

August 1973 employed as an Engineering Aide II in the Nuclear Generation Section of the Bulk Power Supply Department in the General Office

July 1974 employed as a Junior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department at the Brunswick plant in Southport, North Carolina

January 1976 employed as an Engineer in the Nuclear Generation Section of the Bulk Power Supply Department at the Brunswick Plant in Southport, North Carolina

August 1978 employed as a Senior Engineer in the Nuclear Generation Section of the Generation Department at the Brunswick Plant in Southport, North Carolina

January 1979 employed as a Senior Engineer in the Generation Services Section of the Generation Department in the Startup & Technical Unit in the General Office

May 1979 employed as a Senior Engineer in the Nuclear Generation Section of the Generation Department in the Harris Start-up Organization in Raleigh, North Carolina

April 1980 employed as a Start-up Supervisor in the Start-up Subunit of the Harris Plant Section of the Nuclear Operations Department in Raleigh, North Carolina

TABLE 13.1.3-15 (Cont'd)

Terry C. Morton
Maintenance Supervisor - Electrical

October 1981 employed as a Start-Up Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina 13

February 1983 employed as a Maintenance Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina

September 1983 employed as a Maintenance Supervisor in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-16 | 13

David Waters
Principal Engineer - Operations

Education

A. B.S. Degree in Engineering Physics - Ohio State University - 1963.

B. M.S. Degree in Nuclear Engineering - Carnegie Institute of Technology - 1967.

Professional Societies

A. American Nuclear Society

B. Professional Engineer - North Carolina - 1975

C. Society of Fire Protection Engineers

Experience

April, 1963, to April, 1972, Senior Engineer, Westinghouse Electric Corporation, Pittsburgh, PA

May, 1972, employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department. Located in the General Office.

June, 1973, employed as a Project Engineer in the Nuclear Generation Section of the Bulk Power Supply Department. Located in the General Office.

July, 1974, employed as a Principal Engineer in the Nuclear Generation Section of the Bulk Power Supply Department. Located in the General Office.

January, 1977, employed as a Director - Start-up and Technical in the Generation Services Section of the Generation Department. Located in the General Office.

September, 1978, employed as a Principal Engineer - Nuclear Generation in the Nuclear Generation Section of the Generation Department. Located in the General Office.

May, 1979, employed as a Principal Specialist - Regulatory Compliance in the Generation Services Section of the Generation Department. Located in the General Office.

November, 1979, employed as a Principal Specialist - Special Projects in Nuclear Operations Administration Section of the Nuclear Operations Department. Located in the General Office.

TABLE 13.1.3-16 (Cont'd) 13

David Waters
Principal Engineer - Operations

Experience (Cont'd)

February, 1981, employed as a Principal Specialist - Special Projects in the Nuclear Operations Administration Section of the Technical Services Department. Located in the General Office.

June 1981 to June 1982 acting as Principal Engineer - Operations at H. B. Robinson Unit No. 2.

February, 1982, employed as Principal Engineer - Operations, at the Shearon Harris Nuclear Power Plant, located in New Hill, North Carolina.

TABLE 13.1.3-17 13

James P. Thompson III
Shift Operating Supervisor 13

Education & Training

A. B. S. in Textile Technology - N. C. State University, Raleigh, North Carolina, 1965

Professional Societies

None

Experience

October 1965 to November 1967 - Assistant Production Engineer - J. P. Stevens Company, Roanoke Rapids, North Carolina

December 1967 to September 1972 - Engineer - Newport News Shipbuilding and Drydock, Newport News, Virginia

September 1972 employed as a Mechanical Engineer in the Nuclear Generation Section of the Bulk Power Supply Department at the Brunswick Plant in Southport, North Carolina

December 1974 employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department at the Brunswick Plant in Southport, North Carolina

November 1977 employed as a Project Engineer - Performance in the Nuclear Generation Section of the Generation Department at the Brunswick Plant in Southport, North Carolina

May 1979 employed as a Startup and Test Supervisor in the Nuclear Generation Section of the Generation Department in the Harris Organization in Raleigh, North Carolina

February 1982 employed as Shift Operating Supervisor in the Harris Plant Section of the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina 13

September 1983 employed as Shift Operating Supervisor in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-18

Cary S. Briney
Shift Foreman

Education and Training

A. Fullerton Union High School - Fullerton, CA - 1965

B. Fullerton Jr. College - Fullerton, CA - 1 1/2 yrs. of Industrial Electricity - 1967

Experience

February 1968 - February 1976 - Reactor Operator (E6) - U. S. Navy

February 1976 employed as an Auxiliary Operator A in the Nuclear Generation Section of the Bulk Power Supply Department at the Brunswick Plant, Southport, NC 13

June 1977 employed as a Control Operator in the Nuclear Generation Section of the Generation Department at the Brunswick Plant, Southport, NC

March 1980 employed as a Senior Control Operator in the Brunswick Plant Section of the Nuclear Operations Department, Southport, NC

May 1981 employed as a Shift Foreman - Nuclear in the Brunswick Plant Section of the Nuclear Operations Department, Southport, NC

August 1983 employed as a Shift Foreman - Nuclear in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, NC

September 1983 employed as a Shift Foreman - Nuclear in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-19

Richard T. Garner
Shift Foreman

Education and Training

A. West Carteret High School, Morehead City, North Carolina - Diploma - 1972

B. Associate Degree in Science (Electronics) - Lenior Community College, Kinston, North Carolina - 1974

Experience

August 1974 employed as Auxiliary Operator "B" in the Generation Department at the H. B. Robinson Plant, Hartsville, South Carolina

May 1976 employed as Auxiliary Operator "A" in the Generation Department at the H. B. Robinson Plant, Hartsville, South Carolina

July 1977 employed as Control Operator (In Training) in the Generation Department at the H. B. Robinson Plant, Hartsville, South Carolina 13

September 1977 employed as Control Operator in the Generation Department at the H. B. Robinson Plant, Hartsville, South Carolina

March 1982 employed as Senior Control Operator in the Nuclear Operations Department at the H. B. Robinson Plant, Hartsville, South Carolina

November 1982 employed as a Senior Control Operator in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina

April 1983 employed as a Shift Foreman - Nuclear in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina.

September 1983 employed as a Shift Foreman - Nuclear in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-20

Danny G. Batten
Shift Foreman

Education and Training

A. Bladenboro High School, Bladenboro, North Carolina - 1965

B. U. S. Navy

1. Electricians's Mate "A" School - 4 months
2. Nuclear Power School - 6 months
3. Nuclear Prototype - 6 months

Experience

April 1967 to January 1970 - U.S.S. Truxtun DLGN-35. Qualified Electrical Operator, Auxiliary Electrician and Reactor Plant Shutdown Watch. Maintained electrical equipment.

February 1970 to May 1971 - Monob YAG-61. In charge of maintaining electrical system on board this research vessel. 13

July 1971 employed as Auxiliary Operator "A" in the Generation and System Operations Department at the H. B. Robinson Plant, Hartsville, South Carolina

November 1972 employed as Control Operator in the Bulk Power Supply Department at the H. B. Robinson Plant, Hartsville, South Carolina

August 1977 employed as Senior Control Operator in the Generation Department at the H. B. Robinson Plant, Hartsville, South Carolina

June 1981 employed as Shift Foreman - Nuclear in the Nuclear Operations Department at the H. B. Robinson Plant, Hartsville, South Carolina

May 1982 employed as Shift Foreman - Nuclear in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina. (Temporarily assigned to the H. B. Robinson Plant, Hartsville, South Carolina.)

July 1982 employed as a Shift Foreman in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina

September 1983 employed as a Shift Foreman in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-21

James E. Brooks
Shift Foreman

Education and Training

A. G.E.D. Equivalency - U. S. Navy - 1966

B. Engineering Maintenance School - U. S. Navy - 1967

C. Carolina Power & Light Company

1. Reactor Operator License
2. Senior Reactor Operator License

Experience

1959 to 1969 - Machinist Mate First Class - U. S. Navy

February 1969 employed as a Helper at the H. B. Robinson Plant, Hartsville, South Carolina 13

August 1969 employed as an Auxiliary Operator "B" at the H. B. Robinson Plant, Hartsville, South Carolina

January 1970 employed as an Auxiliary Operator "A" at the H. B. Robinson Plant, Hartsville, South Carolina

October 1971 employed as a Control Operator at the H. B. Robinson Plant, Hartsville, South Carolina

May 1976 employed as a Senior Control Operator at the H. B. Robinson Plant, Hartsville, South Carolina

September 1976 employed as a Shift Foreman - Nuclear in the Nuclear Generation Section of the Generation Department at the H. B. Robinson Plant, Hartsville, South Carolina

November 1982 employed as Shift Foreman - Nuclear in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina

September 1983 employed as a Shift Foreman - Nuclear in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-22 13

Jerry Mac Bradley
Radwaste Supervisor

Education

A. B.S.M.E., North Carolina State University, January 1968

B. Nuclear Orientation and Basic Reactor Theory, Newport News Shipbuilding, Newport News, VA - January 1969

Professional Societies

A. Registered Professional Engineer, Commonwealth of Virginia - November 1977.

Experience

February 1968 - Employed as an Associate Engineer (Fluid System Design) in the Atomic Power Division of Newport News Shipbuilding.

September 1979 - Promoted to Engineering Supervisor of a Mechanical Design group at Newport News Shipbuilding.

June 1980 - Employed as a Senior Engineer, Harris Plant Start-up Group, Nuclear Operations Department

October 1981 - Promoted to Start-up Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina

September 1982 - Employed as Radwaste Supervisor in the Nuclear Operations Department at the Shearon Harris Nuclear Power Plant, New Hill, North Carolina 13

September 1983 - Employed as Radwaste Supervisor in the Harris Nuclear Project Department, New Hill, NC

TABLE 13.1.3-23

Joseph M. Collins
Manager - Operations

Education and Training

B. S. Degree in Business Administration - Coker College

Experience

October 1967 - Control Operator - Operation and Engineering Department, Production and System Operations Section, Roxboro Plant, Roxboro, North Carolina

January 1969 - Control Operator - Generation and System Operations Department, Nuclear Generation Section, Robinson Plant, Hartsville, South Carolina

April 1971 - Shift Foreman - Bulk Power Supply Department, Nuclear Generation Section, Robinson Plant, Hartsville, South Carolina

September 1973 - Nuclear Generation Specialist - Bulk Power Supply Department, Nuclear Generation Section, Robinson Plant, Hartsville, South Carolina

January 1976 - Senior Nuclear Generation Specialist - Bulk Power Supply Department, Nuclear Generation Section, Robinson Plant, Hartsivlle, South Carolina 13

January 1977 - Senior Nuclear Generation Specialist - Bulk Power Supply Department, Generation Services Section, General Office, Raleigh, North Carolina

August 1977 - Project Specialist - Simulator, Generation Department, Generation Services Section, General Office, Raleigh, North Carolina

May 1979 - Project Specialist - Operator Training, Generation Department, Generation Services, Harris E&E Center Section, New Hill, North Carolina

December 1979 - Director Nuclear and Simulator Training - Nuclear Operations Department, Nuclear Training Section, Harris E&E Center, New Hill, North Carolina

July 1980 to September 1981 - Vice President - Modification Systems, Inc. - Raleigh, North Carolina

September 1981 to April 1983 - Treasurer - Modification Systems Inc. - Columbia, Maryland

April 1983 - Training Supervisor - Shearon Harris Nuclear Power Plant, Technical Services Department, Nuclear Training Section, Harris Training Unit, New Hill, North Carolina

TABLE 13.1.3-23 (Cont'd)

Joseph M. Collins
Manager - Operations 13

November 1983 - Employed as Manager Operations in the Harris Nuclear Project Department, New Hill, North Carolina

TABLE 13.1.3-24

John W. Digby
Shift Foreman

Education and Training

A. Miami Edison Senior High - Miami, Florida - 1960

B. George T. Baker Aviation - Miami, Florida - 1964 to 1966 - No Degree - Avaiation Mechanics

C. Purdue - West Lafayett, Indiana - 1980 to 1983 - No Degree - STA Program

D. Electrical Power Production Technical - Sheppard Air Force Base, Watchta Fall, Texas - October 1961 to June 1961 - Electrical Power Production

E. Electric Power Production Missile School - Sheppard Air Force, Watchta Fall, Texas - June 1961 to November 1961 - Electrical Power Production 1

Experience

June 1961 to March 1964 - EPPT - United States Air Force

June 1965 to September 1966 - Truck Driver - Lou-Mack Transfer - Miami, Florida

September 1966 to June 1978 - Watch Engineer (SRO) - Florida Power and Light Company - Miami, Florida

June 1978 to June 1980 - Reactor Control Operator I - Washington Public Power Supply System - Richland, Washington

August 1980 to January 1984 - Shift Supervisor - Public Service Indiana - New Washington, Indiana

February 1984 - Employed as Shift Foreman - Nuclear in the Harris Nuclear Project Department, New Hill, North Carolina

TABLE 13.1.3-25

Al Poland
Project Specialist

Education and Training

A. University of Louisville - 1964 - BS Degree in Physics

B. University of North Carolina - 1967 - MS Degree in Public Health (Radiological Health)

C. U. S. Navy - Engineering Officer of Watch (EOOW) qualification, Navy Nuclear Plant Engineer training program - 1974 to 1975

13

Experience

1967 to 1974 - Westinghouse Electric Corporation - West Mifflin, PA - Bettis Atomic Power Laboratory - Radiological Control Engineering Department

1975 to 1980 - PSI General Headquarters - Senior Project Engineer - Nuclear Project Group - Environmental

June 1980 to September 1982 - PSI Marble Hill Site - Madison, Indiana - Nuclear Safety Supervisor and Senior Project Engineer - Nuclear Safety & Licensing Group - Project Engineering

September 1982 to February 1984 - PSI Marble Hill Site - Madison, Indiana - Health Physics Supervisor - C&HP Department - Nuclear Operations

February 1984 - Employed as a Project Specialist - Radiation Control in the Harris Nuclear Project Department, New Hill, North Carolina

TABLE 13.1.3-26

James W. McDuffee
Radiation Control Supervisor

Education and Training

A. West Phoenix High School - Phoenix, Arizona

B. Phoenix College - Phoenix, Arizona - (1960-1961: No Degree)

C. U. S. Navy Nuclear Power Plant Operator's Course - Fort Belvoir, Virginia (Certified Operator)

Experience

1955 to 1959 - Hospital Corpsman - U. S. Navy

1961 to 1966 - Medical Department Representative - U. S. Navy

1966 to 1968 - Health Physics and Process Control Technician - U. S. Navy

1968 to 1971 - Supervisory Health Physicist Technician - U. S. Navy 13

1971 to 1974 - Division Chief Petty Officer/Radiation Health Technician - U. S. Navy

1974 to 1978 - Assistant Personnel Officer - U. S. Navy

May 1978 to January 1983 - Radiation Protection Supervisor - Palo Verde Nuclear Generating Station - Wintersburg, Arizona

January 1983 - Employed as a Project Specialist - Health Physics in the Radiological & Chemical Support Section of the Technical Services Department, New Hill, North Carolina

August 1983 - Employed as a Project Specialist - Health Physics in the Radiological & Chemical Support Section of the Operations Training & Technical Services Department, New Hill, North Carolina

November 1983 - Employed as a Principal Health Physics Specialist in the Radiological & Chemical Support Section of the Operations Training & Technical Services Department, New Hill, North Carolina

March 1983 - Employed as a Radiation Control Supervisor in the Harris Nuclear Project Department, New Hill, North Carolina

TABLE 13.1.3-27

L. P. Capps
Supervisor - Project Material Control

Education

Pembroke State University - Pembroke, North Carolina - 1973 B. S. in Accounting

Experience

1973 - Junior Accountant; Plant Accounting Section, Treasury and Accounting Department, Carolina Power & Light Company, Raleigh, North Carolina

1975 - Accountant, Plant Accounting Section, Treasury and Accounting Department, Carolina Power & Light Company, Raleigh, North Carolina 13

1975 - Accountant, Construction Engineering and Accounting Section, Power Plant Construction Department, Carolina Power & Light Company, Raleigh, North Carolina

1976 - Senior Accountant, Nuclear Construction Section, Power Plant Construction Department, Carolina Power & Light Company, Shearon Harris Nuclear Power Plant, New Hill, North Carolina

1978 - Supervisor - Project Accounting, Harris Site Management Section, Nuclear Plant Construction Department, Carolina Power & Light Company, Shearon Harris Nuclear Power Plant, New Hill, North Carolina

1984 - Supervisor - Project Material Control, Administrative Section, Harris Nuclear Project Department, Carolina Power & Light Company, Shearon Harris Nuclear Power Plant, New Hill, North Carolina.

Professional Societies

None

TABLE 13.1.3-28

E. E. Johnson
Supervisor - Project Document Services

Education

North Carolina State University - Raleigh, North Carolina - 1964 - B. S. in Applied Mathematics

Experience

1964 - Engineer in Atomic Power Division, Newport News Shipbuilding & Dry Dock Company

1971 - Engineering Supervisor in Atomic Power Division, Newport News Shipbuilding & Dry Dock Company.

1973 - Structural Design Specialist, Gilbert Associates, Inc.

1975 - Project Control Engineer - Gilbert Associates, Inc.

1977 - Records Management Consultant of VEPCO's North Anna Nuclear Power Plant for Gilbert Associates, Inc. 13

1979 - Supervisor, Administration and Records Management, at VEPCO's North Anna Nuclear Power Plant

1981 - Information Management Consultant at SCE&G's V. C. Summer Nuclear Power Plant for Gilbert Associates, Inc.

1983 - Project Specialist - Nuclear Operations Administration, Carolina Power & Light Company

1984 - Supervisor - Project Document Services at Harris Nuclear Project Department, Carolina Power & Light Company

Professional Societies

A. Member of Institute of Certified Records Managers

B. Member of Association of Information and Image Management (formerly National Micrographics Association)

C. Member of Association of Records Managers and Administrators

D. Member of Nuclear Records Management and Administrators

(1) Member on Micrographics Committee
(2) Member on Technical Support Center/Emergency Offsite Facility Records Committee

TABLE 13.1.3-29

Ronald E. Gurganus
Supervisor - Project Analysis, Harris Nuclear Project Department

Education

A. North Carolina State University - Raleigh, North Carolina - 1970 B. S. in Forest Management.

B. Duke University - Durham, North Carolina - 1980 - MBA in Business Administration

C. International Correspondence School - Scranton, Pennsylvania - 1982 Diploma in Electrical Engineering, Power Option

D. 3286th United States Army Reserve School - Raleigh, North Carolina - 1982 - First Sergeant School - Diploma

Experience 13

1970 - Assistant to Vice President of General Construction, Stackhouse, Inc.

1973 - Transmission Line Right-Of-Way Forester, CP&L System Operations Department

1978 - Senior Specialist, CP&L System Operations Department

1983 - Senior Engineer - Project Analysis, CP&L Harris Site Management

1984 - Supervisor - Project Analysis, Harris Project Administration, CP&L, Harris Nuclear Project Department

Professional Societies

None

TABLE 13.1.3-30

R. E. Butler
Director - Site Industrial Engineering

Education

A. Maryland University - College Park, Maryland - 1959 B. S. in Chemical Engineering/Math

B. Maryland University - College Park, Maryland - 1967 B. S. in Industrial Engineering

Experience 13

1964 - Distribution Supervisor - UPS - Landover, Maryland

1966 - Personnel Supervisor - UPS - Landover, Maryland

1967 - I.E. Manager - UPS - New Jersey District

1974 - Industrial Engineering Manager Assigned to UPS National Staff - New York, New York

1976 - District Operations/I.E. Manager Carolina District - UPS - Raleigh, North Carolina

1980 - Industrial Engineering Supervisor - Harris Site Construction

1983 - Director Site Industrial Engineering, Shearon Harris Nuclear Power Plant

Professional Societies

Member American Institute of Industrial Engineers

13.4.1 ON-SITE REVIEW 4

SHNPP shall adopt measures to assure that plant management conducts reviews of:

a) Unplanned events that have operational safety significance.

b) Modifications to existing systems, structures, and components which are important to nuclear safety.

c) Procedures as requird by Appendix A, Regulatory Guid 1.33-1978 (Rev. 2) and changes thereto. 4

The review activities of the on-site operating organizations shall be in accordance with Section 4.4 of ANSI N18.7-1976 as endorsed by Regulatory Guide 1.33-1978 (Rev. 2), paragraph C.5.a. 4

The administrative program for review, approval, and control of procedures shall be in accordance with Section 5.2.15 of ANSI N18.7-1976.

13.4.2 INDEPENDENT REVIEW

An off-site independent review program that conforms to the criteria of ANSI N18.7-1976 has been established. The objective of the program is to provide corporate management with an independent review and assessment of those aspects of plant operations which affect nuclear safety. The Corporate Nuclear Safety (CNS) Unit of the Corporate Nuclear 13
Safety & Research Department is responsible for this function.

The CNS Unit is comprised of experienced personnel who, in general, have the collective expertise and technical competence to review problems in the following areas:

- Nuclear Power Plant Operations
- Nuclear Engineering
- Chemistry and Radiochemistry
- Metallurgy
- Instrumentation and Control
- Radiological Safety
- Mechanical and Electrical Engineering
- Administrative Control
- Seismic and Environmental
- Quality Assurance Practices

Looking more at the details of the review function, the following specific items are evaluated:

- Plant procedure changes meeting 10CFR50.59 review criteria,
- Plant design changes meeting 10CFR50.59 review criteria,
- Licensing actions,
- Test or experiments not described in the facility FSAR,
- Plant operational occurrences (LERs),
- Regulatory violations,
- Technical Specification changes,
- Nuclear Safety Review Committee meeting minutes,
- Conformance to regulatory requirements, and
- Any item deemed appropriate for review relative to safe operation.

Should an item arise where sufficient expertise is not available within CNS, the organization has the flexibility and authority to call on appropriate personnel to supplement the independent review ensuring satisfactory resolution of the item. The CNS organizational structure is shown in Figure 13.4.2-1.

Written records of independent reviews are prepared and retained as are periodic reports to corporate management that address safety-related issues. This independent off-site review program is currently in effect for Carolina Power & Light Company's operating nuclear units and will be implemented for the Shearon Harris Nuclear Power Plant prior to receipt of the Operating License. 13

13.4.3 AUDIT PROGRAM

The purpose of corporate operational audits is to ensure an effective means of reviewing and evaluating the plant preoperational, start-up and test, and operational periods. The implementation and effectiveness of the Continuing QA Program shall be regularly assessed for compliance with 10CFR50, Appendix B, NRC Regulatory Guide 1.33, ANSI N18.7, and N45.2.

The corporate organization responsible for independent audit is the Performance Evaluation Unit in the Corporate Quality Assurance Department. The objective of the unit is to continuously assess all functions involved in the design, construction, and operation of the Company's nuclear plants to assure all levels of management that commitments to Regulatory Guides and applicable technical codes are being carried out and regulatory requirements are being met. The function is described in ANSI 18.7 as a comprehensive system of planned and documented audits to verify compliance of all aspects of the administrative controls and quality assurance programs.

Carolina Power & Light Company's principal means of achieving an effective, safe nuclear plant are the Company's Corporate Quality Assurance Program (CQAP) and the ASME QA Program. The CQAP addresses engineering, design, construction, construction testing, startup, operation, and maintenance for the plant life. It covers procurement, design, and operation associated with the fabrication and control of nuclear fuel. The ASME QA Program addresses compliance with the requirements and rules of the ASME Boiler and Pressure Vessel Code during engineering and construction of the SHNPP. The role of the Performance Evaluation Unit in these programs is to assure that procedures are developed to implement each program and that these procedures are being followed.

The Performance Evaluation Unit is responsible for auditing the initial phase in the inception of a nuclear plant, design and construction. This is accomplished by auditing the Harris Plant Engineering Section, the Harris Plant Construction Section, the Nuclear Engineering & Licensing Department, the Harris Plant Quality Assurance/Quality Control Section, and those sections of the Operations Training & Technical Services Department performing nuclear-related activities during the engineering and construction phase. Each of these activities is audited at least once a year to assure that they meet the Corporate Quality Assurance Program and other criteria specified in the FSAR. Additional audits may be requested by line or corporate management if special problems are encountered. 13

The Performance Evaluation Unit is also charged with auditing the operational phase of the nuclear plant. The following criteria are addressed in developing the audit requirements:

Plant Operating Manual and Procedures.

Plant Technical Specifications including the following minimum requirements.

The conformance of facility operation to all provisions contained within the Technical Specifications and applicable license conditions at least once per 12 months.

The training and qualifications of the entire facility staff at least once per 12 months.

The results of actions taken to correct deficiencies occurring in facility equipment, structures, systems, or method of operations that affect nuclear safety at least once per 6 months.

The verification of compliance and implementation of the requirements of the quality assurance program to meet the criteria of Appendix "B", 10CFR50, at least once per 24 months.

The Emergency Plan and implementing procedures at least once per 12 months.

The Security Plan and implementing procedures at least once per 12 months.

The facility Fire Protection Program and implementing procedures at least once per 12 months.

Any other area of facility operation considered appropriate by responsible management.

Commitments made in the plant FSAR.

SHNPP will be audited two to three times yearly when operational. Nuclear fuel activities are audited annually. (Fuel suppliers are also subjected to audits.) Additional audits may be requested by line or corporate management if special problems are encountered.

4 The organizational structure for the Performance Evaluation Unit is shown in Figure 13.4.3-1. When necessary to augment an audit team, outside consultants or qualified Company personnel independent of the operation being audited may be utilized.

The areas audited and the minimum frequency of the audits are listed below:

Operating Nuclear Plants - A minimum of two times per year.

Nuclear Fuel Department - Once per year.

Nuclear Fuel Supplier - Once during applicable time period covered by purchase order or once every three years, whichever is shorter.

4 Harris Energy & Environmental Center - Once per year.

SHNPP Environmental Programs - Once per year.

4 Q-List Modifications Performed by Plant Staff - Once per year.

Radwaste Transfer, Packaging, and Transport Activities - Once per year.

Pre-Operational Audits - Selected by Principal QA Specialist.

Harris Plant Construction - Once per year. 13

Harris Plant Engineering - Once per year.

Site Investigation - Selected by Principal QA Specialist.

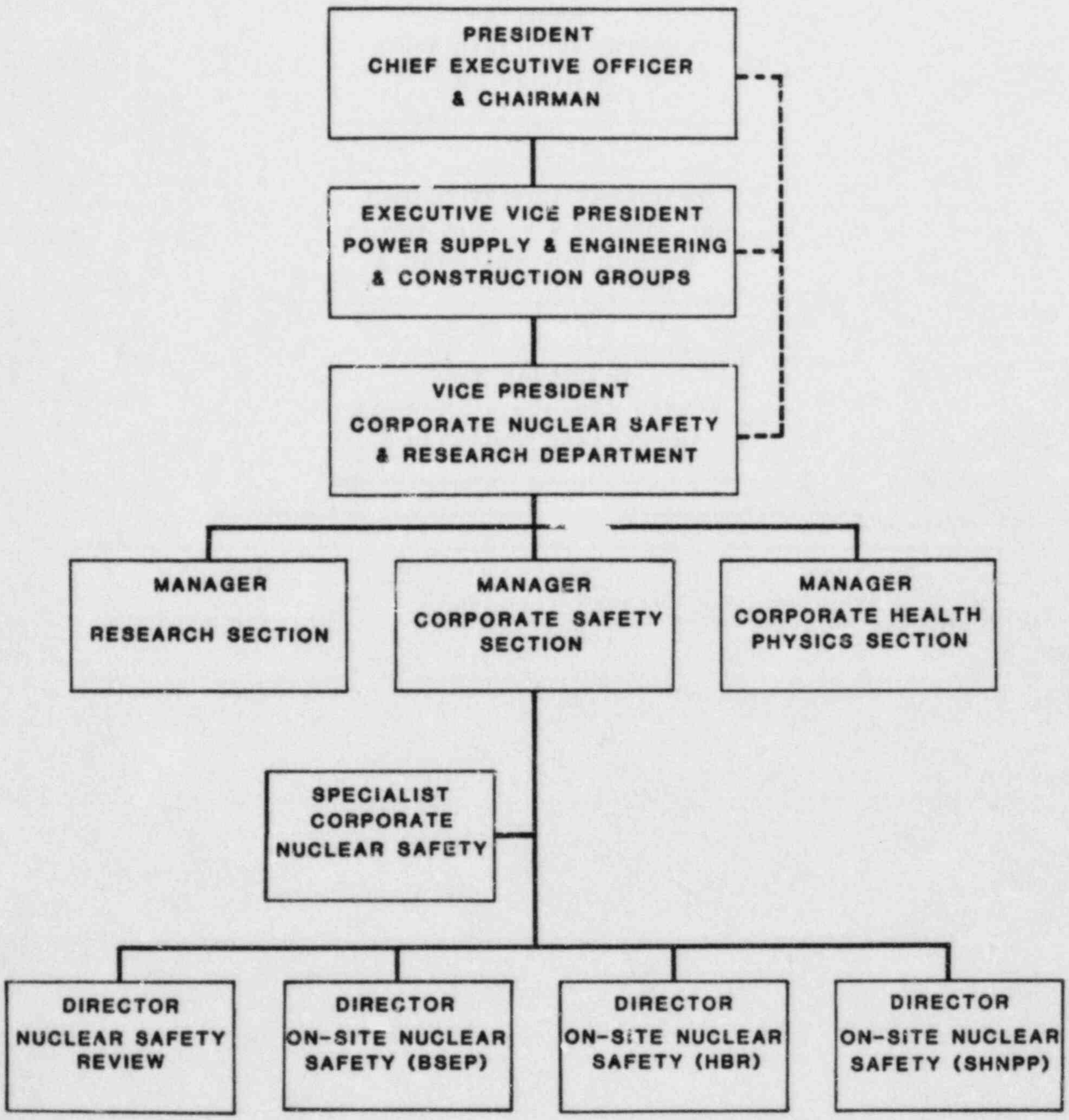
Harris Plant Quality Assurance/Quality Control - Once per year. 13

QA Services - Once per year.

Operating Plant Q - List Modification - Once during modification (only applicable to changes requiring company interface documents).

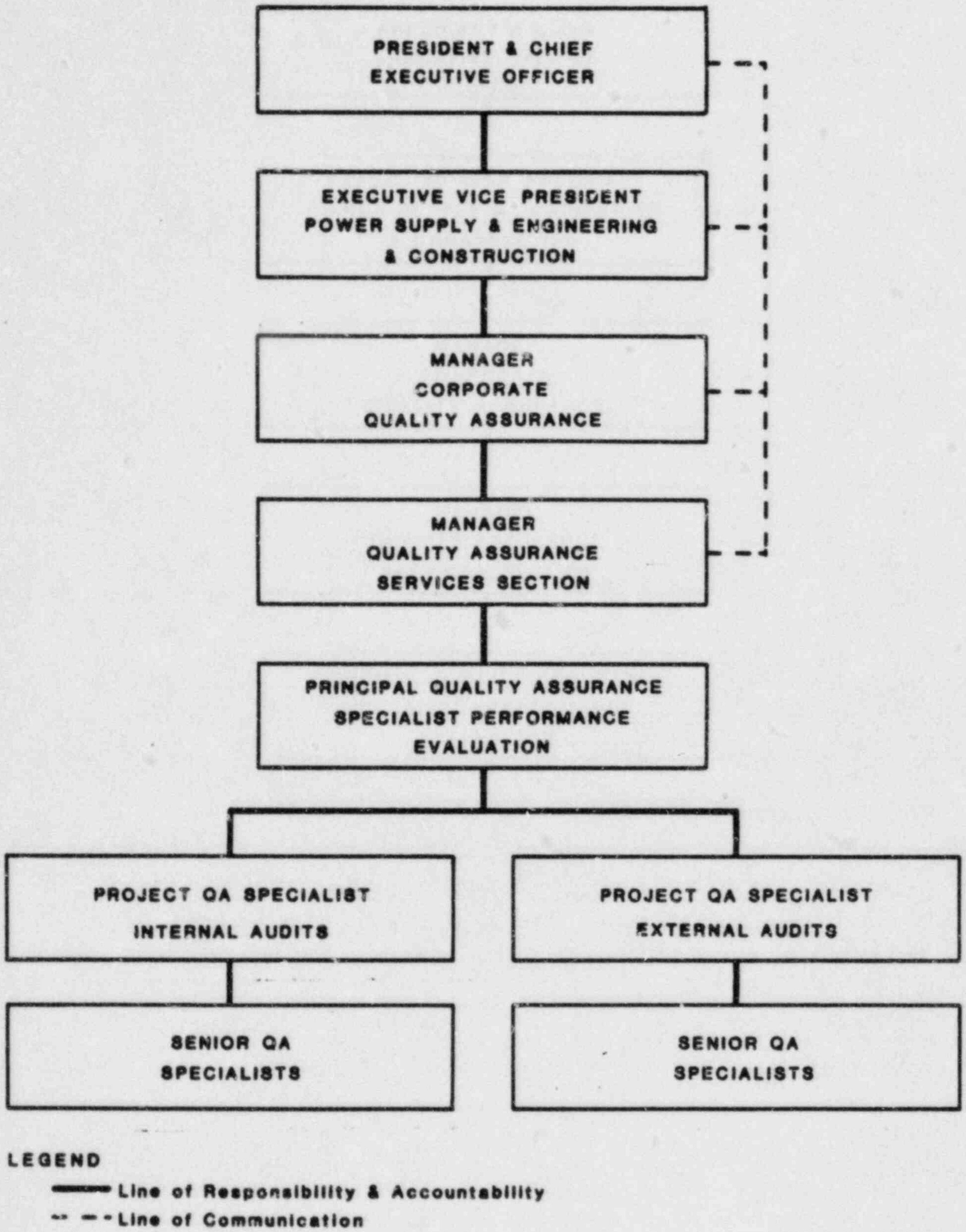
ASME Code Construction - At least twice per year.

Other than audit reports the Performance Evaluation Unit communicates to Senior Management by a monthly report of QA audits conducted during the month including a status of the action items and their resolution. The Manager - Corporate Quality Assurance reports to the Executive Vice President - Power Supply and Engineering & Construction which provides direct communication. Discussions involve an overview of the Company's various organizational units' efforts in maintaining an effective QA program. In addition to these meetings, the Manager - Corporate Quality Assurance Department meets on a regular basis with Department personnel to review activities. In addition to the formal audit activities, the Performance Evaluation Unit is often called on by other Company members for interpretations of codes, standards, or other QA requirements. This contact is in an advisory role identifying acceptable modes of operation and does not compromise the unit's independence from line activities.



Amendment No. 13

SHEARON HARRIS NUCLEAR POWER PLANT Carolina Power & Light Company FINAL SAFETY ANALYSIS REPORT	INDEPENDENT SAFETY REVIEW GROUPS	FIGURE 13.4.2-1



Amendment No. 13

SHEARON HARRIS NUCLEAR POWER PLANT Carolina Power & Light Company FINAL SAFETY ANALYSIS REPORT	CORPORATE QUALITY ASSURANCE AUDIT UNIT	FIGURE 13.4.3-1

13.5 PLANT PROCEDURES*

13.5.1 ADMINISTRATIVE PROCEDURES

The SHNPP General Manager has overall responsibility for the development and implementation of the administrative and operating procedures necessary to ensure safe operation of the plant within the limits set by the facility license and Technical Specifications. These procedures assign responsibilities and delegate authorities to the SHNPP staff. These procedures provide control measures for the preparation, review, approval, revision, and use of all procedures which govern quality - and safety-related plant activities.

13.5.1.1 Conformance with Regulatory Guide 1.33

Section 1.8 describes CP&L's position on conformance to Regulatory Guide 1.33.

13.5.1.2 Preparation of Procedures

All safety-related plant activities will be conducted in accordance with detailed written and approved procedures.

Plant administrative procedures, which govern the safety-related activities of the plant staff, and the plant operating, maintenance, technical, and surveillance procedures are prepared by experienced and technically qualified personnel within the appropriate functional units of the plant organization. 3
Procedures are reviewed in accordance with the provisions of Section 6.0 of the Technical Specifications and recommendations made to the functional unit manager or unit director under whose authority they were prepared. The procedures are issued following approval by the functional unit manager or unit director, or by the plant general manager in the case of procedures affecting activities in more than one functional unit.

13.5.1.3 Procedures

a) Standing Order to Operations: The responsibilities and authorities of plant personnel are delineated through standing orders to shift foremen and shift crews. In addition, corporate management periodically issues directives that emphasize the primary management responsibility of the Shift Foreman is to ensure safe operation of the plant on his shift and that clearly establishes his command duties.

1) Authority and Responsibility of Reactor Operator: The reactor operator has the responsibility and authority for manipulating controls which directly or indirectly affect core reactivity and/or the manipulation of apparatus and mechanisms other than controls which may affect the reactivity or power level of a reactor, including tripping

* Further information is contained in the TMI appendix.

the reactor should he deem it to be necessary. He is responsible for knowing the limits and setpoints associated with safety related equipment and systems contained in the Technical Specifications and in the operating procedures. The reactor operator may be designated to assume the control room command function if the Shift Foreman is temporarily absent from the Control Room during routine operations.

2) Authority and Responsibility of Senior Reactor Operator: The Shift Foreman, who is a licensed senior reactor operator, has, in addition to the authority and responsibility assigned to the reactor operator, the overall responsibility for licensed activities on the Unit(s) under his command. His fundamental and primary responsibility on shift is to maintain at all times a broad perspective on operational conditions affecting plant safety. The Shift Foreman shall remain in the Control Room at all times during emergency situations to direct the activities of control operators. Pursuant to 10CFR50.54(m), the Shift Foreman shall be present at the facility during initial startup and approach to power, recovery from an unplanned or unscheduled shutdown or significant reduction in power, refueling, or as otherwise prescribed in the facility license.

The Shift Foreman shall not engage in administrative functions that detract from his overall responsibility for assuring safe operation of the Unit(s) under his command. There may be additional operating personnel on shift holding senior reactor operator licenses; however, only the Shift Foreman is delineated the authority of the senior reactor operator, pursuant to 10CFR50.54(l).

3) Manipulation of Controls: Administrative control procedures state that no one is permitted to manipulate facility controls which affect reactivity if he is not a licensed reactor operator or senior reactor operator, except for license trainees operating under the direction of a licensed operator or senior operator, pursuant to 10CFR50.54(i).

4) Operations Affecting Reactivity: Administrative control procedures require that all personnel operating plant apparatus and mechanisms other than controls, which may affect the reactivity or power level of the Unit, notify and obtain permission of the control room operator prior to initiating such action, pursuant to 10CFR50.54(j).

5) Presence of Licensed Operator at Controls: A licensed reactor operator or senior reactor operator is required by administrative procedure to be present "at the controls" at all times during the operation of the Unit, pursuant to 10CFR50.54(k). Figure 13.5.1-1 indicates the area of the Control Room which is designated "at the controls."

6) Shift and Relief Turnover: Administrative control procedures provide a formal means of assuring that the oncoming operating shift has the necessary knowledge of critical plant status information and system availability. The procedures includes checklists to be completed and signed by the offgoing shift personnel and reviewed and

signed by the oncoming shift personnel. In addition, provision is made for periodic review to evaluate the effectiveness of turnover between the oncoming and offgoing shifts.

7) Control Room Access: Administrative control procedures establish the authority and responsibility of the shift foreman for limiting access to the Control Room. In general, access is limited to those individuals responsible for the direct operation of the Unit, to technical advisors required or requested to support operations, and to other predesignated personnel.

b) Special Orders of a Transient Nature: From time to time, management issues special orders to the plant staff to conduct (or not to conduct) certain activities which require no changes or additions to existing procedures and/or instructions. These special orders are of a temporary or transient nature such that their execution constitutes cancellation. Typically, these special orders appear in the form of Night Orders from the Manager-Operations to the shift Operating Supervisors.

c) Equipment Control Procedures: An equipment clearance procedure is used to establish the administrative controls to be utilized to prevent unauthorized operation of plant equipment and to provide safe working conditions to personnel. The Shift Foreman authorizes the release of equipment or systems for maintenance, after determining that it may be taken out of service, how long it may remain out of service, to what degree redundant safety systems may be degraded by removing the equipment from service, and the adequacy of the proposed isolation. Red CLEARANCE tags are installed on all equipment associated with the clearance to indicate the item is not to be operated in any manner. When equipment is unsatisfactory for service, and no clearance has been issued on the equipment, the equipment is tagged with a DANGER tag to prevent operation.

d) Control of Maintenance and Modifications The requirements for controlling plant maintenance and modifications are set forth in CP&L's Corporate Quality Assurance Manual. 4

1) Maintenance: Procedures and instructions are applied to control maintenance of safety related items. Maintenance procedures and instructions include the following information, as appropriate:

(a) Requirements for indoctrination, training, and skills.

(b) Prerequisites for special environments, equipment, tools, and material preparation.

(c) Provisions for data collection and reporting.

(d) Instructions for documentation of work performed.

(e) Requirements for verification of functional capability and quality by inspection, witnessing, examination, and testing, including specifications of mandatory holdpoints and verification procedures or instructions.

(f) Quantitative and qualitative criteria for determining important steps or functions have been satisfactorily accomplished.

All procedures utilized for maintenance of safety-related structures, systems, or components are reviewed as provided for in Section 6 of the Technical Specifications. This review ensures that the equipment is returned to a state of quality at least equivalent to that specified originally.

The detailed administrative control of plant maintenance is provided for under the CP&L Maintenance Management System. This system provides an accurate written record of all maintenance work performed, both corrective and preventative. This assures all maintenance and repair work needed is given proper and timely consideration; all such maintenance and repair work is clearly described so that proper investigation of the causes and corrective action may be made; the work priority established is based on urgency; and proper QA/QC considerations are given to all work.

2) Modifications: Plant modifications and setpoint changes are developed in accordance with approved procedures. These procedures assure all necessary activities associated with the modifications are carried out in a planned, controlled, and orderly manner. For each modification, design documents such as drawings, equipment and material specifications, and appropriate design analysis are developed or the as-built design documents are utilized. Based on the information in the design documents, a written safety evaluation is prepared in accordance with 10CFR50.59. This analysis contains the technical data, supporting evaluations, and the safety questions considered and analyzed as safe that form the bases for determining the modification does or does not involve an unreviewed safety question. Separate technical and QA reviews are conducted to verify the adequacy of the design effort. The final modification package is reviewed in accordance with the provisions of Section 6.0 of the Technical Specifications. The purpose of this review is to a assess the potential degradation of plant quality as a result of the proposed modification.

In particular, the safety analysis, conclusions, and any proposed procedure changes are checked and it is determined if the modification involves an unreviewed safety question as defined in 10CFR50.59. Proposed modifications which involve an unreviewed safety question or a change to Technical Specifications are handled in the form of proposed license amendments.

e) Master Surveillance and Testing Schedule: The CP&L Maintenance Management System provides the administrative control measures needed to ensure that the periodic testing (PT) of plant safety-related structures, systems, and components is conducted in accordance with the plant Technical Specifications. The Maintenance Management System establishes a data base for each item subject to periodic testing, itemizing all PT tasks to be performed on each item, including frequency, type, and the responsible plant supervisor.

All PT's are initiated by work orders and controlled by the work order number.

f) <u>Procedures for Log Book Usage and Control:</u> Administrative procedures prescribe the usage, control, number of log books, their location, and the personnel responsible for maintaining them. Log books contain a narrative record of plant events in chronological order. Log entries include, but are not limited to, the following:

Date

Plant status

Changes in generator output

Changes in reactor power level

Starting and stopping of major equipment

Change of auxiliary system configuration

Changes in reactor control and rod group positions

Performance of periodic tests

Reactor trips

Instrument or equipment malfunctions or failures

Unusual trends or conditions observed

Major in-plant electrical switching

Starting and stopping gaseous or liquid waste disposal discharges

Setpoint changes

Company electrical grid events that affect operations

Relay operations and targets

Electrical switching involving switchboard and main transformers

g) <u>Temporary Procedures:</u> Temporary administrative procedures may be issued for the performance of activities which are of an infrequent or nonrecurring nature. Such activities may include:

1) Direction of operations during testing, refueling, maintenance, and modifications.

2) Guidance in unusual situations not within the scope of the normal procedures.

3) Ensuring orderly and uniform operations for short periods when the plant, a system, or equipment is performing in a manner not covered by existing procedures.

Limitations on the usage of temporary procedures is stated in the procedures. Temporary procedures affecting plant safety are reviewed and approved as described in Section 13.5.1.2.

13.5.2 OPERATING AND MAINTENANCE PROCEDURES 5

13.5.2.1 Control Room Operating Procedures

System operating activities performed by licensed operators in the Control Room are conducted in accordance with approved, written procedures. These procedures provide detailed, preplanned instructions for performing operations in order to eliminate errors resulting from inconsistant or arbitrary manipulation of systems and components. Procedures are sufficiently detailed so that qualified operators can perform the required functions without direct supervision.

a) System Operating Procedures - System operating procedures provide instructions for starting, securing, and placing systems in various modes for operation. Each procedure contains a title page, a list of effective pages, a table of contents containing a list of subprocedure titles, and a complete list of precautions that apply to the system. Each subprocedure contains a description of its purpose, a list of initial conditions which must be met before commencing with the basic procedure, a section containing the detailed step-by-step instructions, a valve and electrical lineup, and if required, a checklist. The following is an initial listing of operating procedures:

1) Auxiliary Feedwater System

2) Auxiliary Steam System

3) Boron Recycle System

4) Boron Thermal Regeneration System

5) Chemical and Volume Control System

6) Circulating Water System

7) Component Cooling Water System

8) Condensate and Feed Water System

9) Main Condensor System 5

10) Containment Ventilation and Vacuum Relief System

11) Containment Spray System

12) Control Room Area Ventilation System

13) Cooling Tower System

14) Emergency Diesel Generator System

15) Plant Electrical Distribution System 5

16) Essential Services Chilled Water System

17) Fire Protection/Detection System

18) Generator, Exciter, and Isolated Phase Bus System

19) Generator Gas, Generator and Exciter Mechanical Support System

20) Gross Failed Fuel Detection System

21) Reactor Coolant System

22) Primary Sampling System

5 23) Primary Makeup System

24) Reactor Control and Protection System

25) Rod Control System

26) Ex-Core Instrumentation System

27) In-Core Instrumentation System

28) Safety Injection System

29) Residual Heat Removal System

30) Containment Structure System

5 31) Containment Isolation System

32) Fuel Handling System

33) Spent Fuel Pool Cooling and Cleanup System

34) Radiation Monitoring System

35) Metal Impact Monitoring System

36) Waste Processing System

37) Oily Waste Collection and Separation System

38) Post Accident Hydrogen System

5 39) Steam Generator, Main Steam, Extraction Steam and Steam Dump System

40) Steam Generator Blowdown System

41) Steam Generator Chemical Addition System

42) Secondary Sampling System

43) Compressed Air System

44) Circulating Water Treatment System

45) Condensate Polishers and Demineralizers System

46) Feedwater Heaters, Vents, and Drains System

47) Service Water System

48) Traveling Screens and Screen Wash System

49) Reservoir Complex System

50) Demineralized Water System

51) Caustic and Acid System

52) Waste Process Building Component Cooling Water System

53) Waste Process Non-Essential Chilled Water System

54) Essential Services Chilled Water System

55) Hydrogen Seal Oil System

56) Off-Site Power System

57) Plant Lighting System

58) Communications System 5

59) Secondary Waste Treatment System

60) Filter Backwash System

61) Chemical Drains System

62) Spent Resin Transfer and Storage System

63) Solid Waste Processing System

64) Waste Holdup and Evaporation System

65) Gaseous Waste Processing System

66) Radioactive Equipment Drains System

67) Radioactive Floor Drains System

68) Laundry and Hot Shower System

69) Radioactive Sampling System

70) Moisture Separator Reheater System

71) Turbine and Generator Lube Oil System

72) Gland Sealing System

73) Digital Electro - Hydraulic Control System

74) Heat Trace and Freeze Protection System

75) Cathodic Protection System

76) Compressed Gas System

(a) Nitrogen Supply
(b) Hydrogen Supply
5 (c) Oxygen Supply
(d) Carbon Dioxide Supply

77) Seismic Monitoring System

78) Containment Cooling System

79) Fuel Handling Building HVAC System

80) Waste Process Building HVAC System

81) Reactor Auxiliary Building HVAC System

82) Turbine Building HVAC System

83) Diesel Generator Building HVAC System

b) General Operating Procedures - The General Operating Procedures are the instructions for performing major integrated plant evolutions involving multiple systems such as plant start-up, and shutdown. These procedures provide a coordinated means of tying system operating procedures together and for changing the overall mode of plant operation. The format of General Operating Procedures is similar to System Operating Procedures. The following is an initial listing of General Operating Procedures:

1) Operations- Conduct of Operations

2) Filling and Venting the Reactor Coolant System

3) Plant Heatup - Mode 5 to Mode 3

4) Normal Plant Startup - Mode 3 to Mode 2

5 5) Plant Recovery from Reactor Trip

6) Plant Power Operation - Mode 2 to Mode 1

7) Plant Shutdown - Mode 1 to Mode 3

8) Plant Cooldown - Mode 3 to Mode 5

9) Reactor Coolant System Draining

10) Filling Purification and Draining of the Refueling Cavity 5

11) Containment Integrity

12) Refueling - Mode 6

c) Emergency Operating Procedures - Emergency operating procedures specify operator actions, including manipulation of plant controls for:

1) Restoring an operating variable to its normal controlled value when it departs from its range or,

2) restoring normal operating conditions following a perturbation or,

3) reducing the consequences of an accident or potentially hazardous condition which has already occurred or,

4) implementing the emergency plan or,

5) preparing for possible hazardous natural occurrences.

Each procedure will identify the symptoms of the conditions, automatic actions that may occur, and the immediate and subsequent operator actions to be taken. Operating personnel are required to know all immediate actions since the primary responsibility for detection of an emergency and initiation of corrective action rests upon the operator. The following is an initial listing of Emergency Operating Procedures:

1) Reactor Coolant System Depressurization

(a) Loss of reactor coolant (including recognition of inadequate core cooling)

(b) Steam line rupture

(c) Steam generator tube rupture

2) Loss of Reactor Coolant Flow 5

3) Loss of Feedwater

4) Station Blackout Operation

5) Fuel Handling Accident

6) Accidental Release of Liquid Waste

7) Accidental Release of Waste Gas

8) Reactor Trip

9) Control Room Inaccessibility

10) Post Accident Containment Hydrogen Removal

11) Malfunction of Reactor Control System

(a) Failure of a RCCA control bank to move

(b) Continuous insertion of a RCCA control bank

(c) Continuous withdrawal of a RCCA control bank

(d) Dropped RCCA

5 (e) RCCA Misalignment

(f) Malfunctioning rod position indicator

12) Emergency Boration

13) Malfunction of Reactor Makeup Control

14) Malfunction of Nuclear Instrumentation

15) Radiation Monitoring System Alarm

16) Turbine Vibration

17) Loss of One Heater Drain Pump

18) Loss of One Feedwater Pump

5 19) Loss of One Condensate Pump

20) Partial Loss of Condenser Vacuum

5 21) Loss of Component Cooling Water

22) Secondary Load Rejection

23) Excessive Primary Plant Leakage

24) Loss of Instrument Air

25) Reactor Coolant Pump Abnormal Conditions

26) Malfunction of RCS Pressure Control System

27) Loss of Residual Heat Removal System

28) Seismic Disturbances

29) Loss of Service Water

30) Spurious Safety Injection Recovery

d) Annunciator Procedures - Annunciator procedures specify operator actions necessary to respond to an abnormal condition as indicated by an alarm. These procedures include alarm setpoints, probable causes, automatic actions, immediate manual actions, supplementary actions, and applicable reference. The Annunciator Procedures are organized according to their respective annunciator panel numbers and the annunciator's location in that panel.

e) Temporary Operating Procedures - Temporary operating procedures provide instructions for plant operations which are of a nonrecurring nature such as: The direction of activities during special testing or maintenance; guidance in unusual situations not within the scope of normal procedures; assuring orderly and uniform operations for short periods of time when the Unit, a system, or component is performing in a manner not covered by existing procedures; or when modifications are made such that portions of the existing procedures do not apply.

13.5.2.2 Other Procedures

Maintenance and other activities which may affect the proper functioning of the station's safety-related structures, systems, or components are performed in accordance with approved written procedures. These procedures provide a preplanned method of conducting activities in order to eliminate errors. They are sufficiently detailed so that qualified individuals can perform the required function without direct supervision. However, written procedures cannot cover all contingencies and therefore must contain a certain degree of flexibility. The general character and objectives of these procedures are described below.

a) Plant Radiation Protection Procedures - Information concerning these procedures is presented in Section 12.5.

b) Emergency Preparedness Procedures - Information concerning these procedures is presented in Section 13.3.

c) Instrument Calibration Procedures - Instrument calibration procedures provide detailed instructions for the proper maintenance, testing, and adjustment of all safety-related instrumentation and control system, and the calibration of measuring and test equipment used in activities affecting the quality of these safety-related systems. They ensure measurement accuracies adequate to maintain plant safety-related parameters within operational and safety limits. The plant electrical maintenance group, under the supervision of the Electrical Maintenance Supervisor is responsible for developing and implementing these procedures. | 5

d) Chemical Procedures - Chemical procedures provide instructions to control chemical and radio-chemical related activities. They are developed and implemented by the chemistry and environmental group under the supervision of the Chemistry and Environmental Supervisor. Included in these procedures are such instructions as: the nature and frequency of sampling and analysis to be performed; precorrosive agents which could become sources of radiation hazards; and treatment and control of radioactive wastes.

e) Radioactive Waste Management Procedures - Procedures for the operation of the radwaste processing systems provide for the control, treatment, and management of on-site radioactive wastes. These procedures are developed and implemented by the radwaste operations group under the supervision of the Radwaste Operations Supervisor.

5 f) Maintenance Procedures - Maintenance procedures provide instructions which ensure that electrical and mechanical maintenance work is performed safely and correctly.* These procedures are prepared and implemented by
5 the maintenance group under the supervision of the Mechanical and Electrical Maintenance Supervisors.

g) Material Control Procedures - Information concerning these procedures is presented in Section 17.2.

h) Plant Security Procedures - Information concerning these procedures is presented in Section 13.6.

*These procedures will vary from simple ones that are within the skill of the
5 craftsman, to steps from a technical manual, to step by step instructions for complex procedures. The complexity of the procedure will be based upon the complexity of the task to be performed.

Applicants' Exhibit ______
Joint Intervenors' Contention I
Docket No. 50-400

Shearon Harris Nuclear Power Plant
Final Safety Analysis Report
Sections 14.2.2.2, 14.2.3 - 14.2.12.1.7
and 14.2.12

14.2.2 ORGANIZATION AND STAFFING

The CP&L Start-Up Group is responsible for scheduling and executing the Initial Test Program. This includes coordinating the various groups having start-up responsibilities, preparation of necessary test procedures, and directing the tests performed. The Start-up Group reports to the Superintendent - Start-up, who is responsible to the CP&L Vice President - Nuclear Operations through the Manager - Plant Operations and General Manager - Harris Plant for all start-up activities.

Various organizations and their start-up responsibilities are discussed below:

14.2.2.1 SHNPP Plant Staff

The plant staff participates to the extent possible in the Initial Test Program. Areas in which the staff will directly participate are as follows:

a) Operating Plant Equipment - The plant operations staff is responsible for operating plant equipment as required to support the testing program. Operations personnel shall be assigned to perform equipment lineups, take data, clear equipment, and operate equipment for Start-up Engineers directing tests.

b) Maintaining Plant Equipment - The plant maintenance personnel are responsible for maintaining plant equipment after equipment release to start-up from Construction.

c) Preparing Operating and Maintenance Procedures and Instructions - The various plant groups prepare their sections of the Plant Operating Manual. This manual contains the necessary plant operating, maintenance, and administrative procedures for the plant. These procedures are approved and used to the extent possible during the Initial Test Program.

d) Performing Component Testing and Calibration - The plant maintenance staff performs initial checkout, testing, and calibration of equipment using approved plant maintenance instructions under the Start-up Engineer's direction.

e) Performing Preoperational and Start-up Testing - On a selective basis, members of the plant's technical staff are assigned to the Start-up Group to perform as Start-up Engineers.

14.2.2.2 CP&L Start-up Group

The SHNPP Start-up Group is responsible for the Initial Test Program, including directing and coordinating all groups having start-up responsibilities. The Superintendent - Start-up is responsible for directing the Start-up Group. He will also interface with the other participating groups to ensure that responsibilities are carried out in a timely manner to support the start-up schedule. Responsibilities and authority of the Plant Start-up organization are as follows:

a) <u>Superintendent - Start-up</u>

1) Supervise the activities of the Startup Group through the Start-up Supervisors.

2) Prepare and update the start-up schedule.

3) Assign overall test responsibility to the Start-up Supervisors.

4) Review and approve requests for vendor assistance as recommended by the Start-up Group.

5) Review and approve/recommend approval of test procedures, test procedure modifications, and test data in accordance with the Start-up Manual instructions.

6) Review and recommend approval of start-up requests for construction and engineering modifications or changes required during the test program.

7) Issue periodic progress reports and work schedules for the Start-up Group.

8) Issue special reports concerning start-up activities as deemed necessary.

9) Review progress of start-up activities with contractors, vendors, and company management.

10) Maintain liaison with the plant management, keeping them informed of the test program status, and coordinate with them the activities of plant personnel assigned to start-up activities in conjunction with their training program.

11) Represent the Start-up Group on interdepartmental and interorganizational committees associated with the test program.

12) Maintain liaison with contractors and vendors to coordinate their activities relating to the test program.

13) Responsible for the preparation and maintenance of the Start-up Manual.

14) Accept Release for Tests and System Turnovers from CP&L Construction.

b) Start-up Supervisor

1) Assign a cognizant Start-up Engineer for each test identified to be required on assigned systems, and periodically review test assignments to maintain an even distribution of work load.

2) Supervise the activities of and provide guidance to the Start-up Engineers reporting to him and assure that their operations are conducted in accordance with SHNPP Start-up Manual instructions.

3) Supervise the preparation of test procedures as assigned to the individual Engineer.

4) Provide technical guidance and assistance in the preparation of test procedures.

5) Recommend plant scheduling changes as necessary to support the testing effort.

6) Review and recommend approval of test procedures, test procedure modifications, and test data in accordance with the Start-up Manual procedures.

7) Recommend approval of and schedule vendor representative assistance.

8) Recommend changes in plant design and/or construction to facilitate testing, operation, and maintenance.

9) Review periodic progress reports and work schedules.

10) Assist in the preparation of special reports concerning start-up activities when required.

c) Start-up Engineer

1) Conduct all work assignments in accordance with the Start-up Manual and other Start-up procedures/ instructions.

2) Prepare and recommend for approval-assigned test procedures.

3) Conduct all assigned tests and prepare test eports.

4) Review engineering drawings and documents and prepare requests for construction and engineering changes to facilitate both operation and maintenance.

5) Recommend approval of system Release For Tests.

6) Define system and subsystem Release For Test boundaries.

7) Conduct an inspection of assigned systems prior to system Release For Test acceptance and recommend the acceptance of systems from construction for testing.

8) Coordinate and supervise activities of personnel assigned to support the test program.

14.2.2.3 Ebasco Services, Inc.

Ebasco Services, under the direction of CP&L is the architect-engineer for the SHNPP. As the design organization, they may participate in resolution of engineering-design problems discovered during checkout and testing.

14.2.2.4 Westinghouse Electric Corporation

Westinghouse on-site personnel will provide technical assistance and act as technical liaison with the Westinghouse design organizations to resolve problems within Westinghouse scope. The Westinghouse Site Manager shall review and recommend approval of all NSSS test procedures to the Start-up Superintendent.

14.2.2.5 Personnel Qualifications

Personnel qualifications are discussed in Chapter 13.

14.2.3 TEST PROCEDURES

14.2.3.1 Preoperational Tests

The preoperational test procedures are those procedures required to demonstrate, to the extent practical, the capability of structures, systems, and components, to meet their design criteria to support fuel loading. These procedures are written by the responsible SHNPP Start-up Engineer. The Start-up Engineer utilizes the system/component design documents, FSAR, Architect-Engineer supplied design criteria, applicable codes and standards, and the NRC Regulatory Guides in preparing the procedures.

To ensure that procedures and test results demonstrate the capability of each system to perform its design basis, the procedures and results are reviewed and approved by a Joint Test Group (JTG). Approval shall be by unanimous concurrence of the JTG members which include a representative from the Start-up Group, Operations Group, and Nuclear Plant Engineering Department. The JTG may meet and act as a committee or may review and approve written submittals at the discretion of the members.

14.2.3.2 Start-up Power Tests

The Start-up Power Tests consist of those tests performed during and following fuel loading. These include fuel loading, precritical tests, initial criticality, low-power testing, and power-ascension tests that confirm design bases and anticipated plant operation. The test specifications are provided by Westinghouse and the procedures written by the SHNPP Start-up Group.

Since Start-up Power Tests are performed following fuel loading and under requirements of the Technical Specifications and Plant Operating Manual, procedures and test results approvals are different than approvals for preoperational tests. Procedures and test results will be reviewed and approval recommended by representatives of the Start-up Group, Westinghouse (NSS only), and the Nuclear Safety Review Committee (Refer to Section 6 of the Technical Specifications). Final approval will be by the Manager-Operations.

14.2.3.3 Procedure Format

Format for the test procedures is established by the SHNPP Start-up Manual. Test procedures will contain the following information as applicable: (Not necessarily in the order listed below)

1.0 Purpose/Objective

This consists of a brief description of the test performance parameters and characteristics to be verified. It should include the purpose for which the procedure is intended.

2.0 Acceptance Criteria

Contains the general qualitative acceptance criteria against which success or failure will be judged.

3.0 References

References include all supporting information required to perform the test and used to develop the test procedure.

4.0 Test Equipment and Personnel

Contains a list of test equipment that will be required to perform the test. This would include special recorders, test panels, gauges, temporary test instruments, etc. Any special personnel needed and their required qualifications should be included.

5.0 Precautions

Special precautions, which are needed for safety of personnel or equipment to ensure a reliable test, are highlighted and clearly described in the test procedure. These precautions may include limitations to be observed during testing and possible problems to watch for. If appropriate, precautions are repeated in the text before the step to which they apply.

6.0 Prerequisites and Initial Conditions

Each test for the operation of a system, normally requires that certain activities be performed first, e.g. completion of construction, construction and/or preliminary tests, instrument calibration, component checkout, relief valves set, valve and electrical lineups completed, etc. These independent actions serve to establish the initial conditions required to begin the Test Procedure Section.

7.0 Test Procedure

Detailed step-by-step instructions in the degree of detail necessary for performing a required function or task are provided. Data is recorded in the procedure itself if possible. Steps to ensure the system is restored to normal configuration are provided.

8.0 Checkoff and Data Sheets

8.1 Valve Lineup Sheets (Preoperational Tests Only)

These sheets specify the initial position of all valves in the system being tested.

8.2 Electrical Lineup Sheets (Preoperational Tests Only)

These sheets specify the initial position of all circuit breakers, switches, and electrical controls associated with the system being tested.

8.3 Data Sheets

Any data sheets used shall be placed in this section.

14.2.4 CONDUCT OF THE TEST PROGRAM

14.2.4.1 Administrative Controls

Administrative control of the SHNPP Test Program is maintained by use of approved test procedures. A Start-up Engineer directs each test and verifies by procedure sign-off that the test has been satisfactorily completed. These signed-off procedures will be maintained to document the program.

The signed-off individual procedures assure that the required prerequisites have been met prior to proceeding with the next phase of the test program.

Prerequisites prior to performing start-up power testing are:

a) All preoperational tests listed in Section 14.2.12 should be completed to the satisfaction of Westinghouse and CP&L. Any test exceptions are documented on an Exception List and approved by the General Manager - Harris Plant prior to commencing the Start-up Program.

b) Plant system operation verification is completed to the satisfaction of CP&L and Westinghouse.

c) The NRC has issued a Unit Operating License.

d) Individual Start-up Test prerequisites are verified complete. (See 14.2.12 for general prerequisites).

14.2.4.2 Maintenance/Modification Procedure

Prior to system release for test acceptance by CP&L Start-up, all preventive maintenance is performed by CP&L Nuclear Plant Construction Department in accordance with their procedures. After the system has been released to Start-up, the plant's maintenance staff is responsible for preventive and routine plant maintenance. These programs are established and operated in accordance with the CP&L Maintenance Management Program. To ensure personnel safety and system integrity, any maintenance performed on the system must be initiated thru and controlled by the start-up engineer and shift foreman.

Other work which is required after Release For Tests have been accepted includes clearing exceptions and installing design changes or modifications. In order to assure necessary start-up retesting is completed, this type of work is controlled. The start-up engineer must sign-off that work has been completed and the necessary retesting has been accomplished. Design or engineering changes requested by the Start-up Group or by anyone other than the originating design organization are submitted and approved using the appropriate Start-up Manual Procedure.

14.2.4.3 Test Performance

The Start-up Engineer directs the tests and verifies that tests are performed using approved procedures only. If during the test execution the procedure is found to be incorrect, the Start-up Engineer is responsible for obtaining the necessary revision approval prior to proceeding with that portion of the test procedure.

All revisions are approved prior to test acceptance in the same manner as the original procedure. Revisions may be temporarily approved by CP&L approving authority on the original procedure to allow the testing to continue. However, temporary revisions must be approved in the same manner as the original procedure prior to acceptance and final approval of the test.

14.2.5 REVIEW, EVALUATION, AND APPROVAL OF TEST RESULTS

14.2.5.1 Preoperational Tests

Upon completing the preoperational test, the Start-up Engineer reviews the test results and writes a test report. The test report addresses any exceptions or deficiencies and recommendations to correct these, if necessary. The completed preoperational test procedure, results, and test report is then recommended for approval and approved in the same manner as the original procedure.

The preoperational test phase is considered complete when all necessary tests as outlined in Section 14.2.12 have been completed, results approved, and all outstanding preoperational test exceptions have been resolved.

14.2.5.2 Start-up Power Tests

As portions of the Start-up Power Test Procedures are completed during power ascension testing, the results will be reviewed against the acceptance criteria. At completion of testing at a power level, the results will be reviewed and approved in the same manner as the original procedure. Recommendation to proceed to the next power level will be given by the Manager-Operations and Manager-Plant Operations to the General Manager. Approval to proceed to the next power level is given by the General Manager.

Upon completion of the complete Start-up Power Test procedure, a report will be written on each procedure results and any outstanding exceptions. The completed procedures, results, and test report will then be recommended for approval and approved in the same manner as the original procedure.

14.2.6 TEST RECORDS

The records of the individual preoperational and startup tests are completed and filed for the life of the plant. The original copies of completed test procedures with the associted data, including analysis and results of preoperational tests, initial fuel loading, low power tests, and high power tests prior to commercial operation will be maintained in accordance with Carolina Power & Light Company's administrative procedures as described in Section 17.2.17.

14.2.7 CONFORMANCE OF TEST PROGRAMS WITH REGULATORY GUIDES

The following applicable regulatory guides will be used as guidance in development of the initial test program:

a) Regulatory Guide 1.20, May, 1976, Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing.

b) Regulatory Guide 1.37, March, 1973, Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Plants.

c) Regulatory Guide 1.41, March, 1973, Preoperational Testing of Redundant On-Site Electric Power Systems to Verify Proper Load Group Assignments.

d) Regulatory Guide 1.52, Rev. 2, March, 1978, Design, Testing, and Maintenance Criteria for Engineered - Safety - Feature Atmosphere Cleanup System Air Filtration and Absorption Units of Light-Water-Cooled Nuclear Power Plants.

e) Regulatory Guide 1.68, August, 1979, Initial Test Programs for Water-Cooled Nuclear Power Plants.

f) Regulatory Guide 1.68.2, July, 1978, Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants.

g) Regulatory Guide 1.79, September, 1975, Preoperational Testing of Emergency Core Cooling Systems for Pressurized Water Reactors with the following clarifications/exceptions:

Reg. Position	Clarifications/Exceptions	
C.1.b.(2)	The capability to realign valves for recirculation shall be tested for the plant. Test of a recirculation sump to demonstrate vortex control, acceptable pressure drops across suction lines and valves, and adequate NPSH will be conducted for the plant by model tests. CP&L will verify by appropriate physical examination and flow demonstration test that recirculation sump suction lines are not obstructed and that valves are properly installed.	15 15 15

C.1.c.(1) Blowdown will be into the open reactor vessel at ambient pressure. This condition will allow the rapid accumulator dump which is necessary for evaluation of the system performance. Accumulator pressure will be less than normal operation pressure.

C.1.c.(3) Initial RCS pressure for this test will be greater than the normal accumulator precharge pressure but less than the normal RCS operating pressure. Flow will be injected through a test line from the hydro pump and will not come from the accumulator discharge.

h) Regulatory Guide 1.68.3, April, 1982, Preoperational Testing of Instrument and Control Air Systems.

7 i) Regulatory Guide 1.95, Revision 1, January, 1977, Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release.

7 j) Regulatory Guide 1.140, Revision 1, October 1979, Design, Testing, and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light - Water - Cooled Nuclear Power Plants.

k) Regulatory Guide 1.108, Revision 1, August, 1977, Periodic Testing of Diesel Generator Units Used as On-site Electric Power Systems at Nuclear Power Plants.

14.2.8 UTILIZATION OF REACTOR OPERATING AND TESTING EXPERIENCE DEVELOPMENT OF TEST PROGRAMS

The CP&L SHNPP Initial Test Program will utilize information gained from operating and testing experiance in other similar nuclear plants. This information is used to provide guidance in developing test procedures and schedules and to alert personnel to potential problem areas in the testing program.

The development of this program for utilizing testing and operating experience is the responsibility of the Superintendent - Start-Up with the direct implementation of the program being delegated to the Start-Up Supervisor.

Information regarding operating and testing experiences will be obtained from NRC Licensee Event Report summaries. These reports are reviewed by the start-up organization to identify adverse trends or special testing which should be included in the test program.

The operating experience program consists of an initial review to be conducted prior to the conduct of preoperational tests and an ongoing review during the remainder of the test program. The initial review examines pertinent operating data and abnormal events on similar plants which occurred during a period of two years prior to the review. The review is conducted so as to allow sufficient time for data to be analyzed and incorporated in test procedures. Any new information will be reviewed on a regular basis during the test program so as to address current testing problems.

14.2.9 TRIAL USE OF PLANT OPERATING AND EMERGENCY PROCEDURES

The plant procedures that are used or referenced during the preoperational and start-up test programs are plant operating procedures and instructions, maintenance procedures, chemistry procedures, radiation protection procedures, and emergency instructions.

The adequacy of plant operating and emergency procedures is checked to the maximum extent possible during the preoperational and start-up test programs. Where plant conditions meet the prerequisties of a plant procedure, the plant procedure is followed during preoperational and start-testing. Where plant conditions do not meet the prerequisites of the plant procedure, then applicable portions of the plant procedure are referenced or incorporated in the preoperational and/or start-up procedure. This will assure that these procedures are correct, safe, and usable when the plant is ready for commercial operation.

Plant procedures are prepared by plant personnel with assistance of other qualified personnel. The procedure is tested and revised, as necessary, during on-site training of plant personnel and the performance of preoperational and start-up test programs.

14.2.10 INITIAL FUEL LOAD AND INITIAL CRITICALITY

Fuel loading begins when prerequisite system tests and operations are satisfactorily completed and the facility operating licenses are obtained. Upon completion of fuel loading, the reactor upper internals and pressure vessel head are installed and additional mechanical and electrical tests are performed. The purpose of this phase of activities is to prepare the system for nuclear operation and to establish that design requirements necessary for operation are achieved. The core loading and post loading tests are described below.

14.2.10.1 Initial Fuel Load

The overall responsibility and direction for initial core loading is exercised by the General Manager - Harris Plant. The overall process of initial core loading is, in general, directed from the operating floor of the Containment Building. Procedures for the control of personnel and the maintenance of containment security are established prior to fuel loading.

The as-loaded core configuration is specified as part of the core design studies conducted in advance of Unit startup.

The core is loaded in the reactor vessel and submerged in water containing enough dissolved boric acid to maintain a calculated core effective multiplication factor of 0.90 or lower. The fuel transfer tube is flooded, but the remainder of the refueling cavity is dry during initial core loading. Core moderator chemistry conditions (particularly boron concentration) are prescribed in the core loading procedure document and are verified periodically by chemical analysis of moderator samples taken prior to and during core loading operation. 11

Core loading instrumentation consists of two permanently installed source range (pulse type) nuclear channels, two temporary incore source range channels, and a third temporary channel which can be used as a spare. The permanent channels are monitored in the Control Room by licensed operators; the temporary channels are installed in the Containment Building and are monitored by reactor engineering personnel. At least one permanent channel is equipped with an audible count rate indicator. Both unit channels have the capability of displaying the neutron flux level on strip chart recorders. The temporary channels indicate on rate meters with a minimum of 1 channel recorded on a strip chart recorder. Minimum count rates of two counts per second, attributable to core neutrons, are required on at least two of the four (i.e., 2 temporary and 2 permanent source range detectors) available nuclear source channels at all times following installation of the first source.

The temporary fuel loading source range detectors and the permanently installed source range channels will be calibrated prior to fuel loading. The calibration is performed using a portable neutron source with provisions for positioning the source near the detectors. The neutron response of each detector must be checked following any delay in the fuel loading of eight hours or longer.

Temporary neutron sources are introduced into the core at appropriate specified points in the core loading program to ensure a neutron population corresponding to a minimum count rate of 2 counts/sec for adequate monitoring of the core.

Fuel assemblies together with inserted components (control rod assemblies, burnable poison inserts, source spider, or thimble plugging devices) are placed in the reactor vessel one at a time according to a previously established and approved sequence which was developed to provide reliable core monitoring with minimum possibility of core mechanical damage. The core loading procedure documents include a detailed tabular check sheet which specified inserts from its initial position in the storage racks to its final position in the core. Multiple checks are made of component serial numbers and types at successive transfer points to guard against possible inadvertent exchanges or substitutions of components, and at least 2 fuel assembly status boards are maintained throughout the core loading operation.

An initial nucleus of eight assemblies, the first of which contains an activated neutron source, is the minimum source-fuel nucleus which permits subsequent meaningful inverse count rate monitoring. This initial nucleus is determined by calculation and previous experience to be markedly subcritical ($k_{eff} \leq 0.90$) under the required conditions of loading.

Each subsequent fuel addition is accompanied by detailed neutron count rate monitoring to determine that the just loaded fuel assembly does not excessively increase the count rate and that the extrapolated inverse count ratio is not decreasing for unexplained reasons. The results of each loading step are evaluated by CP&L and its technical advisors before the next prescribed step is started.

Criteria for safe loading require that loading operations stop immediately if:

a) An unanticipated increase in the neutron count rates by a factor of 2 occurs on all responding nuclear channels during any single loading step after the initial nucleus of 8 fuel assemblies is loaded (excluding anticipated change due to detector and/or source movement).

b) The neutron count rate on any individual nuclear channel increases by a factor of five during any single loading step after the initial nucleus of 8 fuel assemblies is loaded (excluding anticipated changes due to detector and/or source movements).

4 An alarm in the Containment and Control Room is coupled to the source range channels with a set-point at five times the count rate on either channel. This alarm automatically alerts the loading operation to an indication of high count rate and requires an immediate stop of all operations until the situation is evaluated by the applicant. Normally the alarm used for this purpose is the containment evacuation alarm. In the event the evacuation alarm is actuated during core loading and after it has been determined that no hazards to personnel exist, special preselected personnel are permitted to remain in the Containment to evaluate the cause and determine future action.

Core loading procedures specify alignment of fluid systems to prevent inadvertent dilution of the reactor coolant, restrict the movement of fuel to preclude the possibility of mechanical damage, prescribe the conditions under which loading can proceed, identify chains of responsibility and authority, and provide for continuous and complete fuel and core component accountability.

14.2.10.2 Initial Criticality

The approach to initial criticality will be conducted according to approved written procedures which specify the plant conditions, safety and precautionary measures, and specific instructions. The procedures also delineate the chains of responsibility and authority in effect during this period of operation. Alignment of the fluid systems is specified to provide controlled "start" and "stop" as well as adjustments of the rate of the approach to criticality.

Initial criticality is achieved by reactor coolant system (RCS) boron concentration reduction, and by withdrawal of control rods.

Inverse count-rate ratio monitoring, using data from the normal plant source-range instrumentation, is used as an indication of the proximity and rate of approach to criticality. Inverse count-rate ratio data are plotted as a function of rod bank position during rod motion and as a function of primary water addition during RCS boron concentration reduction.

A source range count rate of at least 2 cps will be visible on the start-up channels, and the signal to noise ratio will be known to be greater than 2 prior to commencing start-up.

Initially, the shutdown and control banks of control rods are withdrawn incrementally in the normal withdrawal sequence, leaving the last withdrawn control bank inserted far enough in the core to provide effective control when criticality is achieved.

The boron concentration in the RCS is then reduced by the addition of primary water. Criticality is achieved during boron dilution or by subsequent rod withdrawal following boron dilution. The rate of primary water addition, and hence the rate of approach to criticality, may be reduced as the reactor approaches criticality to ensure that effective control is maintained. Throughout this period, samples of the reactor coolant are obtained and analyzed for boron concentration.

Written procedures specify plant conditions, precautions, and specific instructions for the approach to criticality.

Successive stages of control rod assembly group withdrawal and of boron concentration reduction will be monitored by observing changes in neutron count rate, as indicated by the permanent source-range nuclear instrumentation, as functions of group position during rod motion, reactor coolant boron concentration, and primary water addition to the RCS during dilution. Throughout this period, samples of the reactor coolant will be obtained and analyzed for boron concentration.

Inverse count-rate ratio monitoring will be used as an indication of the proximity and rate of approach to criticality during control rod assembly group withdrawal and during reactor coolant boron dilution. The rate of approach will be reduced as the reactor approaches the time extrapolated for criticality to ensure that the approach to criticality will be less than one decade per minute. Criticality predictions for boron concentration and control rod positions will be provided and criteria as well as actions to be taken will be established if actual plant conditions deviate from predicted values.

14.2.10.3 Low Power Testing

Following initial criticality, a program of reactor physics measurements will be undertaken to verify that the basic static and kinetic characteristics of the core are as expected and that the values of the kinetic coefficients assumed in the safeguards analysis are conservative.

Procedures will specify the sequence of tests and measurements to be continued and the conditions under which each is to be performed in order to ensure both safety of operation and the validity and consistency of the results obtained. If test results deviate significantly from design predictions, if unacceptable behavior is revealed, or if unexplained anomalies develop, the plant will be brought to a safe, stable condition and the situation reviewed to determine the course of subsequent plant operation.

These measurements will be made at low power and primarily at or near normal operating temperature and pressure. Measurements will be made in order to verify the calculated values of control rod bank reactivity worths, the isothermal temperature coefficient under various core conditions, differential boron concentration reactivity worth, and critical boron concentrations as functions of control rod configuration. In addition, measurements of the relative power distributions will be made, and a concurrent test will be conducted on the instrumentation including the source and intermediate range nuclear channels. The test will verify that a minimum of a half decade overlap has been established for these channels.

14.2.10.4 Power Level Escalation

When the operating characteristics of the Unit are verified by low power testing, a program of power level escalation in successive stages brings the Unit to its full rated power level. Both reactor and balance of plant operational characteristics are closely examined at each stage and the relevance of the safety analysis verified before escalation to the next programmed level is effected.

Measurements are made to determine the relative power distribution in the core as functions of power level and control assembly group position.

Secondary system heat balances ensure that the several indications of power level are consistent and provide bases for calibration of the power range nuclear channels. The ability of the Reactor Protection System to respond effectively to signals from primary and secondary instrumentation under a variety of conditions encountered in normal operations is verified.

At prescribed power levels the dynamic response characteristics of the Reactor Coolant and Main Steam Supply Systems are evaluated. The responses of system components are measured for design step and ramp changes in load, turbine trip, and trip of a single control rod assembly.

Adequacy of radiation shielding is verified by neutron and gamma radiation 4
surveys inside the Containment and throughout the plant.

The sequence of tests, measurements, and intervening operations will be prescribed in the power escalation procedures.

14.2.11 TEST PROGRAM SCHEDULE

The sequential schedule for the preoperational testing of individual systems and components based on fuel loading date is shown in Figure 14.2.11-1. The sequential schedule for initial startup performed subsequent to fuel loading is shown in Figure 14.2.11-2. These schedules show certain milestones at which time the tests, or portions of test, will be completed and the overall time frame in which the test will be conducted. Detailed schedules for the test program will be developed on a continuing basis as plant completion progresses.

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Station structures, systems, and components which are relied upon to prevent or mitigate consequences of postulated accidents will be fully tested to the maximum extent practicable prior to fuel load. Certain systems will have part of the preoperational testing performed after fuel load due to system configuration (e.g. Control Rod Drive Mechanism, Automatic Reactor Control, In-core Moveable Detectors). Such systems will be adequately tested prior to fuel load to provide reasonable assurance of proper operation after fuel load.

The preparation of test procedures for a particular system will be scheduled to support the fuel loading date. Preoperational procedures preparation will be started approximately 36 months prior to fuel load or the earliest date consistent with the availability of approved reference information. These procedures should be available for review by required personnel 60 days prior to use.

It is planned to have approved initial start-up procedures available for review by required personnel at least 60-days prior to fuel loading.

14.2.12 INDIVIDUAL TEST DESCRIPTIONS

These summaries describe the various tests which are specified as preoperational tests and start-up tests in Regulatory Guide 1.68. Preoperational tests must be completed before fuel loading, and start-up tests must be completed after fuel loading. The scope and titles of these summaries may not in all cases correspond directly to the actual test procedures which will be used during the two test programs. Certain test procedures may include more than one test as described in these summaries, and in some cases, tests described in one summary may be covered under more than one procedure. The overall scope and content of the tests described in these summaries will be addressed in final procedures. It should be noted that all system acceptance tests are designated as preoperational tests, but only those tests listed in Section 14.2.12.1 must be completed prior to fuel loading. The test program will include those features designed to prevent or mitigate anticipated transients without scram (ATWS) that will be incorporated into the SHNPP design.

4.2.12.1 Preoperational Test Summaries

The following is an index of preoperational test summaries described in this Section:

1. Heat Tracing and Freeze Protection Test Summary
2. Main, Auxiliary and Start-Up Transformers Test Summary
3. 6.9 kV Switchgear Test Summary
4. 480 V AC Distribution Test Summary
5. 120 V ESF Uninterruptible AC System Test Summary 11
6. Class 1E DC System Test Summary
7. Normal Emergency AC/DC Lighting Systems Test Summary
8. Communications System Test Summary
9. Annunciator System Test Summary
10. Reactor Protection System Engineered Safety Features Actuation Logic Test Summary
11. Reactor Protection System Engineered Safety Features Actuation Test Summary
12. Piping Vibration Test Summary
13. Metal Impact Monitoring System Test Summary
14. Radiation Monitoring System Test Summary
15. Excore Nuclear Instrumentation System Test Summary
16. Emergency Diesel Generator Test Summary