LILCO
LONG ISLAND LIGHTING COMPANY

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April 22, 1981

SNRC-558

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Proposed Revision to FSAR
Chapter 13.1 and Appendix 13A
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Dear Mr. Denton:

Enclosed are fifteen copies of a proposed revision to Shoreham FSAR Chapter 13.1 and Appendix 13A. This information is being forwarded to facilitate the staff's review of SER Open Item 51, Management Organization.

We anticipate amending the FSAR with the enclosed proposed revisions in May 1981.

Very truly yours,

J. P. Novarro

J. P. Novarro
Project Manager
Shoreham Nuclear Power Station

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Enclosures

cc: J. Higgins

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CHAPTER 13

CONDUCT OF OPERATIONS

13.1 ORGANIZATIONAL STRUCTURE OF APPLICANT

13.1.1 Corporate Organization

The Shoreham Nuclear Power Station (SNPS) is solely owned by the Long Island Lighting Company (LILCO), an investor-owned public utility incorporated in the State of New York. LILCO is responsible for the design, construction, and operation of the Shoreham Station.

LILCO has established an integrated organizational structure to provide for the overall management and technical support of the design, construction, licensing, startup and operation of the Shoreham Nuclear Power Station.

Executive responsibility for the management of these functions is exercised through the Vice President-Nuclear. He reports to the Senior Vice President of T&D and Operations who is responsible to the President of the Company. The Vice President-Nuclear has delegated the authority for managing his nuclear responsibilities to the Managers of the Shoreham Project, Shoreham Station, Nuclear Operations Support and Nuclear Engineering. Supplementary technical support is provided to these organizations under the direction of the Vice President-Nuclear by other LILCO departments and divisions through appropriately defined Nuclear Operations Corporate Policies.

As a minimum, the Vice President-Nuclear shall have a bachelors degree in science or an engineering field associated with power production and ten years of experience associated with power plant design and operation, at least five years of which shall be nuclear power plant experience.

The qualifications and experience of the Vice President-Nuclear are presented in Appendix 13A.

The Vice President of Engineering has overall responsibility for corporate engineering services and quality assurance policy. He reports to the Senior Vice President of Engineering and Purchasing who is responsible to the President of the Company. The Vice President of Engineering has delegated the authority for managing the corporate nuclear quality assurance program to the Manager, Quality Assurance Department. On the Shoreham Station organization, the Operating Quality Assurance Engineer is responsible to the Plant Manager as defined in Section 17.2.

Section 17.1 describes the Quality Assurance Program during design, construction and preoperational testing. Section 17.2 describes the program in effect during operations.

The above corporate relationships are depicted on Fig. 13.1.1-1.

13.1.1.1 LILCO Shoreham Project Organization

The Vice President-Nuclear, has delegated the authority for managing the engineering, licensing, startup and construction aspects of the Company's nuclear program to the Manager, Shoreham Project.

The Manager, Shoreham Project reports directly to the Vice President-Nuclear. Reporting to the Project Manager are:

1. Assistant Project Manager - Engineering and Licensing
2. Assistant Project Manager - Construction
3. Startup Manager

Fig. 13.1.1-2 describes the Shoreham Project Organization. The qualifications and

experience of the key Shoreham Project personnel are presented in Appendix 13A.

The Shoreham Project Manager is responsible for the direction of matters related to project cost control, project schedule, and coordination of all project communications. He has the responsibility to initiate appropriate procedures for engaging outside consultants to conduct and direct those functions in areas of engineering, construction and licensing which he deems essential to fulfill the LILCO responsibility for the design and construction of a safe and reliable power station.

To support the project staff in arriving at the technical and licensing decisions required for the proper execution of the Shoreham Project, the Manager, Shoreham Project has at his disposal the technical expertise of the other nuclear organizations reporting to the Vice President-Nuclear and other LILCO departments and divisions, as required. Engineers and technical personnel from various departments have been assigned to assist the Project Manager's organization as requirements dictate. Direction and coordination of the efforts of these supplementary personnel is the responsibility of the respective Assistant Project or Startup Manager.

Following fuel loading, the technical and engineering expertise gained by Shoreham Project personnel during the design, construction, licensing and preoperating testing of the unit will be utilized to support the operation of the plant. In this manner, the overall qualifications of the nuclear organization will be enhanced by the integration of this experience.

The Manager, Nuclear Engineering provides supplementary support personnel to the Shoreham Project that are trained in nuclear engineering, licensing, radiation protection engineering, nuclear instrumentation, materials engineering, nuclear fuel design, reactor core analysis, and safety analysis. In addition, he has the responsibility to initiate appropriate procedures for engaging consultants and

specialists in specific areas of engineering or science to supplement the capabilities of the Nuclear Engineering Department. This is described in Secton 13.1.1.3.

13.1.1.2 Interrelationships with Contractors and Suppliers and LILCO Shoreham Project Organization

The Shoreham Project Manager is responsible for coordinating and approving plant engineering, design and construction associated with power production systems, structures and equipment.

Stone & Webster (S&W) as the architect-engineer is responsible for the preparation of design concepts, design details, specifications, and drawings in these areas. Final acceptance by LILCO under the direction of the Manager, Shoreham Project is required.

The General Electric Company, as supplier of the nuclear steam supply system, submits drawings and specifications to S&W for interface which are subject to final acceptance by LILCO under the direction of the Manager, Shoreham Project.

The Vice President-Nuclear may request design, engineering and construction support from other LILCO departments and divisions for special projects and studies such as administrative, warehouse and emergency preparedness facilities. Responsibility for the coordination of this support will be established by the Vice President-Nuclear.

Construction of the plant is the responsibility of the Manager, Shoreham Project through the Asst. Project Manager-Construction (UNICO). UNICO is an organization comprised of LILCO and S&W personnel that report to the Asst. Project Manager-Construction. Onsite construction activities are under the direct supervision of the LILCO Asst. Project Manager-Construction.

Preoperational and initial start-up testing is the responsibility of the Startup Manager. He is supported in this area by LILCO test engineers and additional technical

assistance supplied by S&W and GE.

The responsibility of ensuring that equipment suppliers and contractors conform to approved specifications is retained by S&W, although all equipment is procured by LILCO. Conformance is verified through implementation of the quality assurance program described in Section 17.1.

Further information on the corporate organizations and responsibilities of S&W and of GE are contained in Section 1.4.

13.1.1.3 LILCO Technical Support for Shoreham Operations

In addition to the technical and administrative support available as part of the Shoreham Plant staff, technical and administrative support for operation will be provided by the Manager, Nuclear Engineering and the Manager, Nuclear Operations Support and their respective organizations. These Managers report directly to the Vice President-Nuclear. The objective of this supplementary support is to assure that LILCO has the resources to discharge its responsibility for the safe operation of Shoreham Station and to have available a nucleus of personnel to provide timely technical support to the plant staff in the event of an emergency.

As shown on Fig. 13.1.1-3, the Manager, Nuclear Engineering is supported by three divisions, i.e., Nuclear Systems Engineering, Nuclear Licensing, and Nuclear Fuel. These three divisions will have as many staff specialists as required to support initial fuel loading and the safe operation of the plant. The qualifications and experience of the key Nuclear Engineering personnel are presented in Appendix 13A. Technical design and evaluation expertise will be provided in the areas of nuclear instrumentation, nuclear materials engineering, nuclear mechanical engineering, plant modifications, radiation protection and shielding, licensing, NRC compliance, reactor physics, transient analysis, accident analysis, and nuclear fuel management. In

addition to the technical support provided by this staff, various consultants will be utilized as needed when supplementary expertise is required beyond that available within LILCO. The Manager, Nuclear Engineering has the responsibility to engage consultants and specialists in specific areas of engineering or science to supplement the capabilities of the Nuclear Engineering staff.

The Manager, Nuclear Operations Support will have the responsibility for coordination, implementation and direction of appropriate technical and administrative support functions carried out jointly by the Nuclear Operations Support and Nuclear Engineering organizations (i.e., "Engineer-in-Charge" as described in ANS 3.1 draft revision dated 12/6/79). He is responsible directly to the Vice President-Nuclear for the development and administration of corporate policies and procedures required for the management of the nuclear organization and the monitoring of its performance.

As shown in Fig. 13.1.1-4, the Manager, Nuclear Operations Support is supported by three divisions; i.e., Nuclear Regulation, Nuclear Services and Nuclear Records Management. These three divisions will have as many staff specialists as required to support initial fuel loading and the safe operation of the plant. The qualifications and experience of key Nuclear Operations Support personnel are presented in Appendix 13A. Nuclear Operations Support personnel will provide operation, maintenance, technical and administrative expertise for supplementary support functions such as coordination of regulatory activities, long-range outage planning, initiation and evaluation of major projects, cost control, records management and other long-term planning activities. The Nuclear Operations Support organization will be structured to accommodate future tasks which will also require supplemental support.

The Manager, Nuclear Operations Support position will correspond to the responsibilities and qualifications of the "Engineer-in-Charge" as described for guidance in ANS 3.1 draft revision dated 12/6/79. He will have a minimum of a

Bachelor's degree in Engineering or the Physical Sciences and have a minimum of six years of professional level experience in nuclear services, nuclear plant operation, or nuclear engineering. A maximum of two years of the six years of professional experience may be fulfilled by related technical or graduate academic training.

The Nuclear Operations Support supervisors responsible for the Nuclear Regulation or Nuclear Services divisions will have a minimum of a Bachelor's degree in an academic field associated with electric power production or the physical sciences related to electrical energy generation, and six years of experience in power plant operation and/or design.

13.1.2 Operation Organization

13.1.2.1 Station Organization

The Shoreham Nuclear Power Station organization as shown on Fig. 13.1.2-1, 2 and 3 will consist of a minimum of 165 full-time employees functioning in one of 11 main sections reporting through their respective Section Heads to one of three divisions headed by either the Chief Operating Engineer, Chief Technical Engineer, or Technical Support Manager who report to the Plant Manager. The Operating Quality Assurance division reports to the Plant Manager through the Operating Quality Assurance Engineer as described in Section 17.2.

The Operations Section of the station will include a minimum of 32 supervisors and operators, and will be responsible for operation of the station. The station will have a Watch Engineer directing the operations of each shift through the Watch Supervisor, Nuclear Station Operator and Nuclear Assistant Station Operator. The Watch Engineer will report to the Operating Engineer.

The Maintenance Section of the station will have a minimum of 26 men experienced in mechanical and electrical maintenance of large steam-electric generating stations. The force will be supervised by the Maintenance Foreman who in turn reports to the Maintenance Engineer. This number of maintenance personnel will be adequate for normal maintenance, but will be supplemented by additional competent maintenance personnel from other LILCO power stations or organizations, or outside contractors, as may be required.

The technical sections will consist of a Chief Technical Engineer, with a minimum staff of 39 engineers and technicians who will function in the areas of instrumentation and control, reactor physics, conventional chemistry, radiochemistry, radiological protection, fuel management, plus overall reactor coolant system and station performance.

The technical support staff will consist of a Technical Support Manager with a minimum of 8 engineering and technical personnel who will function in the areas of NRC compliance, modification coordination, inservice inspection coordination, document review, and nonroutine testing.

13.1.2.2 Personnel Functions, Responsibilities, and Authorities

The following subsections detail the functions, responsibilities, and authorities of station supervisory personnel. The succession of responsibility and authority for overall operation shall be a follows: Plant Manager, Chief Operating Engineer*, Chief Technical Engineer*, and Operating Engineer. (*Succession shall be as defined in station administrative procedures)

13.1.2.2.1 Plant Manager

The Plant Manager reports to the Vice-President-Nuclear and has direct responsibility for operating the station in a safe, reliable, and efficient manner. He is responsible for offsite radioactive discharges and for the policy of maintaining occupational radiation exposures as low as reasonably achievable (ALARA). He bears the responsibility for compliance with the facility license.

13.1.2.2.2 Chief Operating Engineer

The Chief Operating Engineer reports directly to the Plant Manager and is responsible for the supervision of station operations, training, mechanical and electrical maintenance, administration, and security.

13.1.2.2.3 Chief Technical Engineer

The Chief Technical Engineer reports directly to the Plant Manager and is responsible for the supervision of the technical sections. The Chief Technical Engineer's primary responsibility is to provide technical support in the areas of Nuclear Physics, Radiation Protection, Plant Chemistry, and overall station performance. In addition to

the above, the Chief Technical Engineer is responsible for maintenance, repair, and calibration of station instrumentation and control systems.

13.1.2.2.4 Technical Support Manager

The Technical Support Manager reports directly to the Plant Manager and is responsible for the supervision of the station technical support staff. The Technical Support Manager's primary responsibility is to assist other sections in carrying out their responsibilities by providing support in the areas of regulatory compliance, coordination of station modifications, nonroutine testing, document review and preparation, and liaison with headquarters organizations.

13.1.2.2.5 Operating Engineer

The Operating Engineer reports directly to the Chief Operating Engineer and has the responsibility of directing the actual day-to-day operation of the unit. The Operating Engineer coordinates operation-related maintenance activities with the Maintenance Engineer and Instrumentation and Control Engineer.

13.1.2.2.6 Maintenance Engineer

The Maintenance Engineer reports directly to the Chief Operating Engineer and is responsible for organizing and conducting preventive maintenance and repairs of mechanical and electrical equipment for the station. Operation-related maintenance activities are coordinated with the Operating Engineer.

13.1.2.2.7 Instrument and Control Engineer

The Instrument and Control (I&C) Engineer reports directly to the Chief Technical Engineer and is responsible for the preparation of calibration, surveillance, preventative maintenance, and repair procedures; the testing, repair, and calibration of station instrument and control system; the completion of the instrumentation surveillance program as detailed in the technical specifications; and the training of

technicians engaged in the calibration, maintenance, and testing of instruments and control systems in the nuclear power station.

The Instrument and Control Engineer administers the Measuring and Test Equipment Program, manages the spare parts procurement for instrumentation, and implements the Instrument Record System. In addition, the I&C Engineer coordinates work performed on-site by the Relay Section, and the Meter and Test Department.

13.1.2.2.8 Radiochemistry (RC) Engineer

The RC Engineer reports directly to the Chief Technical Engineer. He is directly responsible for all station chemistry and radiochemistry activities, control and detection of all environmental releases, technical aspects of the radwaste handling systems, and oversight of monitoring of the environment and assessment of radiation doses to the public. The RC Engineer is responsible for the chemistry laboratory, including the counting room, process and effluent radiation monitoring, coordination and technical input to radwaste equipment operation, oversight of environmental monitoring programs, the Off-Site Dose Calculation Manual and the Process Control Program.

13.1.2.2.9 Health Physics (HP) Engineer

The HP Engineer reports directly to the Chief Technical Engineer and directs the Station Health Physics activities. He is responsible for the radiation protection safety of all personnel at the plant, within the guidelines established by regulatory agencies and company policy, and for implementation of the ALARA policy and making it a formal part of the radiation protection program. The HP Engineer supervises the work of plant technicians and personnel assigned for radiation protection. He is responsible for detecting and controlling radiation at the plant. He maintains the Nuclear Material License. He is also responsible for shipment and receipt of all radioactive materials. The HP Engineer provides training programs as required to

assure that plant and temporary personnel are familiar with established HP procedures. He participates in the design, review and modifications of the Radiological Emergency Plan. He is responsible for the emergency preparedness aspects of operating the plant and insures coordination and implementation of the emergency plan effort. The HP Engineer oversees the preparation of Radiation Work Permits and the performance of radiological surveillances including surveys of radiation. He maintains plant records and reports on personnel exposure, radiation surveys and contamination levels. The HP Engineer has the authority for direct contact to the Plant Manager when he believes items concerning plant and public safety are not being observed to established standards.

13.1.2.2.10 Reactor Engineer

The Reactor Engineer reports directly to the Chief Technical Engineer and is responsible for the management of overall plant performance including nuclear, thermal and hydraulic performance of the reactor core, and overall thermal efficiency of balance of plant systems including the Main Turbine-Generator. He is responsible for in-station fuel management including fuel inventory, refueling schedules, fuel warranty and core component refueling pattern. He supplies all current nuclear and thermal information to operating personnel including reactivity coefficients, control rod worths, core physics, core power distributions and stability. He maintains software associated with all plant computer systems. He is responsible for conducting and evaluating testing for post refueling startup testing in compliance with the station surveillance program. He is responsible for the activities of Shift Technical Advisors.

13.1.2.2.11 Training Supervisor

The Training Supervisor reports directly to the Chief Operating Engineer and is responsible for defining the content, establishing and supervising the initial operator

training, operator requalification, and replacement operator training programs. He is also responsible for the content of training programs for all non-licensed station personnel, as well as general employee training.

13.1.2.2.12 Training Instructor

The Training Instructor reports directly to the Training Supervisor and is responsible for preparing training materials and conducting training lectures and examinations in support of assigned station training programs.

13.1.2.2.13 Nuclear Engineer

The Nuclear Engineer reports directly to the Reactor Engineer. His duties are similar to those of the Reactor Engineer.

13.1.2.2.14 Shift Technical Advisor

The Shift Technical Advisor administratively reports to the Reactor Engineer. The prime responsibility of the Shift Technical Advisor is to assist the Watch Engineer in accident assessment and transient analysis. Additional responsibilities of the Shift Technical Advisor include: review of Licensee Event Reports, review of station procedures, evaluation of operating practices, and performance of other relevant functions as assigned.

13.1.2.2.15 Watch Engineer

The Watch Engineer (WE) is responsible for overall operation of the unit during his assigned shift. He reports directly to the Operations Engineer. He directs the activities of station personnel assigned to his shift and is cognizant of maintenance and operations activities being performed while he is on duty. The WE on duty has both the authority and the obligation to shut down the unit if, in his judgement, conditions warrant this action.

13.1.2.2.16 Watch Supervisor

The Watch Supervisor is responsible for the actual operation of the unit during his assigned shift. He reports directly to the Watch Engineer. He directs the activities of the control room operators on his shift and is cognizant of all maintenance activity being performed while he is on duty. The Watch Supervisor on duty has both the authority and the obligation to shut down the unit if, in his judgement, conditions warrant this action.

13.1.2.2.17 Maintenance Foreman

The Maintenance Foreman reports to the Maintenance Engineer and is responsible for the daily supervision of plant maintenance activities related to mechnical and electrical repair and building maintenance. He is responsible for the direct management of the general labor force, and preparation of maintenance history records that demonstrate adherence to quality work standards.

13.1.2.2.18 Plant Administrative Coordinator

The Plant Administrative Coordinator reports directly to the Chief Operating Engineer and is responsible for the administration and direction of the office organization. This includes plant personnel records, plant filing system, office procedures, and reproduction equipment. He administers the flow of correspondence, specifications, and drawings into and out of the plant.

He is responsible for the formulation, reproduction and distribution of procedures for SNPS.

13.1.2.2.19 Site Security Supervisor

The responsibilities of the Site Security Supervisor are described in Section 1.2 of the Security Plan.

13.1.2.3 Nonsupervisory Personnel

13.1.2.3.1 Nuclear Station Operator

The Nuclear Station Operator (NSO) reports directly to the Watch Supervisor and is responsible for operating or supervising the operation of all equipment in the station or substation including the securing and starting of equipment or systems as requested; assisting in reactor fueling and station waste handling operations; and performing operational testing as required.

He is also responsible for supervising and directing Nuclear Assistant Station Operators, Equipment Operators, and other personnel assigned to operations in the performance of their duties, and being responsible for their on-the-job training and satisfactory performance.

He is responsible for recognizing, reporting, and analyzing operating irregularities and assuming the responsibility for acting independently in emergencies when the Watch Supervisor or Watch Engineer are not immediately available. This responsibility shall, when the Watch Supervisor or Watch Engineer are not immediately available, include the authority and obligation to shut down the unit if, in his judgement, conditions warrant this action.

13.1.2.3.2 Nuclear Assistant Station Operator

The Nuclear Assistant Station Operator (NASO) is responsible to the Nuclear Station Operator (NSO) for operating or supervising the operation of all equipment in the station or substation including the starting or securing of equipment or systems as requested; assisting in reactor fueling; assisting in station radioactive waste handling operations; and performing operational testing.

The NASO is responsible for recognizing, reporting, and analyzing operating irregularities and assuming the responsibility for acting independently in emergencies when the Nuclear Station Operator, Watch Supervisor and Watch Engineer are not immediately available.

13.1.2.3.3 Equipment Operator

The Equipment Operator (EO) is responsible to, and operates station auxiliary equipment under, the supervision of the NSO or NASO.

13.1.2.3.4 Technician

Technicians are responsible to the engineer or supervisor to which they are assigned. Technicians perform all types of work associated with installing, maintaining, repairing, and calibrating all station instrumentation and controls for electrical, mechanical, and nuclear systems; perform all phases of water analysis for chemical and radiochemical content; perform radiation surveys; and operate, maintain, and calibrate radiation protection equipment and instrumentation.

13.1.2.3.5 Mechanic

Mechanics are responsible to the Maintenance Foreman for properly installing, inspecting, analyzing, testing, repairing, and maintaining station mechanical and electrical equipment, such as, pumps, heat exchangers, generators, motors, breakers, and power cables. They are also responsible for the preparation or completion of required applicable documentation to support their maintenance activities such as completion of repair and inspection reports on safety related equipment.

13.1.2.3.6 Security Officer

The responsibilities of the security officers are described in Section 1.2 of the Security Plan.

13.1.2.4 Shift Crew Composition

The minimum plant operating shift will consist of one Watch Engineer (SRO), one Watch Supervisor (SRO), one Nuclear Station Operator (RO), one Nuclear Assistant Station Operator (RO), two Equipment Operators (non-licensed) and one Technician trained in health physics/radiochemistry techniques for a total of seven personnel per shift.

During periods when the reactor vessel is fueled and shut down, the minimum plant operation staff will consist of one Watch Engineer (SRO) or Watch Supervisor (SRO), one Nuclear Station Operator (RO) or Nuclear Assistant Station Operator (RO), one Equipment Operator and one Technician for a total of four personnel per shift.

13.1.3 Qualification Requirements for Station Personnel

13.1.3.1 Minimum Qualification Requirements

This section includes the minimum qualification requirements for all responsible station personnel, both supervisory and non-supervisory. ANS 3.1 Draft Revision 12/6/79 was used as guidance in developing these requirements. The following requirements as to experience and licenses will apply at the time of initial fuel loading or when appointed to the active position.

13.1.3.1.1 Plant Manager

The Plant Manager shall have a minimum of 6 years of responsible power plant experience of which at least 3 years will be in nuclear power plant design, construction, start-up, operations, maintenance, or technical services.

During the (3) years of nuclear power plant experience the plant manager shall have participated in the management activities of an operating nuclear power plant during:

1. Two (2) months operation above 20% power,
2. Routine refueling outage (1 to 2 months),
3. Initial plant startup testing or post refueling outage startup testing.

He shall have a 4 year degree in engineering or related scientific field. He shall acquire the experience and training necessary to be examined for the Senior Reactor Operators License but may not be required to hold such a license; or have held a license for a similar unit; or have been certified at the plant or at an appropriate simulator.

13.1.3.1.2 Chief Operating Engineer

The Chief Operating Engineer shall have a minimum of 4 years of responsible power plant experience of which at least 3 years will be in nuclear power plant design,

construction, start-up, operation, maintenance, or technical services.

During the (3) three years of nuclear power plant experience he shall have participated in the management activities of an operating nuclear power plant during:

1. Two (2) months operation above 20% power,
2. Routine refueling outage (1 to 2 months),
3. Initial plant startup testing or post refueling outage start-up testing.

He shall have a 4 year degree in engineering or related scientific field. He shall acquire the experience and training necessary to be examined for the Senior Reactor Operators License but may not be required to hold such a license; or have held a license or NRC SRO Certification for a similar unit; or have been SRO Certified at the plant or at an appropriate simulator.

13.1.3.1.3 Chief Technical Engineer

The Chief Technical Engineer will have a minimum of four (4) years experience in a responsible engineering position of which at least 3 years will be in nuclear power station design, construction, start-up, operation, maintenance, or technical services.

During the (3) three years of nuclear power plant experience he shall have participated in the management activities of an operating nuclear power plant during:

1. Two (2) months operation above 20% power,
2. Routine refueling outage (1 to 2 months),
3. Initial plant startup testing or post refueling outage startup testing.

He shall have a 4 year degree in engineering or related scientific field. He shall acquire the experience and training necessary to be examined for the Senior Reactor Operators License but may not be required to hold such a license; or have a license or NRC SRO Certification for a similar unit; or have been SRO Certified at the plant or at an appropriate simulator.

13.1.3.1.4 Technical Support Manager

The Technical Support Manager will have a minimum of 4 years experience in a responsible engineering position of which at least 1 year will be in nuclear power station design, construction, start-up, operation, maintenance, or technical services. He shall have a four (4) year degree in engineering or related scientific field.

13.1.3.1.5 Operating Quality Assurance Engineer

The Operating Quality Assurance Engineer shall meet the minimum qualifications stated in Section 17.2.1.

13.1.3.1.6 Operating Engineer

The Operating Engineer will have a Bachelor Degree in Engineering or related science. He shall have a minimum of 4 years of responsible power plant experience of which at least three years shall be nuclear power plant experience (design, construction, startup, operations, maintenance, or technical services). A maximum of 2 years of power plant experience may be fulfilled by academic or related technical training, on a one-for-one time basis. During the three years of nuclear power plant experience, the individual shall participate in the operations or technical section activities of an operating nuclear power plant during the following periods:

1. Two (2) months operation above 20% power,
2. Routine refueling outage (1 to 2 months),
3. Initial plant startup testing or post refueling outage startup testing.

The initial Operating Engineer shall be assigned to the site a minimum of 18 months prior to initial fuel loading.

The Operating Engineer shall hold a Senior Reactor Operators License.

13.1.3.1.7 Maintenance Engineer

The Maintenance Engineer shall have a Bachelors Degree in Engineering or related

science. He shall through training or experience have non-destructive testing familiarity, craft knowledge and an understanding of electrical, pressure vessel, and piping codes and standards. He shall have four (4) years of power plant experience of which two (2) years shall be nuclear power plant experience. During the two years, he shall participate at an operating nuclear power plant during the following periods:

1. One (1) month operation above 20% power,
2. Routine refueling outage (1 to 2 months).

The initial Maintenance Engineer shall be assigned to the site 12 months prior to initial fuel loading.

13.1.3.1.8 Reactor Engineer

The Reactor Engineer will have a Bachelor of Science Degree in Engineering or related sciences and at the time of initial core loading will have four (4) years professional level experience of which two (2) years will be nuclear power plant experience. The experience will be in such areas as reactor physics, core measurements, core heat transfer, and core physics testing programs. During the two years the individual will participate in the reactor engineering section activities at an operating nuclear power plant during the following periods:

1. Routine refueling outage fuel handling period,
2. Post refueling outage,
3. Power increase from 10% power to 100% power including stabilization of xenon,
4. Rod sequence exchange,
5. Two (2) weeks operation above 20% power.

13.1.3.1.9 Instrument and Control Engineer

The Instrument and Control Engineer shall have a minimum of two years of experience in the instrument and control field of which at least one year will be associated with nuclear instrumentation.

The Instrument and Control Engineer shall possess a Bachelor of Science Degree in Engineering or related science. He shall have participated in the instrument and control section, section activities at an operating nuclear power plant during the following periods:

1. Surveillance testing and calibration of instruments and controls during a routine refueling outage,
2. Startup preparation testing at the end of a routine refueling outage,
3. Post refueling outage startup testing,
4. One (1) month operation above 20% power.

13.1.3.1.10 Health Physics Engineer

The Health Physics Engineer shall have a Bachelor's Degree in Engineering or Science including formal training in radiation protection. He shall have a minimum of four years of experience in radiation protection of which at least three years of this experience shall be at a nuclear facility. Of these three years, the Health Physics Engineer shall have participated in the radiation protection section of an operating nuclear power plant during the following periods:

1. One (1) month of routine refueling outage,
2. Two (2) months of operations above 20% power,
3. Six (6) months of experience on-site.

He shall have the technical competence to establish radiation protection programs and the supervisory capability to direct the work of engineers, technicians, and journeymen required to implement the radiation protection program.

13.1.3.1.11 Radiochemistry Engineer

The Radiochemistry Engineer will have a minimum of two years experience in chemistry. A minimum of one year will be in radiochemistry at a nuclear power plant. During the one year, the individual shall participate in the chemistry section at an operating

nuclear power plant for three (3) months; no less than two (2) months shall be with the plant operating above 20% power. Successful completion of a chemistry and radiochemistry training program (such as a chemistry and radiochemistry certification program offered by NSS Vendors) may be equivalent to one year's nuclear power plant experience. Six (6) months experience shall be on-site. The RC Engineer shall have a Bachelor's Degree in Engineering or related science.

13.1.3.1.12 Training Supervisor

The Training Supervisor shall have a Bachelor Degree. He shall have four (4) years of professional level experience of which two (2) years shall be nuclear power plant experience. During the two years, he shall have participated in the operations or training section activities of an operating nuclear facility during the following periods:

1. Qualification and/or requalification written and/or oral examination period (1 to 2 months),
2. One (1) month operation above 20% power.

He shall have or shall acquire some training in educational techniques if not included in the Bachelor Degree course material.

Either the Training Supervisor or another individual who holds a Senior Reactor Operator license; or has held a license for a similar unit (BWR); or has been SRO certified at the plant or similar plant, or at an appropriate simulator shall have the responsibility for the content and conduct of the training program for licensed operators.

13.1.3.1.13 Training Instructor

The Training Instructor shall have a high school diploma or equivalent and necessary special education or training to support the materials being presented. He shall have

experience consistent with his instructional duties. He shall have demonstrated by experience or training, knowledge of instructional techniques and be certified by the Training Supervisor as a qualified instructor for the material being presented.

13.1.2.1.14 Nuclear Engineer

The Nuclear Engineer will have a Bachelors Degree in engineering or related science and two (2) years professional level experience, of which one (1) year will be nuclear power plant experience. Six (6) months experience will be on-site.

13.1.3.1.15 Engineer

The Engineer shall have a Bachelor of Science Degree in Engineering or physical sciences, or a high school diploma and 4 years experience in a responsible technical position.

13.1.3.1.16 Watch Engineer

The Watch Engineer shall have a high school diploma or equivalent. He shall have the equivalent of 60 credits (900 classroom hours) in mathematics, reactor physics, chemistry, materials, reactor thermodynamics, fluid mechanics, heat transfer, electrical and reactor control theory; or the equivalent college level education or training as may be deemed appropriate based upon a task analysis for the position (guidance developed by INPO will be utilized for this task analysis); or a Shift Technical Advisor shall be available during his shift. He shall have a minimum of 4 years power plant experience of which a minimum of 2 years will be nuclear power plant operations or maintenance experience. During the two years of nuclear power plant experience, the individual shall participate in reactor operator activities at an operating nuclear power plant during the following periods:

1. Six (6) weeks operation above 20% power,
2. Startup from subcritical to 20% power,
3. Shutdown from above 20% power to cold (<212°F) and subcritical,

4. Startup preparations following a refueling outage.

The Watch Engineer shall hold a Senior Reactor Operators License.

13.1.3.1.17 Watch Supervisor

The Watch Supervisor shall have a high school diploma or equivalent. He shall have the equivalent of 30 credits (450 classroom hours) in mathematics, reactor physics, chemistry, materials, reactor thermodynamics, fluid mechanics, heat transfer, electrical and reactor control theory; or the equivalent college level education or training as may be deemed appropriate based upon a task analysis for the position (guidance developed by INPO will be utilized for this task analysis); or a fully qualified Watch Engineer or Shift Technical Advisor shall be available during his shift. He shall have a minimum of 3 years power plant experience of which 2 years shall be nuclear power plant experience. During the 2 years, the individual shall participate in reactor operator activities at an operating nuclear power plant during 6 weeks operation above 20% power. He shall hold a Senior Reactor Operators License.

13.1.3.1.18 Nuclear Station Operators (NSO)

The Nuclear Station Operator will have a high school diploma or equivalent. They shall have a minimum of three years of power plant experience of which a minimum of one year shall be nuclear power plant experience. This one year of nuclear power plant experience shall include six (6) months of plant operational duties at the power plant. The NSO shall hold a Reactor Operators License.

13.1.3.1.19 Nuclear Assistant Station Operators (NASO)

The Nuclear Assistant Station Operator will have a high school diploma or equivalent. They shall have a minimum of two years of power plant experience of which a minimum of 6 months will be nuclear power plant experience. The Control Room NASO shall hold a Reactor Operators License.

13.1.3.1.20 Equipment Operators

The Equipment Operator will have a high school diploma or equivalent. Equipment Operators whose actions could effect the quality of structures, systems and components important to safety will have one year of power plant experience.

13.1.3.1.21 Maintenance Foremen

Foremen in the above categories will be required to have a high school diploma or equivalent and a minimum of four years of experience in the craft discipline which they supervise, of which one (1) year shall be nuclear power plant experience. This experience may be fulfilled by an equivalent period of related training.

13.1.3.1.22 Mechanics

Mechanics who hold responsible positions shall have a minimum of three (3) years work experience in one or more crafts and shall by experience or training, demonstrate their ability to perform assigned tasks and their knowledge of the significance of these tasks to plant safety.

13.1.3.1.23 Technicians

Technicians will be high school graduates or equivalent. They will have a minimum of three years experience. Of the three years experience, one year may be related technical training, while two years experience will be in their specialty. Of the two year specialty experience, the Health Physics and Radiochemistry technicians will have at least six months hands-on training/experience at a nuclear facility. Technicians will have a thorough knowledge of the design and operation of the equipment related to their field.

13.1.3.1.24 Shift Technical Advisor

The minimum qualifications for the Shift Technical Advisor should enhance the accident assessment function at the plant. The Shift Technical Advisor will possess as a

minimum the equivalent of 60 semester hours of college level studies in mathematics, sciences, engineering, associated diciplines. The Shift Technical Advisor shall receive general employee training and specialized training in thermohydraulics, heat transfer, and accident/transient analysis.

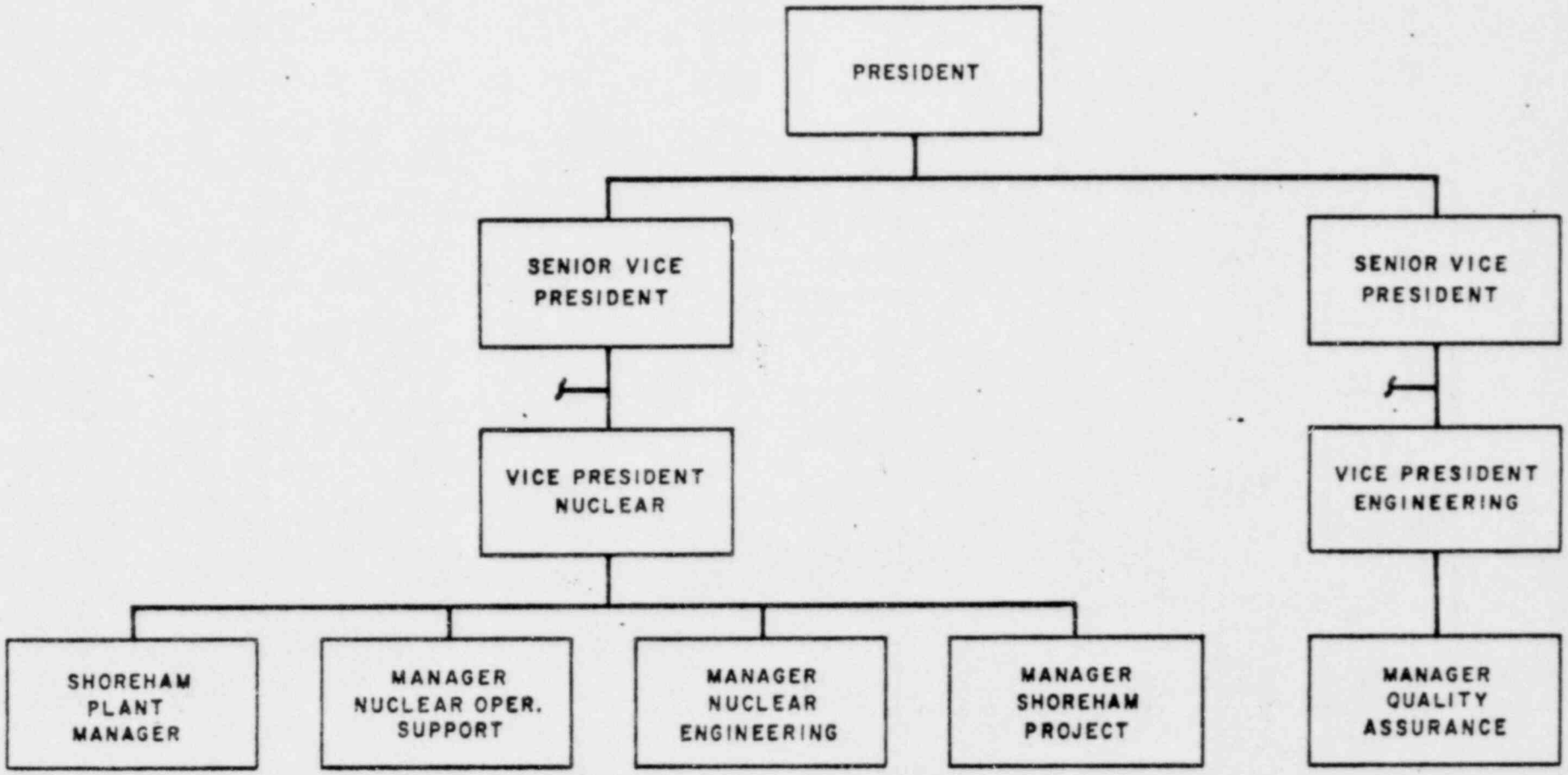

FIGURE 13.1.1-1
DIRECTION OF EXECUTIVE RESPONSIBILITY
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

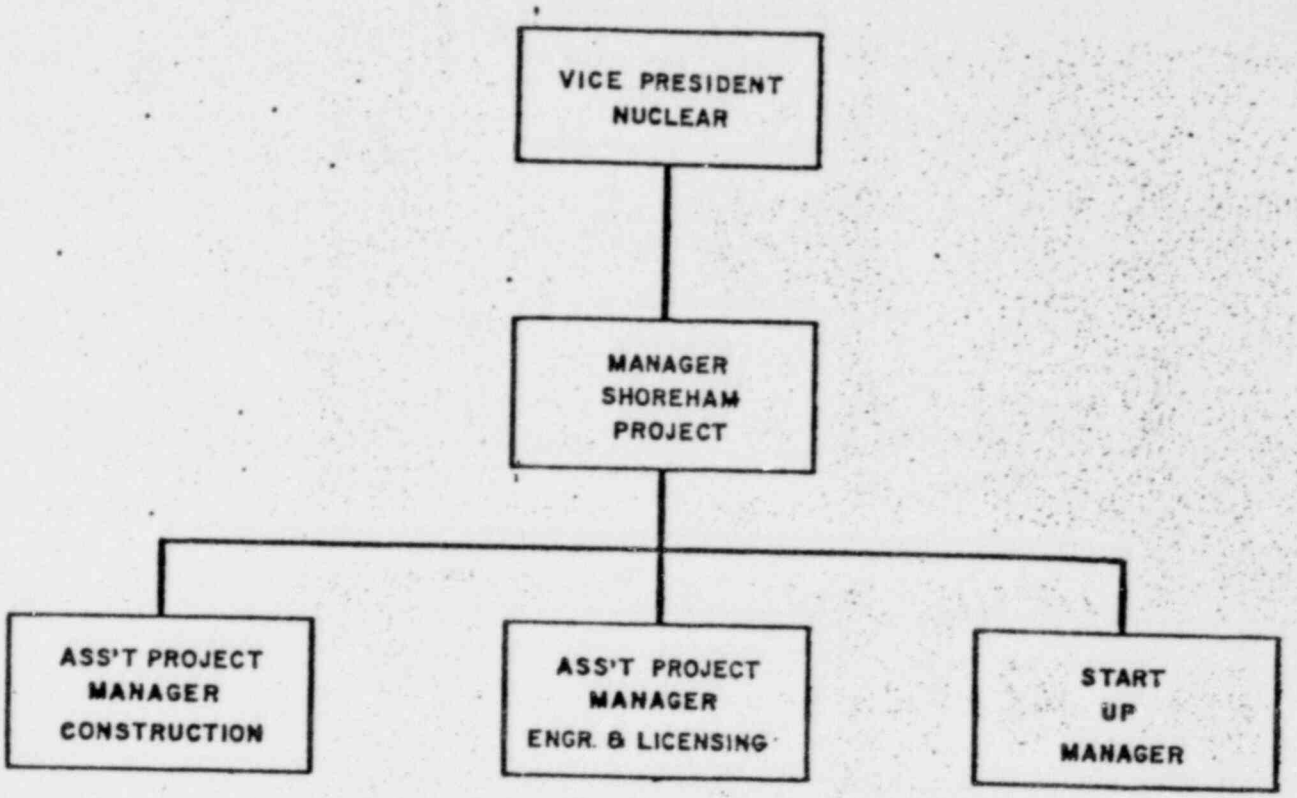

FIGURE 13.1.1-2
SHOREHAM PROJECT ORGANIZATION
SHOREHAM NUCLEAR POWER STATION-UNIT1
FINAL SAFETY ANALYSIS REPORT

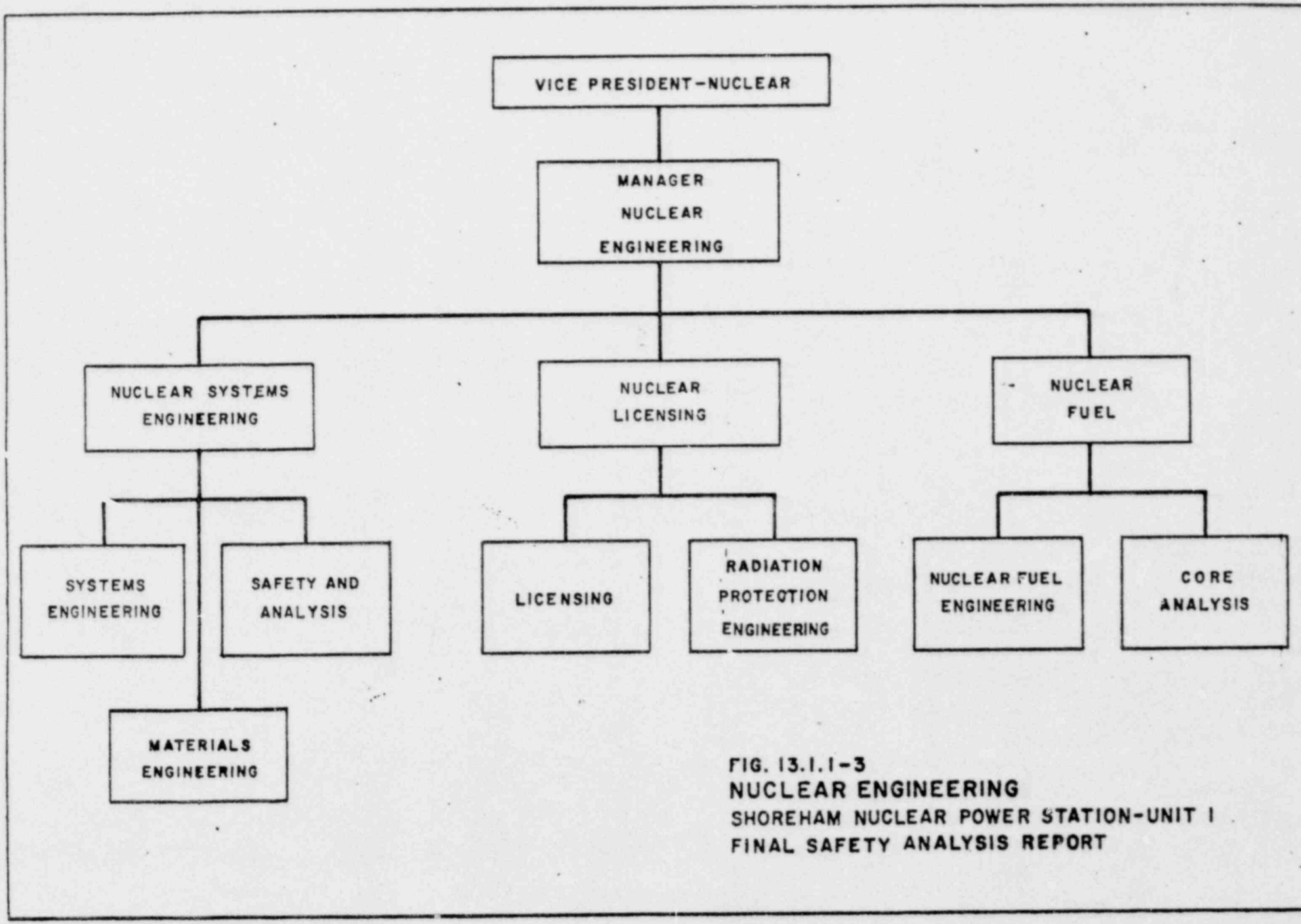

FIG. 13.1.1-3
NUCLEAR ENGINEERING
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT

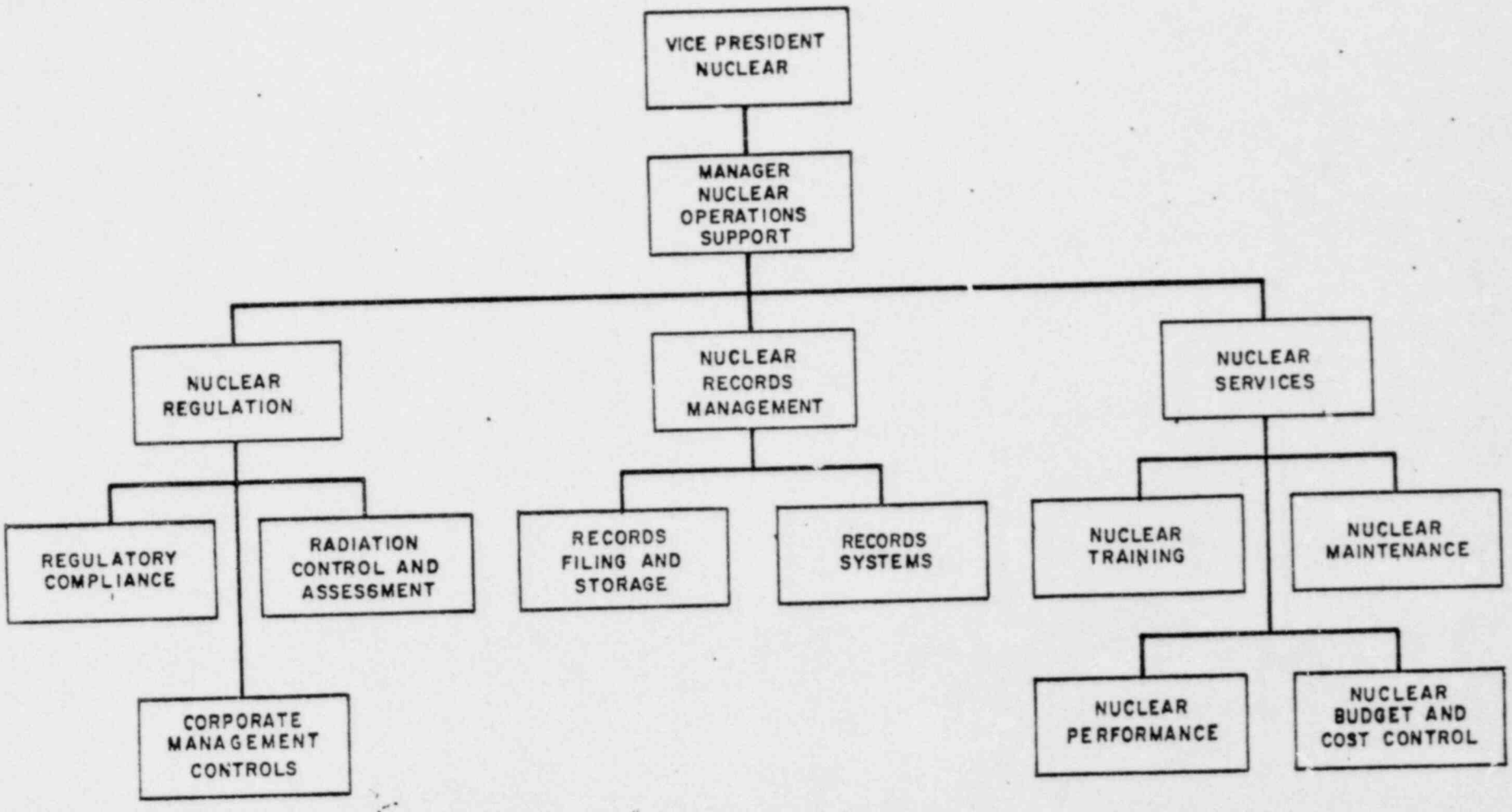

FIGURE 13.1.1-4
NUCLEAR OPERATIONS SUPPORT
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT

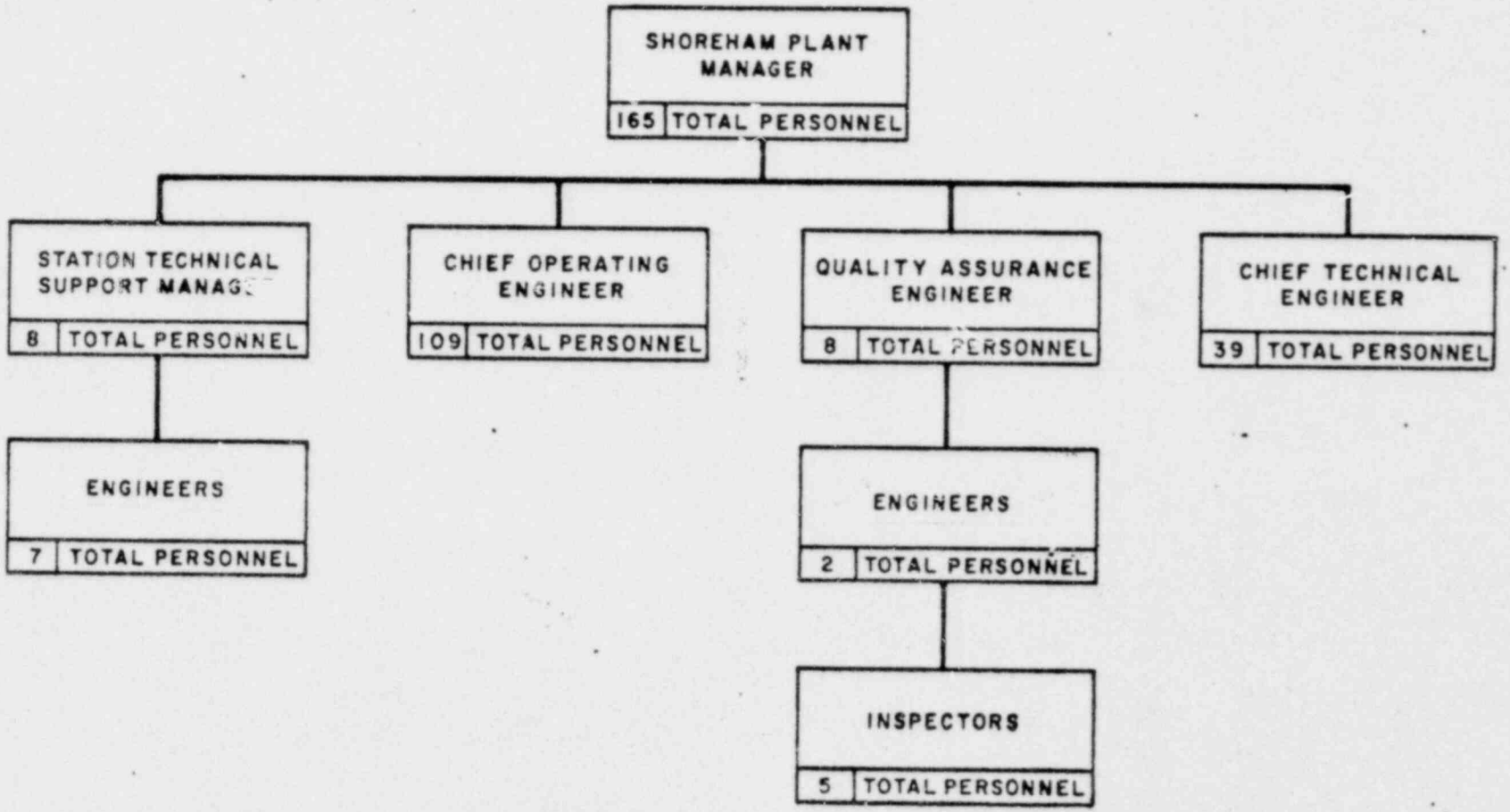

FIGURE 13.1.2-1
STATION ORGANIZATION
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT

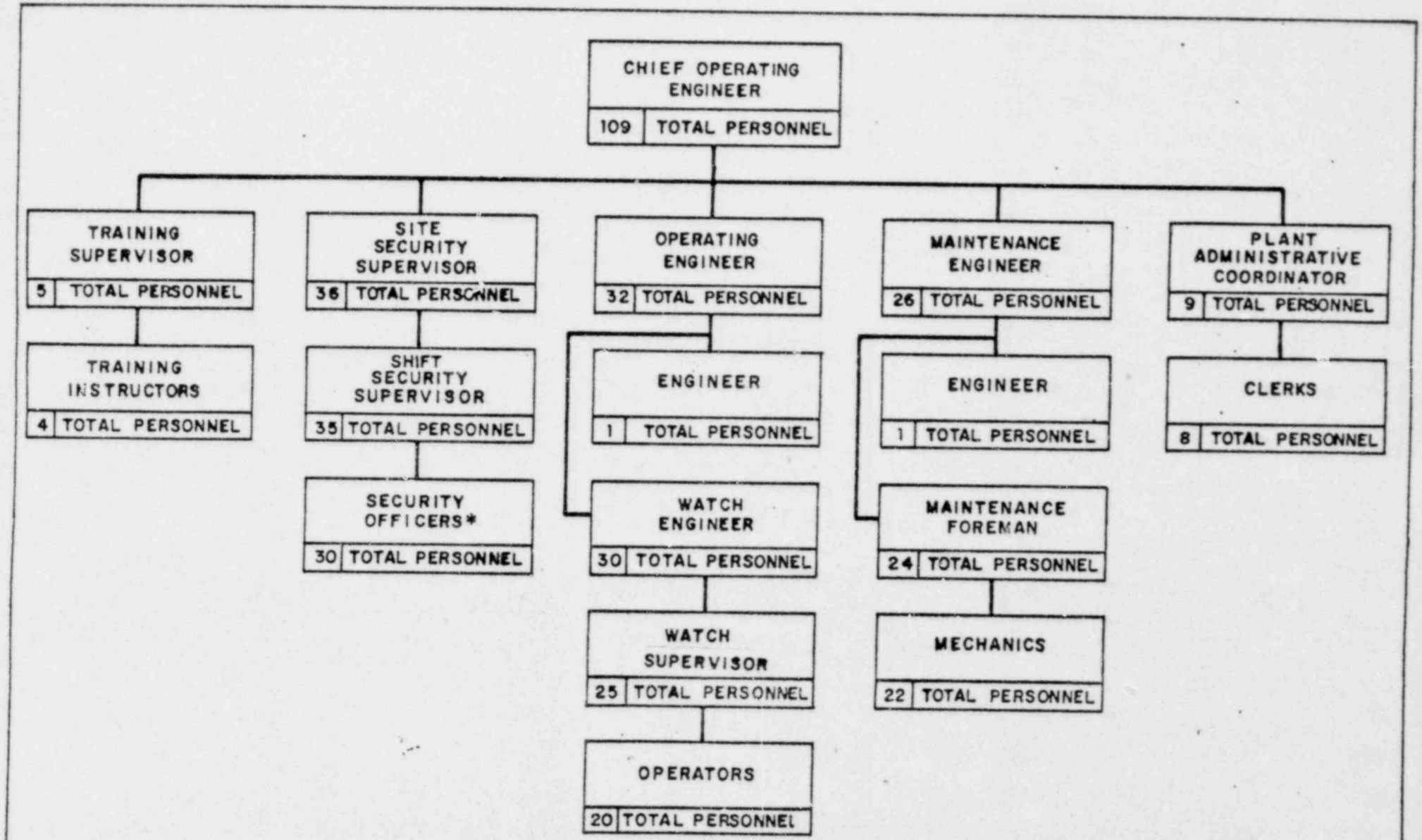

FIG. 13.1.2-2
STATION ORGANIZATION
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT

* CONTRACTOR

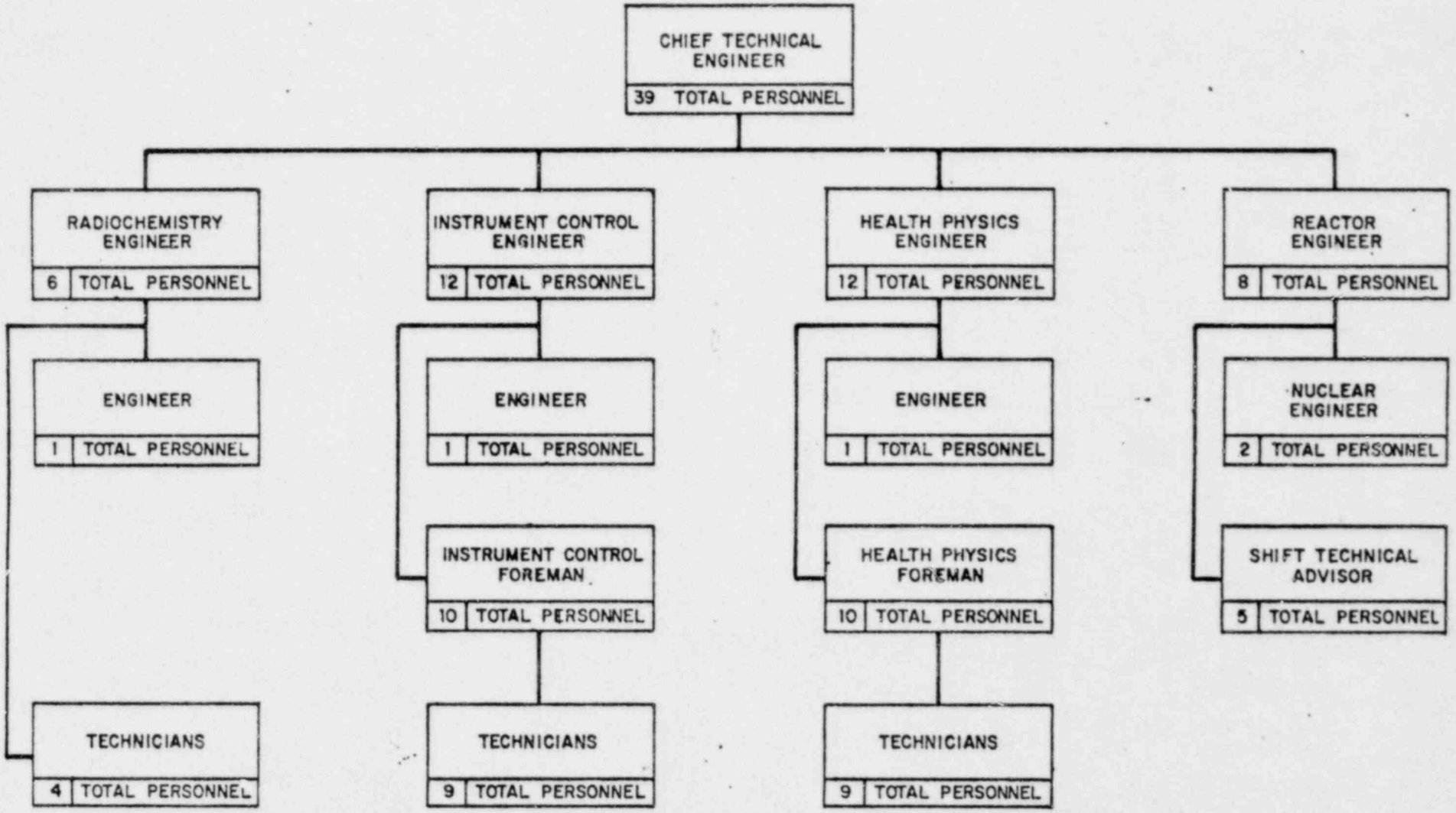

FIG. 13.1.2-3
STATION ORGANIZATION
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT

APPENDIX 13A

RESUMES

Millard S. Pollock

Vice President-Nuclear

The Vice President-Nuclear has overall responsibility for the engineering, construction, licensing, startup testing, and operation of the nuclear facilities within the Company. He reports to the Senior Vice President of Transmission, Distribution and Operations who is responsible to the President of the Company. The position is responsible for management of the engineering, construction, and licensing aspects of the Nuclear project until fuel loading and subsequently is responsible for the safe operation of the nuclear plant during startup and commercial operation. Is responsible, also, for implementation and management of engineering and high level technical and administrative support functions for plant operations.

Graduated from Stevens Institute of Technology in 1951 with a degree in Mechanical Engineer (M.E.). Completed the General Electric Boiling Water Reactor Simulator Orientation Program in 1973. Completed the University of Michigan Public Utility Executive Program in 1969. Attended an Operational Quality Assurance Indoctrination Program in 1978.

1974-1980

Became Manager of the Electric Production Department (Fossil and Nuclear) in 1974, and full authority in the administration of the operation of electric production system and significant participation in the engineering development of production system additions and modifications. On July 1, 1978, was relieved of administrative responsibilities relative to the fossil steam system to devote full effort to the development of nuclear operating plant and support organizations and coordination of final nuclear plant startup and operating activities.

1968-1974

Assistant Manager of Electric Production Department with responsibilities of operating management of 3991 MW of electric production facilities consisting of 2524 MW of fossil steam plants, 1467 MW of internal combustion generating equipment and with responsibility for setup and development of the operating organization for the system's first nuclear unit with full authority to act for the Electric Production Manager in all areas.

1965-1968

Manager of an 800 MW fossil steam power plant with responsibilities of direction of operation, performance, maintenance, staff support groups and cost control with associated administrative functions. Assignment entailed initial setup of the operating organization, screening and selection of plant complement and startup of two 400 MW fossil steam units.

1957-1965

Assistant Manager of two different fossil steam power plants with responsibilities of direction of operation, performance, maintenance and staff support groups. One plant consisted of eight boilers and five steam turbines with a capacity of 400 MW. One plant consisted of two boilers and two steam turbines with a capacity of 378 MW. Became Manager of the 400 MW plant in 1963.

1951-1957

Second line supervisory positions in power plants with engineering responsibilities in area of performance, operation, maintenance and personnel management. Supervision of specific startup functions of three 100 MW fossil steam generating units.

1946-1948

United States Army Ordinance

Member of the Prime Movers Committee and Nuclear Subcommittee of the Edison Electric Institute, the American Society of Mechanical Engineers and the American Nuclear Society.
New York State Pistol Permit

Joseph P. Novarro
Project Manager
Long Island Lighting Company

Assigned as Project Manager of the Shoreham Nuclear Power Station in 1976. Responsible for engineering, construction, and preoperational testing of the plant.

Graduated from Manhattan College in 1963 with a bachelor of Electrical Engineering degree. Graduated from the Oak Ridge School of Reactor Technology (ORSORT) in 1964.

1966 - 1978

Employed by Long Island Lighting Company. From December 1976 to August 1978 held the position of Project Manager for the Jamesport Nuclear Power Station. Responsible for the preliminary engineering, construction, planning and state and NRC licensing activities.

From 1974 to 1976 held the position of Project Engineer and Assistant Project Manager for the Shoreham Nuclear Power Plant. Responsible for the direction of engineering and licensing activities of company personnel, the architect engineer, and NSSS vendor.

From 1972 to 1974 served as Project Engineer for the Jamesport Nuclear Power Plant. Responsible for the conceptual design and Architect Engineer, NSSS Vendor selection process leading to initiation of the project.

From 1966 to 1972 served as Associate Engineer, Nuclear Engineer, and Assistant Project Engineer for the Shoreham Plant. Responsible for the review of preliminary engineering and support of the construction permit licensing process.

1963 - 1966

Employed by U.S. Atomic Energy Commission (AEC), New York Operations Office. Attended ORSORT while on work/study program of AEC. As Reactor Engineer, responsible for replacement reactor core fabrication of land based military reactors and research and development programs supporting the large water reactors demonstration projects.

WILLIAM J. MUSELER
ASSISTANT PROJECT MANAGER
CONSTRUCTION
SHOREHAM NUCLEAR POWER STATION
LONG ISLAND LIGHTING COMPANY

My name is William J. Museler. My business address is Long Island Lignting Company, P. O. Box. 618, Wading River, New York. I am the Ass't Project Manager for the Shoreham Nuclear Power Station reporting to the Shoreham Project Manager. My responsibilities include the supervision of the UNICO Construction Organization which is charged with the responsibility of constructing the Shoreham Station. The UNICO Organization is a composite construction management group consisting of LILCO, Architect Engineer, and Consultant Engineers who supervise the various contractors responsible for the physical construction. Construction Scheduling, Cost Reporting, Field Purchasing, Field Design, Site Security and Safety, Records Managment, and Site Accounting also fall under the Construction Manager's responsibility. The UNICO Construction Management Organization is responsible for the Shoreham Nuclear Power Station up to the point of system turnover to the Startup Testing Group.

I received my Bachelor of Science degree in Engineering Science from Pratt Institute in 1962 and my Master of Science degree in Mechanical Engineering from Worcester Polytechnic Institue in 1964. In addition I have complete one (1) year of Post Graduate work in Nuclear Engineering at the University of Florida and have taken additional courses in Industrial Management from the Polytechnic Institue of Brooklyn.

I have been employed by the Long Island Lighting Company since July 1973, and have held the positions of Assistant Project Engineer, Mechanical Construction Engineer, Assistant Project Manager, and currently Assistant Project Manager-Construction.
From 1973 to 1975 I held the position of Assistant Project Engineer on the Shorheam Nuclear Power Station (one year) and the Jamesport Nuclear Power Station (one year). In these capacities, I was responsible for reviewing the base plant design, assuring that procurement documents reflected the appropriate design and Quality Assurance requirements, and preparing various licensing documents for the FSAR and New York State Article 8 proceedings.

From 1976 to 1977, I served as a Mechanical Construction Engineer at the Shoreham Station, supervising a group of four (4) engineers responsible for the monitoring of the Mechanical effort on site (Piping, Welding, Mechanical Equipment, etc.) I chaired several task forces during this period directed towards the improvement of the Mechanical effort at the Shoreham site, resulting in a three (3) month direct demonstration of techniques for the improvement of the Piping and Welding effort in the Reactor Building.

From 1977 through 1979, I served as Assistant Project Manager responsible for Engineering, Licensing, and Cost, reporting to the Project Manager. The Assistant Project Manager is responsbile for the supervision of the Architect Engineering effort, all contacts, commitments, and company positions relative to the NRC Licensing proceedings, and the overall plant cost estimate and yearly budgets.

In March of 1980, I assumed my present position of Construction Manager of the Shoreham Nuclear Power Station.

Prior to joining the Long Island Lighting Company, I was employed as Deputy Director of the Eighty Inch (80") Hydrogen Track Chamber at the Brookhaven National Laboratory from 1968 through June 1973. In this position I was responsible for supervising the operating personnel of the Eighty Inch (80") Chamber as well as for the design of system modifications invovlving High Vacuum, Hydraulic, Optical, and Cryogenics Systems.

From 1965 through 1967 I was employed by Combustion Engineering, Incorporated in Windsor Connecticut as an Associate Staff Engineer and worked in the development and test area on the Heavy Water Cooled Organic Moderated Reactor (HWOCR) Project and the Palisades Nuclear Power Plant.

I am a member of the American Nuclear Society and Chairman Elect of the Long Island Section of that Society.

BRIAN R. McCAFFREY
ASSISTANT PROJECT MANAGER
ENGINEERING & LICENSING
SHOREHAM NUCLEAR POWER STATION
LONG ISLAND LIGHTING COMPANY

My name is Brian R. McCaffrey. My business address is Long Island Lighting Company, 175 E. Old Country Road, Hicksville, New York. I am Assistant Project Manager- Engineering and Licensing for the Shoreham Nuclear Power Station, reporting to the Project Manager. I am responsible for the overall engineering and licensing of the Shoreham Station. In this capacity, my organization directs and approves the engineering efforts of the Architect Engineer and Nuclear Steam Supplier. This organization is also responsible for directing the activities leading to an Operating License from the NRC.

I received my Bachelor of Science degree in Aerospace Engineering from the University of Notre Dame in 1967 and a Master of Science degree in Aerospace Engineering from the Pennsylvania State University in 1972. I have also received a Master of Science degree in Nuclear Engineering from the Polytechnic Institute of New York in 1978. In addition, I completed a General Electric BWR Design Orientation Course in 1978.

I was employed as an Engineer with Grumman Aerospace Corporation from 1968 to 1972. Primary responsibilities were in the areas of aircraft aerodynamics and flight test stability and control.

I have been employed by Long Island Lighting Company since January 1973. From January 1973 to May 1975, I held the positions of Associate Engineer and Engineer in the Power Engineering Department involved with balance of plant engineering on both fossil and nuclear power stations. From June 1975 to September 1977, I held the position of Senior Engineer in the Power Engineering Department with responsibilities as Project Coordinator for gas turbine installations and Lead Mechanical Engineer for nuclear projects.

In the period from October 1977 to December 1978, I held the position of Senior Licensing Engineer for the Shoreham Nuclear Project responsible for the licensing activities leading to an Operating License.

In the period January 1979 to April 1980, I held the position of Project Engineer for the Shoreham Nuclear Project. Responsibilities included directing the activities of Project Engineering and the Architect Engineer in the engineering and procurement for the Shoreham Nuclear Power Station.

In April 1980, I assumed my present position as Assistant Project Manager for Engineering and Licensing for the Shoreham Project, with responsibilities for an integrated engineering and licensing program.

I am a member of the American Society of Mechanical Engineers and the Long Island Section of the American Nuclear Society.

I am a registered professional Engineer in the State of New York.

EDWARD J. YOUNGLING
Startup Manager
Long Island Lighting Company

Assigned as Startup Manager in March 1981. Responsible for the Preoperational test activities for the Shoreham Nuclear Power Station. Report to the Shoreham Project Manager during the period prior to fuel load and to the Plant Manager at a time before fuel loading designated by the Project Manager. Responsible for coordinating all Checkout & Initial Operations and Preoperational Testing. Set initial construction priorities by system/subsystem and monitor construction progress as it relates to the startup schedule. Have the authority to modify construction schedule as conditions demand. Chairs construction release meetings at which status of construction, as it relates to systems scheduled to be released, is discussed. Participates in the meetings of the Joint Test Group. Ensure that the established procedures of documentary control are followed. Responsible for the review, monitoring, supervision and approval of Checkout & Initial Operations Tests, Preoperational Tests, and Acceptance Tests, review of all test results summaries and recommend acceptance, rejection or modification by the JTG according to results. Responsible for the production of all the Software required for testing of Shoreham.

Graduated from Lehigh University in 1966 with a Bachelor of Science Degree in Mechanical Engineering. From June 1966 to March 1968 attended Union College and achieved credits towards a Masters of Science Degree in Nuclear Engineering. Successfully completed the following training courses:

"Introduction to Nuclear Power" by NUS Corp., July 1970

"Boiler Control Fundamentals" by General Electric Co. at the G.E. Simulator, August 1972

"Process Computer Concepts and Practices" by General Electric Co., February 1973

"Shoreham Research Reactor Training Program" at Brookhaven National Laboratory Medical Research Reactor (NRC SROC license candidate research reactor training requirement), May 1975

"Planning for Nuclear Emergencies" by Harvard School of Public Health, May 1976

"Interagency Course in Radiological Emergency Response Planning in Support of Fixed Nuclear Facilities" by Nuclear Regulatory Commission, September 1978

"Customer Engineer Training Program in the Methods Used to Conduct Maximum Turbine Capacity Tests and Analyze Results to Detect and Correct Cycle Losses" by General Electric Co., Large Steam Turbine Division, September 1979

"Shoreham Nuclear Power Station On-site Training Program" (NRC SROC license candidate plant system training requirement), January-April 1979.

"LILCO Advanced Supervisory Workshop," April 1979

"LILCO Management Workshop," December 1980

Achieved a Senior Operator Certification from the General Electric Company on the Duane Arnold Energy Center Boiling Water Reactor.

May 1979-March 1981

Assigned as Nuclear Services Supervisor in May 1979, reporting to the Manager, Nuclear Operations Support Division. Responsible for the management and coordination of those support services required by LILCO Nuclear Power Stations. These support services include coordination of major station modifications, performance of operational design reviews, coordinating the resources of other LILCO Departments and outside consultants to achieve a desired result assigned to the Division, coordinating long-range planning activities associated with plant maintenance, fuel cycle strategy and budget

and cost control, monitoring overall plant and individual equipment performance, maintaining a current knowledge of federal regulations, industry codes and standards, and changes thereto applicable to the facility.

Participated on the LILCO Corporate Task Forces assessing Shoreham design and operations, corporate communications, and overall company emergency preparedness following the Three Mile Island Unit 2 accident. Responsible for the Shoreham Control Room human factor design review.

Developed the corporate policy manual defining interdepartmental responsibilities for the LILCO Nuclear Program.

February 1975-May 1979

Assigned as Chief Technical Engineer of the Shoreham Nuclear Power Station-Unit 1 in January 1975. Responsible for the activities of the Instrtumentation and Control, Health Physics, Radiochemistry and Reactor Engineering Sections of the plant staff, including the development of administrative and technical programs and procedures to meet regulatory, company and industry requirements; and the training of professional personnel and technicians to satisfy qualification standards. Served on the plant Review of Operations Committee (ROC) and when designated acted as Chairman of the ROC in the Plant Manager's absence. Served as a member of the plant Licensed Source User's Committee as stipulated in NRC Nuclear Material License No. 31-17432-01, February 1977.

August 1974-January 1975

Reassigned to the plant staff as the Instrumentation and Control Engineer, then Acting Chief Engineer-Technical. Responsible for manpower planning and the development of the technical training programs for subordinate personnel. Participated in generating portions of the Shoreham Safety Analysis Report, and in the review and approval of plant operating procedures, lesson plans and system descriptions.

July 1973-July 1974

Named the Instrumentation and Control Engineer for Shoreham Nuclear Power Station and assigned to the General Electric Company Startup, Test and Operations (STP) organization at the Duane Arnold Energy Center in Cedar Rapids, Iowa. Participated in the preoperational test program in the areas of nuclear instrumentation, process radiation, and reactor vessel instrumentation. Acted as G.E. shift engineer during fuel loading operations and as assistant to G.E. shift engineer during startup testing and power ascension program. Participated in the G.E. shift engineer training program and sat for the G.E. Certification Examination for DAEC.

August 1972-June 1973

Reassigned to Shoreham Nuclear Power Station Project as the Assistant Project Engineer, then Project Engineer. Responsible for overall plant design control. Coordinated design effort between LILCO, Stone & Webster Engineering Corporation, General Electric Co. Nuclear Energy Division, various major equipment suppliers and regulatory agencies.

November 1971-July 1972

Reassigned to the Northport Power Station to participate in the startup of Northport Unit No. 3. Directly responsible for the startup of the boiler for this 380 MW unit including the fuel safety system, the combustion control system, and associated mechanical equipment. Assumed overall plant shift operations responsibility during the latter stages of startup. Was an instructor in the Unit No. 3 systems training program given to plant supervisors, operators, technicians, and mechanics.

November 1969-October 1971

Assigned to the Shoreham Nuclear Power Station Project in the Nuclear Engineering Department. Participated in the engineering review of the Shoreham plant design in the following areas: plant equipment layout, equipment specifications, equipment selection, main control board design, plant operations logic, plant instrumentation, plant computers. Review included contacts with the A-E, Stone & Webster, NSSS supplier, General Electric Company, various vendors and visits to several nuclear stations.

April 1968-October 1969

Employed by the Long Island Lighting Company and assigned to the Northport Power Station. During the period, assisted in the startup of Northport Unit 2, assisted in the station maintenance section supervising routing and shutdown maintenance activities and acted as the station Results Engineer responsible for the repair and calibration of the station instrument and control systems and for monitoring station performance.

June 1966-March 1968

Employed by the General Electric Company at the Knolls Atomic Power Laboratory. Stationed at the West Milton Site as a Mechanical Test Engineer on the S3G Prototype "USS Triton" submarine. While at the S3G plant, my responsibilities were to prepare procedures for tests and operations which were not in accordance with normal plant operations; supervise the actual tests, analyze the results and issue reports to the A&C. The following specific activities were engaged in: completed selected sessions of the Engineering Officer of the Watch Training Course, participated in numerous plant tests including routing low power physics testing including directing reactor control rod movements through Navy reactor operators, maneuvering transients, main coolant pump tests, power runs, various engine room tests and ultrasonic testing to trend pipeline degradation. Participated in Advanced Reactor Control Program as Lead Shift Test Engineer, including completion of required training program, and performing preoperational tests and integrated plant acceptance testing.

Member - American Nuclear Society. Hold a Guest Associate Engineer appointment in the Reactor Division at Brookhaven National Laboratory. Member - Pi Tau Sigma. Hold an Engineer in Training Certificate-State of Pennsylvania (State Registration Board for Professional Engineers).

DONALD J. BINDER
Manager, Nuclear Engineering
Long Island Lighting Company

My name is Donald J. Binder. My business address is Long Island Lighting Company, 175 East Old Country Road, Hicksville, New York. I am the Manager of the Nuclear Engineering Department reporting to the Vice President-Nuclear. My responsibilities include the review and approval of the technical aspects of nuclear systems engineering, radiation protection, nuclear fuel and licensing as it applies to the Company's overall nuclear program. In carrying out these responsibilities, personnel under my direction will provide the technical support for the Company nuclear plant operations.

I received my Bachelor of Mechanical Engineering degree from the Polytechnic Institute of Brooklyn in 1955 and my Master of Science degree in Nuclear Engineering Physics from Long Island University in 1969. In addition, I have completed courses in Nuclear Reactor Engineering at the University of Michigan in 1963 and in Nuclear Power Reactor Safety at the Massachusetts Institute of Technology in 1969.

I have been employed by Long Island Lighting Company since July 1955. In the period 1955-1968 I have held the position of Junior Engineer, Associate Engineer and Engineer in carrying out various engineering responsibilities relating to fossil power plant design; gas production, transmission and distribution design; architectural and structural building modifications, and economic studies.

In 1968-1969 I held the position of senior engineer in the Nuclear Projects Group, responsible for obtaining various Federal, State, and local permits for the Shoreham Nuclear Power Station.

From August 1969 to February 1970, I held the position of Quality Assurance Administrator for the Shoreham Nuclear Power Station responsible for the initial establishment of that project's overall quality assurance program.

In the period from February 1970 to August 1972, I held the position of Project Engineer for the Shoreham Nuclear Power Station responsible for the overall direction of the architectural engineering effort, including review of design, specifications, and purchase recommendations.

Since August 1972 to December 1978, I held the position of Manager of the Nuclear Engineering Division with responsibility for its initial development.

In December 1978, I assumed my present position of Manager of the Nuclear Engineering Department.

I am a member of the American Society of Mechanical Engineers and the American Nuclear Society.

I am a registered Professional Engineer in the State of New York.

DR. HANCOCK CHAU
Manager, Licensing
Long Island Lighting Company

My name is Hancock Chau. My business address is Long Island Lighting Company, 175 East Old Country Road, Hicksville, New York. I am the Manager of the Nuclear Licensing Division responsible for the generic licensing engineering efforts associated with the Company's nuclear power program. In this capacity I report to the Manager, Nuclear Engineering Department. My responsibilities include the technical assessment of the health and safety aspects of radiation protection, nuclear systems components, designs and structures in light of the various generic criteria, and guidelines established by the Federal Nuclear Regulatory Commission, Environmental Protection Agency, New York State, and local governmental agencies.

I was graduated fro Rensselaer Polytechnic Institute in 1956 with a Bachelor of Science in Biology. I received a Bachelor of Chemical Engineering from Rensselaer Polytechnic Institute in 1957. In 1961 I received a Master of Science in Mechanical Engineering from the University of Connecticut, and in 1965 I received my Ph.D. in Mechanical Engineering from the same University. My graduate studies included the nuclear engineering option in mechanical engineering. I have completed training courses in Boiling Water Reactor and Pressured Water Reactor technology. I am a Regents appointed member of the New York State Board for Engineering and Land Surveying. As a Professional Board Member, I assist the Board of Regents and the State Education Department on matters of licensure, practice, and conduct of all licensed professional engineers and land surveyors in New York State.

From 1957 to 1959, I was a Medical Service Corps officer for the U. S. Army in Europe. I was in the Industrial Hygiene Engineering Branch and was responsible for the laboratory and field investigation of environmental health problems involving radiation protection, potable water, toxic chemicals, heating, ventilation, and noise.

From 1959 to 1960, I was a Project Engineer at the Electric Boat Division of General Dynamics Corporation responsible for directing the development of a photosynthetic gas exchanger using algae for life support in a closed ecological system. Results of this study and other related studies were published in the Journal of Food Technology and in the American Institute of Biological Sciences.

From 1960 to 1965 I was a Graduate Teaching Assistant and graduate student in mechanical engineering at the University of Connecticut. From 1965 to 1967 I was an Assistant Professor of Mechanical Engineering at New York University. I taught undergraduate and graduate courses in mechanical engineering. My research and publication activities were in the areas of radiation heat transfer.

From 1967 to 1973, I was an Advanced Development Project Engineer at Grumman Aerospace Corporation responsible for directing R&D activities on long term cryogenic storage in space. As an Advanced Development Thermodynamic Group Leader, I was responsible for directing the heat transfer and thermodynamic design of cryogenic tankage for space applications. I have published papers and reports associated with the analytical and experimental treatments of vacuum multilayer insulation systems and cryogenic design. Some of which have appeared in R&D reports, thermophysics conferences, and in the Progress in Astronautics and Aeronautics.

I joined the Long Island Lighting Company in 1973 as a nuclear mechanical engineer in the Nuclear Engineering Division. I worked in the area of engineering licensing for the Shoreham Nuclear Power Project. In 1974, I became the Section Head of Licensing Engineering. I was responsible for the development and maintenance of essential regulatory expertise in the health and safety areas relating to the construction and operation of nuclear power stations. In December 1978, I assumed my present capacity as Manager of the Nuclear Licensing Division.

I am a member of the American Society of Mechanical Engineers, the American Nuclear Society, the National Society of Professional Engineers, and the National Council of Engineering Examiners.

I am a licensed Professional Engineer in New York State.

ROBERT M. KASCSAK
Manager, Nuclear Systems Engineering
Long Island Lighting Company

My name is Robert M. Kascsak. My business address is Long Island Lighting Company, 175 East Old Country Road, Hicksville, New York. I am currently the Nuclear Systems Engineering Division Manager. My Divisional responsibilities include overseeing an engineering staff organization capable of analyzing and coordinating activities associated with nuclear plant design, operation, reliability and safety. My responsibilities include approval of Architect Engineer designs, vendor designs, and in-house support effort associated with future plant modifications.

I graduated from Manhattan College in 1969 with a Bachelor degree of Mechanical Engineering. In 1977 I received a Masters of Science degree in Nuclear Engineering from Polytechnic Institute of New York. I have completed training courses in BWR and PWR technology.

In 1969 I joined Long Island Lighting Company as an Assistant Engineer in the Mechanical and Civil Engineering Department. I worked on various fossil fuel power station projects in the capacity of Associate and Senior Engineer. In particular, I was involved in the late stages of the Northport Power Station Unit 3 and the early stages of the Northport Power Station Unit 4 mechanical engineering design.

From July 1974 to March 1975, I served as LILCO Lead Mechanical Engineer for the Shoreham Nuclear Power Station and the Jamesport Nuclear Power Station. In March 1975 I joined the Shoreham Project Group as an Assistant Project Engineer, after which I assumed the responsibilities of Project Engineer. From March 1975 to January 1979, I held the position as Project Engineer for the Shoreham Nuclear Power Station. As such I was responsible for the review and approval of design activities prepared by our Architect/Engineer, Nuclear Steam Supply System Vendor, and LILCO in-house engineering departments.

I am a registered Professional Engineer in New York State and a member of the American Society of Mechanical Engineers.

WILLIAM J. TUNNEY
Manager, Nuclear Fuel
Long Island Lighting Company

My name is William J. Tunney. My business address is Long Island Lighting Company, 175 East Old Country Road, Hicksville, New York. I am the Manager of the Nuclear Fuel Division and report to the Manager of the Nuclear Engineering Department. I am responsible for nuclear fuel design and performance, long range planning and scheduling, and technical and economic direction for the various components of the nuclear fuel cycle.

I was graduated in 1962 from Worcester Polytechnic Institute with a Bachelor of Science Degree in Physics. I have completed training courses in BWR and PWR technology.

From 1962 to 1970 I was employed by Brookhaven National Laboratory in the position of Physics Associate. During this period I was involved in conducting independent research in the area of experimental reactor physics.

I have been employed by the Long Island Lighting Company (LILCO) since 1970. In the period 1970-1973 my responsibilities were to provide technical support for the licensing efforts on the Shoreham Plant required to obtain a construction permit.

From 1973-1974 I was responsible for nuclear fuel management which included long range planning, fuel contract evaluations, fuel economics, and development of fuel management capabilities necessary to support the safe and economic operation of LILCO's nuclear plants.

From 1974-1978 I held the position of Section Head, Nuclear Fuel Management Section, and from February 1978 to the present I have held the position of Manager, Nuclear Fuel Division with the responsibilities of both in core and out of core nuclear fuel management.

I am a member of the American Nuclear Society.

R.A. KUBINAK
Manager, Nuclear Operations Support
Long Island Lighting Company

The Manager, Nuclear Operations Support reports to the Vice President-Nuclear and has the responsibility to provide headquarters technical and nontechnical support for operating Nuclear Stations. The prime objective of this support effort is to enhance the safe, reliable, and economic operation of the nuclear facility by maintaining an effective interface and flow of information between the nuclear stations and regulatory agencies, company departments, and outside resources. Within this objective, the division is charged with the specific responsibility of accomplishing long range operating functions properly based in headquarters. These include administration of the corporate Nuclear Review Board, conduct of special studies, long range outage planning, compliance with Federal and State Law, records management, project management representation for units in the design and construction phase, regulatory representation, control of major nuclear plant modifications, industry representation, evaluation of plant performance, coordination of corporate nuclear policy, and the conduct of special programs.

Graduated from Rensselaer Polytechnic Institute in 1953 with a Bachelors degree in Electrical Engineering (BEE). Completed the General Electric Boiling Water Reactor Simulator Program in September of 1971, and obtained a certificate as a Senior Reactor Operator. Completed Training programs with the Westinghouse Nuclear Training Organization, the NUS training organization, and various manufacturer's training schools in equipment operation, maintenance and nondestructive testing. Received a Masters of Business Administration (MBA) from Dowling College in 1979.

1969 1978

Assigned as Plant Manager for the Shoreham Nuclear Power Station in 1969. Responsible for the establishment and training of the Shoreham plant staff to qualify for nuclear plant operation. Additional responsibilities included the respresentation of the Electric Production Department in Shoreham engineering activities with LILCO Engineering Groups, associated engineering firms and consultants. Engaged in technical licensing efforts with federal, state and local regulatory groups. Assigned as a preoperational test engineer and shift engineer on the General Electric Startup Team for the Commonwealth Edison Dresden Nuclear Generating Station Units No. 2 and No. 3.

1965 - 1969

Chief Engineer, Northport Power Station, in the Electric Production Department. Directed engineering, supervisory and nonsupervisory personnel in the startup, operation and maintenance of two 400 MW steam generating units. Initiated design reviews, recommended revisions, and directed field modifications. Responsible for economic studies and equipment evaluation.

1963 - 1965

Operations Engineer of the Glenwood Power Station. Responsible for the direction of the operations personnel in the operation of plant equipment. Developed operating procedures and techniques to optimize plant efficiency and reliability.

1961 - 1963

Maintenance Engineer at the Port Jefferson Power Station. Responsible for the maintenance of power plant systems and equipment. Directed repair efforts through foremen and mechanics. Responsible for the design, instrumentation, and installation of subsytems including power piping and electrical power distribution.

1957 - 1961

Plant Instrument and Control Engineer at Port Jefferson Power Station. Directed the efforts of engineers and technicians in startup and maintenance of power plant electronic, pneumatic, and hydraulic control systems.

1955 - 1957

Assistant Engineer in the Electric Production Department. Training assignments included the startup of accessory electrical equipment, maintenance of power plant equipment; developing techniques to optimize equipment performance and reliability, completed assignments in the maintenance of power plant electrical instrumentation; and the analysis and reporting of performance data for electrical generating units.

1953 - 1955

Radar Maintenance Officer with the U.S. Air Force Air Defense Command. Responsible for the analysis of radar equipment performance and malfunctions, directed calibration and repair through maintenance technicians.

A member of the American Nuclear Society, and the New York State Society of Professional Engineers, and the Prime Movers Committee of the Edison Electric Institute.

Registered Professional Engineer, State of New York. AEC Certified Reactor Operator, Dresden Units 2 & 3, Commonwealth Edison Company.

JEFFREY L. SMITH

Supervisor
Nuclear Regulation, Nuclear Operations Support
Long Island Lighting Company

Assigned to the position of Regulatory Supervisor in February 1979, reporting to the Manager, Nuclear Operations Support Division. Have overall responsibility for the management and coordination of nuclear regulatory matters which are under the jurisdiction of the Vice President-Nuclear. These regulatory matters include licensing and compliance activities associated with maintaining a full power operating license, Nuclear Review Board affairs, special compliance projects and programs and company commitments to federal, state and local agencies.

Graduated from Clarkson College of Technology in 1967 with a Bachelor of Science degree in Mechanical Engineering. Received a Master of Science degree in Nuclear Engineering in 1978 from Polytechnic Institute of New York. Completed the General Electric Boiling Water Reactor Simulator Program in December 1979 and obtained a certificate as a Senior Reactor Operator. Completed BWR Observation Training at Millstone Nuclear Station from May to June 1980. Completed training courses with General Physic Corp. relating to Nuclear and Core Physics in 1974 and Practical Nuclear Power Plant Technology in 1975 and with the General Electric Co. at the BWR Training Center in 1976 relating to both academic and simulator training on a boiling water reactor (six day program).

1975 - 1979

Held the position of Manager, Operational Quality Assurance at the Long Island Lighting Company. To provide an initial orientation into quality assurance functions, I was assigned to Rochester Gas and Electric Corporation's Quality Assurance Department from June 1975 to May 1976 as QA Engineer. In this position, I participated in quality control activities at R. E. Ginna Nuclear Station, audited nuclear station activities, prepared headquarters quality assurance procedures and received certification as a qualified lead auditor. As the Manager, Operational Quality Assurance, I was responsible for establishing and assuring the overall implementation of the Operational Quality Assurance Program, defining the content and changes to the Operational Quality Assurance Manual and evaluating the manner in which quality affecting activities both onsite and offsite are conducted by means of checks, reviews, audits, surveillance and inspections.

1974 - 1975

Assigned to Hicksville Operations Center as the Staff Engineer in the Electric Production Department of Long Island Lighting Company responsible for coordination and liaison with the Jamesport Nuclear Project. In addition, I was responsible for turbine, boiler, capability and equipment performance testing at all electric generating stations on the LILCO system.

1972 - 1974

Held the position of Operations/Control Engineer at the Northport Power Station on the Long Island Lighting Company system at which time I was responsible for the direction of all operations, instrumentation, controls, testing and water chemistry functions at the station. During this period, I was also involved with the startup and initial operation of Unit No. 3 at Northport Power Station.

1969 - 1972

Resumed employment at the Long Island Lighting Company. Held the position of Associate Engineer and Plant Engineer at the Northport Power Station in carrying out various management and engineering responsibilities relating to operation, maintenance and administrative activities in a large fossil generating station.

1967 - 1969

Served in the U.S. Army as Mechanical Engineering Assistant at Munitions Command Headquarters, Picatinny Arsenal, Dover, New Jersey. In this capacity, I was responsible for the formulation of investigative testing programs to determine the cause of malfunctioning munitions released to the field. I received the Certificate of Achievement for outstanding accomplishment during the period.

1966 - 1967

Employed by the Long Island Lighting Company and assigned as Assistant Engineer at the Port Jefferson Power Station. In this position, I was responsible for various operations and maintenance administrative activities and for the design and installation of numerous modifications at the station.

A member of the American Nuclear Society and American Society of Mechanical Engineers.

I have also completed the following additional training:

PWR Reactor Principals and Systems - Westinghouse Electric Corp.

Quality Assurance Audit Techniques for the Nuclear Power Industry - L. Marvin Johnson & Associates, Inc.

R. E. Ginna Station PWR Systems - Rochester Gas and Electric Corp.

Quality Assurance Indoctrination - Rochester Gas and Electric Corp.

Practical Welding Metallurgy - American Welding Society

Industrial Radiography - Eastman Kodak Company

J. RIVELLO
Plant Manager
Long Island Lighting Company

Assigned as Plant Manager for the Shoreham Nuclear Power Station in 1978. Responsible for the administration of the station and its personnel. Also responsible for assurance of proper procedure and personnel support of the preoperational test phase which leads to Plant Staff performance of Fuel Load and power operation.

Additional responsibilities include the representation of the Plant in Shoreham engineering, construction, and testing activities. Engaged in technical licensing efforts with federal, state, and local regulatory groups.

Graduated from Manhattan College in 1963 with a Bachelor of Mechanical Engineering Degree. Completed 2 years of the Nuclear Engineering Masters Program at Long Island University in 1969.

Completed specialized nuclear courses at the University of Michigan: Nuclear Engineering Review (June 1973); General Electric Company's: BWR Technology (August 1973) and BWR Simulator for SRO Certification (Nov. - Dec. 1973).

December 1974 to October 1978

Startup Manager of the Shoreham Nuclear Power Station. Developed Startup Program and prepared implementing manual.

Developed Checkout and Initial Operations Test Program which has subsequently been adopted by other utilities.

Member of the Joint Test Group which approves all safety-related system preoperational tests. Alternate to J.T.G. Chairman, the Plant Manager of Shoreham.

Member of the Review of Operations Committee which approves all safety-related system plant procedures.

Directly manage six Engineers, including S&W Lead Advisory Engineer, General Electric Company Site Operations Manager, and four Lead Startup Engineers.

Coordinate engineering, construction, and plant staff activities as they relate to system completion regarding design, construction, documentation of testing, and compatibility of generated data in the respective organizations.

December 1973 - November 1974

Assigned to Commonwealth Edison Company's Dresden Nuclear Station as a Technical Staff Engineer (5 months) and Project Engineer (6 months).

As a Technical Staff Engineer, a major duty was coordination of a refueling outage of D-3, not including basic maintenance work. Worked directly for the Lead Nuclear Engineer and Assistant Plant Manager. Also provided substantial input to planning for refueling outage of D-2 as a result of experiences on D-3.

Performed all activities of Technical Staff Engineer from unusual event reports (abnormal occurrences) through major and minor modification safety evaluations, engineering, procurement, and operational testing.

As Project Engineer, was directly responsible for final construction schedule and initial operations testing of major high conductivity drain waste concentration/evaporation system. System is dual train of evaporator/concentrates, bottoms discharge system, filter demineralizer recovery system. Conducted all tests, evaluated same, design changes recommended and implemented and met EPA in-service date under very late start conditions.

Throughout assignment, performed many substantial special projects for on-site review committee and special nuclear systems testing and evaluations.

September 1973 - November 1973

Completed G.E. run BWR Simulator Course obtaining Senior Reactor Operator Certification.

July 1973 - August 1973

Completed G.E. run BWR Technology Course.

June 1973

Completed a special nuclear review course on nuclear reactor engineering at University of Michigan, Ann Arbor, Michigan.

April 1971 - May 1973

Chief Engineer (Assistant Plant Manager) of multi-unit 400 MW fossil station. Position was particularly demanding of technical management skills since units were older and staff was large. Maintenance, operations schedules were further complicated by the fact that two units were 'peaking' stations and period of assignment was a heavy demand period for utility.

June 1963 - May 1971 (8 years)

Several supervisory positions in four different fossil stations. Followed normal progression of Associate Engineer (entry level for engineers), Plant Engineer, Operating, Maintenance, and I&C Engineer.

Utility is staffed by physical workers who are union members and, therefore, personnel dealings are complex and demand mature supervision.

WILLIAM E. STEIGER JR.
Chief Operating Engineer
Long Island Lighting Company

Assigned as Chief Operating Engineer of the Shoreham Nuclear Power Station in January 1975. Responsible for the formulation and implementation of the training programs for licensed operators, licensed and unlicensed fuel handling personnel, station mechanics, security force, and administrative personnel: development and review of the administrative, operations, maintenance, and security sections of the Station Operating Manual: and for the identification and procurement of necessary plant equipment to support the activities of the administrative, operations maintenance, and security sections of the station. Additional responsibilities include personnel licensing activities with the Nuclear Regulatory Commission and development of selected portions of the Shoreham FSAR.

Graduated United States Merchant Marine Academy in 1965 with a Bachelors Degree in Marine Engineering. Received Masters Degree in Nuclear Engineering in 1971 from Long Island University. Completed United States Maritime Administration academic, simulator, and on-the-job training programs in 1966, and obtained an Atomic Energy Commission Reactor Operator License (OP-2103) for the N.S. Savannah. Upgraded Atomic Energy Commission license to Senior Reactor Operator (SOP-914) in 1967.

Completed a training program with the General Electric Startup Group in December 1973 at Cooper Nuclear Station and obtained a certificate from General Electric as a Senior Reactor Operator. Completed a training program with Cooper Nuclear Station Operations Personnel in March 1974 and obtained a certification from the Atomic Energy Commission as a Senior Reactor Operator.

Participated in the management activities of the Vermont Yankee 1980 Maintenance/ Pefuel outage for the routine refueling outage activities.

Successfully completed the following training courses:

"Boiler Control Fundamentals": by General Electric Co., January 1972
"Fundamentals of BWR Operation": by General Electric Co., February 1973
"Process Computer Concepts & Practices": by Honeywell, November 1976
"Advanced Supervisory Workshop": by LILCO, December 1978
"NDE-UT Course": by Rockwell International, June 1979

1968-1974

Employed by the Long Island Lighting Company and assigned as Assistant Engineer for the maintenance of fossil fired units. Responsible for the procurement of materials, spare parts, and replacement equipment and for planning of maintenance activities. Promoted to Associate Engineer in 1970 with increased responsibilities in planning and scheduling of maintenance work schedules and additional responsibilities for capital improvements. Promoted to Plant Engineer in 1971 with increased responsibilities for planning and preparation of major maintenance outages.

Transferred to Shoreham Project to assist in licensing activities. Assigned in later part of 1971 as Startup Engineer for 385 MW fossil unit responsible for all balance of plant mechanical systems and equipment. Transferred to Shoreham Nuclear Project in July 1972 as Lead Nuclear Engineer responsible for design coordination and review of all NSSS systems, Reactor Building and Radwaste Building. Promoted in 1973 to Operations Engineer Shoreham Nuclear Power Station and assigned to participate with the General Electric Company Startup Group in the Startup of the Cooper Nuclear Station.

1965-1968

Employed by First Atomic Ship Transport, Inc., as Third Assistant Marine Engineer aboard the N.S. Savannah. Upon receipt of an Atomic Energy Commission Reactor Operator License, assumed the responsibilities of Reactor Operator including the operation, maintenance, repair, and testing of NSSS and BOP equipment. Promoted to Second Assistant Marine Engineer in 1967 with the additional responsibilities of Watch Engineer (Shift Supervisor).

Member of the American Society of Mechanical Engineers.
Member of the American Nuclear Society-Reactor Operations Division Executive Committee.
Licensed Marine Engineer - United States Coast Guard.

LEONARD J. CALONE
Chief Technical Engineer
Long Island Lighting Company

Assigned to the position of Chief Technical Engineer at the Shoreham Nuclear Power Station in July, 1979. Responsible for providing technical support in the areas of Nuclear Physics, Radiation Protection, Plant Chemistry and Radiochemistry, and overall station performance. In addition, repsonsible for maintenance, repair and calibration of station instrumentation and control systems.

Educational Background:

Graduated from Stevens Institute of Technology in 1967 with a degree in Mechanical Engineering. Received a Masters of Science Degree in Physics in 1974 from C.W. Post College.

Completed the General Electric Boiling Water Reactor (BWR) Simulator Program in June 1976 and obtained a Senior Reactor Operator certification.

Completed the following additional nuclear related training and qualification programs:

a) one-week course on Westinghouse PWR systems in Monroeville, Pa.
b) two-week General Physics course: Practical Nuclear Power Plant Technology; also pulled a critical on the reactor at Catholic University in Washington, D.C.
c) five-week General Electric BWR Technology course.
d) Brookhaven Laboratory's Basic Applied Health Physics course.
e) ten training criticals at the Brookhaven National Laboratory's Medical Research Reactor (MRR). Also, successfully passed a MRR walk-through and control room examination conducted by NUS Corporation.
f) six-week General Electric Station Nuclear Engineering course.
g) thirty-week field assignment to TVA's Browns Ferry Nuclear Plant. Performed as a Test Engineer in the Unit #3 Startup Test Program, and qualified as a Nuclear Engineer under the TVA training program for Browns Ferry. Participated in Unit #1 and Unit #2 Startup Retest Program.
h) two-week Honeywell Concepts and Practices Computer Course.
i) four-week Honeywell Process Assembly Language (PAL) Programming course for the HS4000 series computer.
j) Completed 2 weeks GE LSTG course on Improving Nuclear Steam Plant Heat Rate.

General Industrial Record:

1976 - 1979

Reactor Engineer at the Shoreham Nuclear Power Station. Responsible for the nuclear and thermal performance of the core. Assists in maintaining overall unit performance, and maintaining fuel inventory, refueling schedules, and refueling patterns. Supplies current nuclear and thermal information to the operating staff, including reactivity coefficients, control rod worths, and core power distributions and stability. Participates in the preparation of physics related programs. Responsible for the plant computers' software and their application.

1975

Station Performance and Compliance Engineer at the Shoreham Nuclear Power Station. Responsible for writing LILCO's portion of operating system descriptions for Shoreham. Responsible for reviewing and evaluating the system descriptions produced by consultants and vendors, and to interface with said consultants and vendors to insure proper adherence to contracts and designs. Responsible for the development of first draft operating procedures and surveillance test procedures. Responsible for the review of startup tests and acceptance tests to insure compliance with design performance parameters. Also, to witness such testing that is considered to be critical for operations and

safety. Responsible for the activities of the engineers and assistants assigned to this section, and the coordination of all work developed.

1973 - 1974

Operating-Control Engineer at the E.F. Barrett Power Station. Responsible for the daily operations and reliability of the plant, for supervision of the Watch Engineers, for overall direction of the operating personnel, and for adherence to operating procedures and parameters. Responsible for the plant instrumentation and control systems, for the scheduling of and evaluation of performance tests, for planning annual overhaul work and plant control revisions and for the direction of activities of the Control Group technicians through the Controls Foreman.

1972 - 1973

Industrial Relations Representative on a 1 year management training program. Responsible for the proper application of the Collective Bargaining Agreement between LILCO and the IB&W Local Unions, and the proper application of the Company's Policy and Procedure Guide. Represented the Company in grievance procedures with the Unions, and in State unemployment hearings.

1970 - 1972

Associate, and Plant Engineer at the E.F. Barrett Power Station. Worked in the position of acting Operating Engineer for 14 months, and acting Maintenance Engineer for 8 months. Also, was assigned to the I.C. Division for 4 months as the "Site" Startup Engineer for the Barrett Station 160 MW Pratt & Whitney gas turbine installation.

1967 - 1970

Hired by LILCO in 1967. Assistant Engineer at Glenwood Power Station. Temporarily assigned to the Construction Department, Contracted Projects Division, for a period of 4 months to assist in startup of Northport #2 Unit. Worked as Results Section First Line Supervisor at Glenwood for 15 months.

Related Information:

a) Completed a 1 week maintenance course at the Fisher Governor Controls School in Iowa.

b) Completed 2 weeks of Pratt & Whitney gas turbine controls and sequencer school in Connecticut.

c) Completed IRD balancing school at LILCO.

d) Instructed at the Company's First Line Supervisory Workshop (American Management Institute Course).

e) Participated in the Company's Second Line Supervisory Workshop.

f) Completed General Electric Seminar on electrical equipment at LILCO.

g) Completed National Electric Coil Seminar on motors in Ohio.

Organization (Industry):

a) American Nuclear Society

b) New England Reactor Engineers Association

c) Honeywell Computers User's Group

ROBERT A. LOPER

Station Technical Support Manager
Long Island Lighting Company

Assigned as Station Technical Support Manager in July 1979 at the Shoreham Nuclear Power Station responsible for the supervision of the station technical support staff. The Technical Support Manager's primary responsibility is to assist other sections in carrying out their responsibilities by providing support in the areas of regulatory compliance; the preparation, review, coordination, and evaluation of station modifications and nonroutine testing; document review; liaison with headquarters organizations; and the technical administration and physical direction of consultants and contractors.

Graduated from Union College in 1950 with a Bachelors Degree in Electrical Engineering. Completed a General Electric course in the Fundamentals of BWR Operation which included BWR simulator training. Completed a General Physics course in Nuclear Technology for Power Plant Engineers. Also completed General Electric courses in Nuclear and Process Control Instrumentation.

1977-1979

Assigned as Station Performance and Compliance Engineer at the Shoreham Nuclear Power Station in April 1977. Responsible for the supervision of section activities which included: coordinating technical consultant activities for station software, assisting in writing required station software, witnessing preoperational tests, reviewing preoperational test and test results for compliance to design parameters and regulatory requirements, and assisting the plant organization in technical related activities. Additional direct responsibilities included the documentation and coordination of the turnover of plant systems for the Startup organization to Electric Production.

1975-1977

Assigned as Lead Startup Engineer - Instrumentation and Controls of the Shoreham Nuclear Power Station. Responsible for the supervision of the activities of I&C Test Engineers. Particular responsibilities include the review of I&C test procedures and test results. Also responsible for the direction of technicians and vendor specialists in the calibration and testing of instrumentation.

1973-1975

Employed by the Long Island Lighting Company and assigned as Operations Engineer at a fossil fuel generating station. Responsible for the operating efficiency of the plant and the training of operators. Assigned as Electronics Engineer to the Shoreham Nuclear Power Station. Responsible for establishing the instrument repair and calibration facility. Also responsible for preparation of particular sections of the operator and technician training programs.

1960-1973

Employed by Brookhaven National Laboratory in the Accelerator Department. Assigned as a Project Engineer responsible for the design, development, operation, and maintenance of special equipment and devices used in high energy nuclear physics research. The equipment included nuclear particle separators, automated control systems, and instrumentation systems.

1957-1960

Employed by the Bettis Atomic Power Division of Westinghouse Electric Corp. Assigned as an Apparatus Engineer responsible for the specifications, testing, and installation of the reactor plant control panels for a nuclear powered naval surface ship. Responsible as a systems Engineer for the rod drive, steam generator water level, and primary plant instrumentation systems associated with both a prototype reactor at the Naval Reactor Testing Station and a nuclear powered naval surface ship. Particular responsibilities included system descriptions, parameters, test procedures, and coordination of the systems with

the remainder of the plant. Also responsible for the training of naval personnel in these systems.

1953-1957

Employed by Brookhaven National Laboratory as an instrumentation and controls engineer at a large acceleraor used in nuclear research. Assigned as a Power Engineer responsible for the operation and maintenance of special high power AC-DC conversion equipment and power distribution systems.

Registered Professional Engineer - State of New York

Senior Member - Instrument Society of America