LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

September 5, 1984

SNRC-1078

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

Submittal of the FSAR Chapter 13
and Section 17.2 Revisions
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Dear Mr. Denton:

As a result of the Long Island Lighting Company's recent management reorganization to reflect the Shoreham Nuclear Power Station's operational readiness, Chapter 13 - CONDUCT OF OPERATIONS and Section 17.2 - QUALITY ASSURANCE DURING THE OPERATIONS PHASE of the FSAR have been substantially revised.

Five (5) advance copies are attached herewith for your information. Revision bars, located in the margins, are used primarily to denote substantive text changes. These revisions, as submitted, will be included as part of the forthcoming Revision 33 to the FSAR.

If any additional information is required, please contact this office.

Very truly yours,

John D. Leonard, Jr.
Vice President - Nuclear Operations

MJG/RJT:ck

Enclosure

cc: P. Eselgroth
C. Petrone
M. Campagnone

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SNPS-1 FSAR

CHAPTER 13

CONDUCT OF OPERATIONS

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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 licensing and operation of the Shoreham Nuclear Power Station.

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

As a minimum, the Vice President, Nuclear Operations shall have a bachelors degree in science or an engineering field associated with power production and 10 years of experience associated with power plant design and operation, at least 5 years of which shall be nuclear power plant experience.

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

The Director, Quality Assurance, Safety, and Compliance has overall responsibility for quality assurance policy and the Independent Safety Engineering Group. He also serves as Chairman of the Nuclear Review Board. He reports directly to the Executive Vice President. The Director, Quality Assurance, Safety and Compliance has delegated the authority for managing the nuclear Quality Assurance Program to the Manager, Quality Assurance Department (QA Manager).

Among his duties, the QA Manager has responsibility for the Quality Control Division. The plant QA/QC responsibilities, the duties and qualifications of the QA Manager and the Manager of the Quality Control Division are defined in Section 17.2.

The Quality Systems and Quality Assurance Divisions, located outside of the station, and the QC Division, located at the station are responsible to the QA Manager as described in Section 17.2, Quality Assurance During the Operations Phase. Section 17.1 describes the Quality Assurance Program during design, construction, and preoperational testing. The Independent Safety Analysis Group and the Nuclear Review board are discussed in Sections 13.4.3 and 13.4.2.2 respectively.

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

13.1.1.1 LILCO Shoreham Project Organization

As the Shoreham Nuclear Power Station approached the operational phase, the Vice President, Nuclear Operations realigned management responsibilities to reflect the conclusion of the construction and preoperational testing phases. The Project Organization has been disbanded; project personnel have been reassigned to other departments. The technical and engineering expertise gained by Shoreham Project personnel during the design, construction, licensing and preoperational testing phases 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.

13.1.1.2 Corporate Organization at Fuel Load

The corporate reorganization to reflect the fuel load readiness of the Shoreham Nuclear Power Station has been implemented as described in Paragraphs 13.1.1 and 13.1.2.

13.1.1.3 LILCO Technical Support for Shoreham Operations

In addition to the technical and administrative support available as part of the Plant Operations Department, technical and administrative support for operation will be provided by the Manager, Nuclear Engineering, the Manager, Nuclear Operations Support, and the Vice President, Engineering and Administration, and their respective organizations. As shown on Fig. 13.1.1-1, the Manager, Nuclear Engineering and the Manager, Nuclear Operations Support report directly to the Vice President, Nuclear Operations on site. The objective of this supplementary support is to assure that LILCO has the resources to discharge its responsibility for the safe operation of the 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. 13.1.1-2, the Manager, Nuclear Engineering Department is supported by five divisions, i.e., Nuclear Systems Engineering, Nuclear Project Engineering, Radiation Protection, Engineering Assurance and Nuclear Fuel. These divisions will have as many staff specialists as required to support initial fuel loading and the safe operation of the plant. Technical design and evaluation expertise will be available in the areas of nuclear instrumentation, nuclear materials engineering, nuclear mechanical engineering, plant modifications, radiation protection and shielding, reactor physics, transient analysis, accident analysis, engineering assurance and nuclear fuel management. The Manager, Nuclear Engineering will have the responsibility for coordination, implementation, and direction of appropriate technical support functions carried out by the Nuclear Engineering Department (i.e., "Engineer-in-Charge" as described in ANS 3.1 draft revision dated 12/6/79). The qualifications and experience of the Manager,Nuclear Engineering Department are presented in Appendix 19A.

In order to ensure a continuing high level of engineering support, QA, and design control, an interim Management Control Program for Station Modifications has been implemented and will cover the period through approximately the first refueling. This program has been implemented in accordance with approved administrative procedures.

The qualified Architect/Engineer of record for the plant construction will be retained under this program to supply the necessary assistance to maintain the safety and operability of the plant.

As shown on Fig. 13.1.1-3, the Manager, Nuclear Operation Support Department is supported by six divisions; i.e., Nuclear Licensing and Regulatory Affairs, Nuclear Contracts and Material Control, Nuclear Financial Services, Nuclear Training, Nuclear Emergency Preparedness and Nuclear Services. These six divisions will have as many staff specialists as required to support initial fuel loading and the safe operation of the plant. Nuclear Operations Support personnel will provide administrative expertise for supplementary support functions such as licensing and regulatory activities, nuclear security, emergency preparedness, nuclear training, budget, contract administration, material control cost control and records management. The Manager, Nuclear Operations Support is also responsible directly to the Vice President, Nuclear Operations for the development and administration of corporate policies and procedures required for the management of the nuclear organization.

The Manager, Nuclear Operations Support position will have a minimum of a bachelors degree in engineering or the physical sciences and 6 years of professional level experience in nuclear services, nuclear power plant operation and/or engineering/design. A maximum of 2 years of the 6 years of

professional experience may be fulfilled by related technical or graduate academic training.

The qualifications and experience of the Manager, Nuclear Operations Support Department are presented in Appendix 13A.

The managers responsible for the Nuclear Licensing and Regulatory Affairs Division and the Nuclear Services Division will have a minimum of a bachelors degree in an academic field associated with electric power production or the physical sciences related to electrical energy generation, and 6 years of experience in power plant operation and/or engineering

The manager responsible for the Nuclear Training Division, shall have a bachelors degree. He shall have four years of professional level experience of which two 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 periods (one to two months).

2. One month operation above 20 percent power. He shall have or shall acquire some training in educational techniques if not included in his bachelor's degree course material. He shall, when responsible for the content and the conduct of the training program for licensed operators, possess a senior reactor operator's license.

Training Instructors shall have a high school diploma or equivalent and necessary special education work training to support the material being presented. He shall have experience consistent with his instructional duties. He shall have demonstrated knowledge of instructional techniques by experience or training, and he shall be certified a qualified instructor.

Training instructors who teach BWR Specific Systems, integrated response, transients, or simulator courses to licensed operators shall be certified a licensed Senior Reactor Operator.

The responsibilities of the Site Security Supervisor are described in the Security Plan. The minimum security complement is shown in Figure 13.1.1-3.

To further supplement the technical support of the nuclear organizations, the Vice President, Engineering and Administration has designated a minimum of 10 engineering personnel, assigned to the Corporate Engineering Office, for nuclear support. The first priority for these engineering personnel will be to respond to the needs of the Shoreham Plant as required.

13.1.2 Operations Organization

13.1.2.1 Plant Operations Department

The Shoreham Nuclear Power Station Operations Department as shown on Figs. 13.1.2-1 through 5 consists of 12 main sections reporting through their respective Section Heads to one of five Division Managers i.e., Operations, Maintenance, Radiological Controls, Outage and Modifications, and Operations Staff who in turn report to the Plant Manager.

13.1.2.1.1 Operations Division

The Operations Division will be responsible for the generation of electrical power in compliance with the rules and regulations of the governing regulatory agencies and the monitoring of the station performance to maximize plant availability and performance. The Operations Division consists of the Operations and Reactor Engineering Sections.

The Operating Engineer directs the activities of the Operations Section which will primarily consist of the routine operation of the station systems and equipment. The section will include a minimum of 32 supervisors and operators, responsible for the operation of the station. A Watch Engineer will direct the operation of each shift through the Watch Supervisor, Nuclear Station Operator and the Nuclear Assistant Station Operator. The Watch Engineer reports to the Operating Engineer.

The Reactor Engineering Section is supervised by the Reactor Engineer. The section will include a minimum of 8 Engineers and Shift Technical Advisors who will function in the areas of core physics, fuel management, post refueling start-up surveillance testing and accident assessment/transient analysis.

13.1.2.1.2 Maintenance Division

The Maintenance Division will be responsible for ensuring that the mechanical, electrical, instrumentation and computer systems are in an operable state, thereby minimizing forced outages or power reductions. The Maintenance Division is comprised of the Instrument and Control, Computer Engineering and Maintenance Sections.

The Instrument and Control Section will have a minimum of 12 persons comprised of engineers, a foreman and technicians who will be responsible for the calibration, maintenance, and testing of instruments and control systems in the nuclear power station.

The Computer Engineering Section, directed by the Computer Engineer will repair, test and maintain all hardware, software and firmware associated with process, emergency and administrative computer and teleprocessing systems. In addition

to the Computer Engineer the section will include a minimum of 6 Engineers and Technicians. Additional technicians may be used to supplement the computer work force as required.

The Maintenance Section will have a minimum staffing of 26 persons 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.

13.1.2.1.3 Radiological Controls Division

The Radiological Controls Division is responsible for the protection of the public, station personnel and the environment from the effects of exposure to radiation and the hazards of industrial chemical products. The Division will maintain the radiation doses of station personnel and the public as low as reasonably achievable and assure proper handling, processing and disposal of radioactive materials. The Radiological Controls Division consists of the Health Physics, Radiochemistry and Radwaste Sections.

The Health Physics Section, directed by the Health Physics Engineer will have a minimum of 14 engineers and technicians to implement Shoreham's Radiation Protection Program, including the preparation of Radiation Work Permits, performance of radiological surveillances, maintenance of personnel exposure records and calibration and maintenance of fixed and portable radiation detection instrumentation.

The Radiochemistry Section will consist of a minimum of 11 Engineers and Technicians. The Radiochemistry Engineer will supervise the section activities such as detection and control of environmental releases, assessment of radiation doses to the public and station chemical and radiochemical activities.

The Radwaste Engineering Section, directed by the Radwaste Engineer, will consist of a minimum of 5 Engineers and Technicians. The Section will be responsible for the processing, handling and preparation for shipment of all radioactive waste.

13.1.2.1.4 Outage and Modifications Division

The Outage and Modifications Division consists of the Modification Engineering, Planning and Scheduling and Outage Planning sections which will implement design changes to plant systems and equipment as required by regulatory agencies or to improve plant operation and reliability. Through the planning and scheduling of maintenance and modification work during

operation, short term outages, and refueling outages the division functions to increase the station availability and optimize the size of modification related work forces.

The Modification Engineering Section, directed by the Modification Engineer, requests and implements station modifications, coordinates post modification retesting, and return to service. This section is comprised of the Modification Engineer, engineers (as assigned), and engineering aides (as assigned).

The Planning and Scheduling Section, directed by the Planning and Scheduling Engineer, performs planning and scheduling associated with plant activities. This section is comprised of the Planning & Scheduling Engineer, engineers (as assigned), engineering aides (as assigned), planners, and clerical personnel.

The Outage Planning Section, directed by the Outage Planning Engineer, coordinates the planning of scheduled plant outages. This section is comprised of the Outage Planning Engineer and Engineers (as assigned).

13.1.2.1.5 Operations Staff Division

The Operations Staff Division is comprised of the Administrative and Operational Compliance Sections which provide station administrative support and assurance that the station is in compliance with the requirements of the Operating License.

The Plant Administrative Section, directed by the Administrative Coordinator, reports directly to the Operations Staff Manager and is responsible for the administration and direction of the office organization, including plant personnel records, plant filing system, office procedures, and reproduction equipment. The section administers the flow of correspondence, specifications, and drawings into and out of the plant.

The Operational Compliance Section, directed by the Operational Compliance Engineer, implements the station surveillance programs including Leak Rate Testing, Inservice Testing, and Snubber Testing. The Operational Compliance Engineer reviews surveillance activities to ensure compliance with the station's technical specifications. The Operational Compliance Section is comprised of the Operational Compliance Engineer and engineers (as assigned).

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 as

follows: Plant Manager, Operations Manager*, Maintenance Manager*, outage and Modifications Manager, 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 Operations and has direct responsibility for operating the station in a safe, reliable, and efficient manner. The Plant Manager is responsible for offsite radioactive discharges and for the policy of maintaining occupation radiation exposures as low as reasonably achievable (ALARA). He bears the responsibility for compliance with the facility license.

13.1.2.2.2 Operations Division Manager

The Operations Division Manager (Operations Manager) reports directly to the Plant Manager and is responsible for the supervision of the Operating and Reactor Engineering Sections.

13.1.2.2.3 Maintenance Division Manager

The Maintenance Division Manager (Maintenance Manager) reports directly to the Plant Manager and is responsible for the supervision of the Instrument and Control, Computer Engineering and Maintenance Sections.

13.1.2.2.4 Radiological Controls Division Manager

The Radiological Controls Division Manager (Radiological Controls Manager) reports directly to the Plant Manager and is responsible for the supervision of the Health Physics, Radiochemistry and Radwaste sections.

13.1.2.2.5 Outage and Modification Division Manager

Outage and Modification Division Manager (Outage and Modification Manager) reports directly to the Plant Manager and is responsible for the supervision of the Outage Planning, Modification Engineering and the Planning and Scheduling sections.

13.1.2.2.6 Operations Staff Division Manager

The Operations Staff Division Manager (Operations Staff Manager) reports directly to the Plant Manager and is responsible for the supervision of the Administrative and the Operational Compliance Sections.

13.1.2.2.7 Operating Engineer

The Operating Engineer reports directly to the Operations Manager 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, Computer Engineer and Instrument and Control Engineer.

13.1.2.2.8 Maintenance Engineer

The Maintenance Engineer reports directly to the Maintenance Manager 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.

13.1.2.2.9 Instrument and Control Engineer

The Instrument and Control (I&C) Engineer reports directly to the Maintenance Manager and is responsible for the preparation of calibration, surveillance, preventative maintenance, and repair procedures; the repair and calibration of the station instrument and control systems; the implementation 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 and implements the Instrument Record System. In addition, the I&C Engineer coordinates work performed onsite by the Protection Division, and the Meter and Test Department.

13.1.2.2.10 Radiochemistry (RC) Engineer

The RC Engineer reports directly to the Radiological Controls Manager and is directly responsible for all station chemistry including the oversight of chemical and radiochemical analyses and chemical treatment of plant process systems. The RC engineer defines programs for detecting and controlling environmental releases, implements the Nuclear Regulatory Commission ALARA policy for these releases, and implements the Offsite Dose Calculation Monitor (ODCM). The RC Engineer manages the station chemistry laboratory, the counting room and the plant effluent radiation monitoring equipment to ensure compliance with technical specifications, manufacturer's fuel warranty and other governmental regulatory requirements. He oversees preparation of records and reports of chemical surveys and plant effluents.

13.1.2.2.11 Health Physics (HP) Engineer

The HP Engireer reports directly to the Radiological Controls Manager and directs the station health physics activities. He is responsible for the radiation protection of all personnel at the plant, consistent with regulatory guidance and company policy. He also implements the ALARA policy for workers and makes it a

formal part of the Shoreham Radiation Protection Program. He is responsible for the Respiratory Protection Program, the maintenance of the nuclear license and for the receipt of all radioactive materials. The HP Engineer provides input to training programs to assure that plant and temporary personnel are familiar with established health physics procedures. The HP Engineer oversees the preparation of Radiation Work Permits and the performance of radiological surveillances including surveys of radiation levels. He maintains plant records and reports on personnel exposure and radiation and contamination surveys. 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.

13.1.2.2.12 Reactor Engineer

The Reactor Engineer reports directly to the Operations Manager 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 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.

13.1.2.2.13 Computer Engineer

The Computer Engineer reports directly to the Maintenance Manager and is responsible for the repair testing and maintenance of all hardware, software, and firmware associated with process, emergency and administrative computer and teleprocessing systems.

13.1.2.2.14 Radwaste Engineer

The Radwaste Engineer reports directly to the Radiological Controls Manager and is responsible for the handling, processing and preparation of radwaste for shipment in a manner that is in compliance with regulations, consistent with ALARA and supportive of plant operation. He provides direction for all operations in the Radwaste Building, except those directly affecting plant processes. He manages the packaging of all waste based on its type and radioactivity levels consistent with the Process Control Program and storage, transportation and burial requirements. The Radwaste Engineer also maintains records of radwaste activities and makes recommendations regarding plant operations that affect radwaste.

13.1.2.2.15 Modification Engineer

The Modification Engineer reports directly to the Outage and Modification Manager and is responsible for the implementation of all station modifications, coordination of post-modification retesting and return to service.

13.1.2.2.16 Planning and Scheduling Engineer

The Planning and Scheduling Engineer reports directly to the Outage and Modifications Manager and is responsible for the scheduling of plant activities.

13.1.2.2.17 Outage Planning Engineer

The Outage Planning Engineer reports directly to the Outage and Modifications Manager and is responsible for the planning of scheduled outages.

13.1.2.2.18 Nuclear Engineer

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

13.1.2.2.19 Engineer

The Engineer within the Operating Section reports to the Operating Engineer. His duties are similar to those of the Operating Engineer.

13.1.2.2.20 Shift Technical Advisors

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

13.1.2.2.21 Watch Engineers

The Watch Engineers (WE) are responsible for the overall safe operation of the unit during his assigned shift. He reports directly to the Operating Engineer. He directs the activities of station personnel assigned to his shift and is cognizant of the performance of maintenance, and operations activities. The WE on duty has both the authority and the obligation to shut down the unit if, in his judgment, conditions warrant this action.

13.1.2.2.22 Watch Supervisors

Watch Supervisors are responsible for the actual operation of the unit during their assigned shifts. They report directly to the Watch Engineer. They direct the activities of the control room operators on shift and are cognizant of the performance of all maintenance activity during the shift. The Watch Supervisor on duty has both the authority and the obligation to shut down the unit if, in his judgment, conditions warrant this action.

13.1.2.2.23 Foremen

The Operations Department has foremen working in the following sections: Maintenance, Instrumentation and Controls, Health Physics, and Radiochemistry. These foremen are responsible for effecting daily activities related to their specific section. They directly supervise the activities of the labor force assigned to their sections. In addition, they are involved in the implementation of programs within their sections which demonstrate, maintain and ensure quality work standards.

13.1.2.3 Nonsupervisory Personnel

13.1.2.3.1 Nuclear Station Operators

The Nuclear Station Operators (NSO) report directly to the Watch Supervisor and are 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.

They are 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 are responsible for their on-the-job training and satisfactory performance.

They are 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 their judgment, conditions warrant this action.

13.1.2.3.2 Nuclear Assistant Station Operators

The Nuclear Assistant Station Operators (NASO) are 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.

NASOs are 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 Operators

Equipment Operators (EO) are responsible to and operate station auxiliary equipment under the direct supervision of the NSO or NASO.

13.1.2.3.4 Technicians

Technicians are responsible to the engineer or supervisor to whom 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 analyses for chemical and radiochemical content; perform radiation surveys; and operate, maintain, and calibrate radiation protection equipment and instrumentation.

13.1.2.3.5 Mechanics

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 maintenance activities such as completion of repair and inspection reports on safety-related equipment.

13.1.2.4 Shift Crew Composition

The normal plant operating shift will consist of one Watch Engineer (with SRO license), one Watch Supervisor (with SRO license), one Nuclear Station Operator (with RO license), one Nuclear Assistant Station Operator (with RO license), one Shift Technical Advisor, three Equipment Operators (nonlicensed), one Technician trained in health physics techniques, and one Technician trained in radiochemistry techniques for a total of ten personnel. One of the Equipment Operators will be dedicated to the communication function in the event of an emergency, as described in Section 13.3.

In addition, LILCO will have at least one individual on site on each operating shift with substantive previous BWR operating

experience, including startup and shutdown of a BWR. This experienced person will be assigned to each shift, reporting to the Watch Engineer, commencing at fuel loading until the plant is operating at 100 percent power. At that time, the operating personnel will have acquired sufficient operating experience to operate without such consultants.

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

13.1.3 Qualification Requirements for Station Personnel

This section includes the minimum qualification requirements for all responsible station personnel, both supervisory and nonsupervisory. 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 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, startup, 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 months operation above 20 percent 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 a 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.

The qualifications and experience of the Plant Manager are presented in Appendix 13A.

13.1.3.2 Operations Manager

The Operations Manager 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, startup, operation, maintenance, or technical services.

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

1. Two months operation above 20 percent 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 a 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.

The qualifications and experience of the Operations Manager are presented in Appendix 13A.

13.1.3.3 Maintenance Manager

The Maintenance Manager will have a minimum of 4 years of responsible power plant experience of which at least 2 years will be in a nuclear power station design, construction, startup, operation, maintenance, or technical services.

During the 3 years of nuclear power plant experience he shall have participated in the management activities in any two of the following areas:

1. Preoperation or initial plant startup testing or post refueling outage startup testing (6-12 months)
2. Construction of a nuclear power plant (6-12 months)
3. Maintenance of a nuclear power plant (6-12 months)
4. Two months training at an operating nuclear power plant

He shall have a 4 year degree in engineering or a 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.

The qualifications and experience of the Maintenance Manager are presented in Appendix 13A.

13.1.3.4 Radiological Controls Manager

The Radiological Controls Manager will have a minimum of 4 years experience in a responsible engineering position of which at least 3 years will be in a nuclear power station design, construction, startup, operation, maintenance, or technical services.

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

1. Two months operation above 20 percent power,

2. Routine refueling outage (1 to 2 months).

The Radiological Controls Manager shall have a 4 year degree in engineering or a related scientific field.

The qualifications and experience of the Radiological Controls Manager are presented in Appendix 13A.

13.1.3.5 Outage and Modifications Manager

The Outage and Modifications Manager will have a minimum of four years experience in a responsible engineering position of which at least three years will be in a nuclear power station design, construction, start-up, operation, maintenance, or technical services.

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

1. Two months operation above 20 percent power,

2. Routine refueling outage (one to two months),

3. Initial plant start-up testing or post refueling outage start-up testing.

The Outage and Modifications Manager shall have a four year degree in engineering or a related scientific field.

The qualifications and experience of the Outage and Modifications Manager are presented in Appendix 13A.

13.1.3.6 Operating Engineer

The Operating Engineer will have as a minimum the experience qualifications listed for Operations Manager in ANSI N18.1-1971. He will have a bachelors degree in engineering or a related science. He shall have a minimum of 8 years of responsible power plant experience of which at least 3 years shall be nuclear power plant experience (design, construction, startup, operations, maintenance, or technical services). A maximum of 2 years of the remaining 5 years of power plant experience may be fulfilled by academic or related technical training, on a one-for-one time basis. During the 3 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 months operation above 20 percent 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 Operator License.

13.1.3.7 Maintenance Engineer

The Maintenance Engineer shall have a bachelors degree in engineering or a related scientific field. He shall through training or experience, have nondestructive testing familiarity, craft knowledge and an understanding of the electrical, pressure vessel and piping codes and standards. He shall have 4 years of power plant experience of which 2 years shall be nuclear power plant experience. During the 2 years, he shall participate at an operating nuclear power plant during the following periods:

1. One month of operation above 20 percent 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.

13.1.3.8 Reactor Engineer

The Reactor Engineer will have a bachelors degree in engineering or a related science and at the time of initial core loading will have 4 years professional level experience of which 2 years will

be nuclear power plant experience. The Reactor Engineer's experience will be in such areas as reactor physics, core measurements, core heat transfer, and core physics testing programs. During the 2 years this 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 percent power to 100 percent power including stabilization of xenon,
4. Rod sequence exchange,
5. Two weeks operation above 20 percent power.

13.1.3.9 Instrument and Control Engineer

The Instrument and Control Engineer shall have a minimum of 2 years experience in the instrument and control field of which at least 1 year will be associated with nuclear instrumentation.

The Instrument and Control Engineer shall possess a bachelors degree in engineering or a related science. He shall have participated in the instrument and control 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 month operation above 20 percent power.

13.1.3.10 Health Physics Engineer

The Health Physics Engineer shall have a bachelors degree in engineering or a related science including formal training in radiation protection. He shall have a minimum of 4 years of experience in radiation protection of which at least 3 years of this experience shall be at a nuclear facility. Of these 3 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 month of routine refueling outage,
2. Two months of operations above 20 percent power,

3. Six months of experience onsite.

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.

13.1.3.11 Radiochemistry Engineer

The Radiochemistry (RC) Engineer will have a minimum of 2 years experience in chemistry. A minimum of 1 year will be in radiochemistry at a nuclear power plant. During the 1 year, the individual shall participate in the chemistry section at an operating nuclear power plant for 3 months; no less than 2 months shall be with the plant operating above 20 percent 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 1 year of nuclear power plant experience. Six months experience shall be onsite. The RC Engineer shall have a bachelors degree in engineering or a related science.

13.1.3.12 Computer Engineer

The Computer Engineer shall have a minimum of 2 years of experience in instrumentation and controls of the computer field and he shall possess a bachelor of science degree in engineering or a related science.

13.1.3.13 Radwaste Engineer

The Radwaste Engineer shall have a bachelors degree in engineering or a related science or 6 years of power plant experience at which 2 yrs shall be in a nuclear power plant. He shall have a minimum of 4 years professional level experience of which at least 1 years shall be nuclear power plant experience.

13.1.3.14 Modifications Engineer

The Modifications Engineer 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, startup, operation, maintenance, or technical services. He shall have a 4 year degree in engineering or a related scientific field.

13.1.3.15 Planning and Scheduling Engineer

The Planning and Scheduling Engineer will have a minimum of 4 years experience in a power plant position of which at least 1 year will be in nuclear power station design, construction,

startup, operation, maintenance or technical services. He shall have a 4 year degree in engineering or a related scientific field or 6 years of power plant experience of which 2 years shall be in a nuclear power plant.

13.1.3.16 Outage Planning Engineer

The Outage Planning Engineer 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, startup, operation, maintenance, or technical services. He shall have a 4 year degree in engineering or a related scientific field.

13.1.3.17 Nuclear Engineer

The Nuclear Engineer will have a bachelors degree in engineering or a related science and 2 years professional level experience of which 1 year will be nuclear power plant experience. Six months experience will be onsite.

13.1.3.18 Engineers

Engineers shall have a bachelors degree in engineering or the physical sciences, or a high school diploma and 4 years experience in a responsible technical position.

The Engineer who reports to the Operating Engineer and acts as his alternate shall possess the experience qualifications required by ANSI 18.1-1971 for the Operations Manager.

13.1.3.19 Watch Engineer

Watch Engineers shall have a high school diploma or equivalent. They 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 during operational conditions 1, 2, or 3). They 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 this 2 years of nuclear power plant experience, these individuals shall participate in reactor operator activities at an operating nuclear power plant during the following periods:

1. Six weeks operation above 20 percent power.

2. Startup from subcritical to 20 percent power.

3. Shutdown from above 20 percent power to cold (212° F) and subcritical.

4. Startup preparations following a refueling outage.

Watch Engineers shall hold a Senior Reactor Operators License.

13.1.3.20 Watch Supervisors

Watch Supervisors shall have a high school diploma or equivalent. They 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 two years, the individual shall participate in reactor operator activities at an operating nuclear power plant during 6 weeks operation above 20 percent power. He shall hold a Senior Reactor Operators License.

13.1.3.21 Nuclear Station Operators (NSO)

Nuclear Station Operators will have a high school diploma or equivalent. They shall have a minimum of 3 years of power plant experience of which a minimum of 1 year shall be nuclear power plant experience. This one year of nuclear power plant experience shall include 6 months of plant operational duties at the power plant. NSOs shall hold a Reactor Operators License.

13.1.3.22 Nuclear Assistant Station Operators (NASO)

Nuclear Assistant Station Operators will have at least the requirements for a Licensed Reactor Operator given in ANSI N18.1-1971. That is, they will have a high school diploma or equivalent and shall have a minimum of 2 years of power plant experience of which a minimum of 1 year will be nuclear power plant experience. NASOs shall hold a Reactor Operators License.

13.1.3.23 Equipment Operators

The Equipment Operators 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 1 year of power plant experience.

13.1.3.24 Foremen

A foreman will be required to have a high school diploma or equivalent and a minimum of 4 years of experience in the craft discipline which he supervises, of which 1 year shall be nuclear power plant experience. This experience may be fulfilled by an equivalent period of related training.

13.1.3.25 Mechanics

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

13.1.3.26 Technicians

Technicians will be high school graduates or equivalent. Technicians in responsible positions shall have a minimum of 2 years of working experience in their specialty, (e.g., Health Physics, Chemistry, or Instrumentation and Controls). These personnel should have a minimum of 1 year related technical training in addition to their experience. Technicians will have a thorough knowledge of the design and operation of the equipment related to their field.

13.1.3.27 Shift Technical Advisors

The minimum qualifications for Shift Technical Advisors should enhance the accident assessment function at the plant. Shift Technical Advisors will have a bachelors degree in a scientific or an engineering discipline. Shift Technical Advisors shall receive general employee training and specialized training in thermohydraulics, heat transfer, and accident/transient analysis.

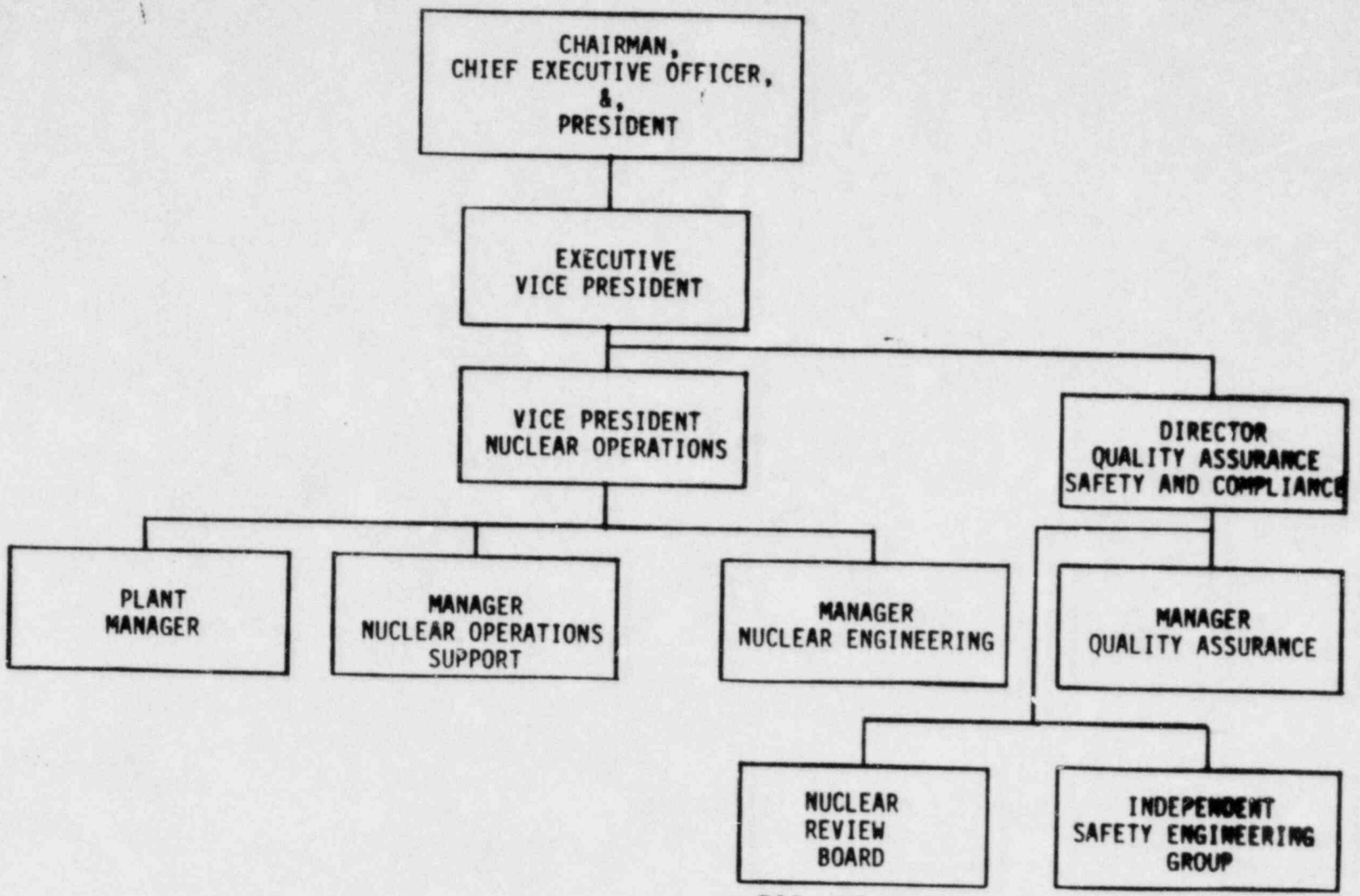


FIG. 13.1.1-1
DIRECTION OF EXECUTIVE RESPONSIBILITY
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

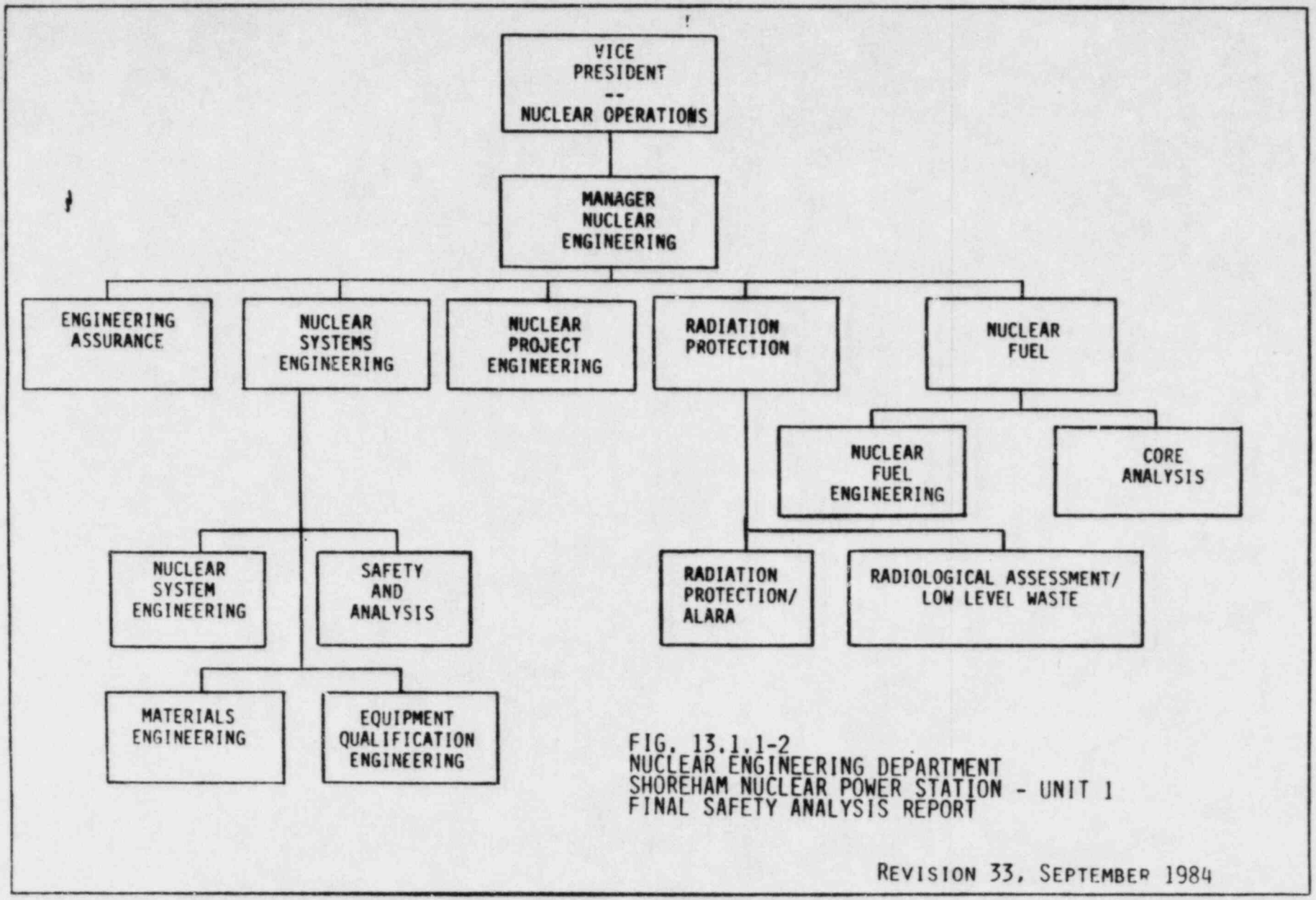


FIG. 13.1.1-2
NUCLEAR ENGINEERING DEPARTMENT
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

REVISION 33, SEPTEMBER 1984

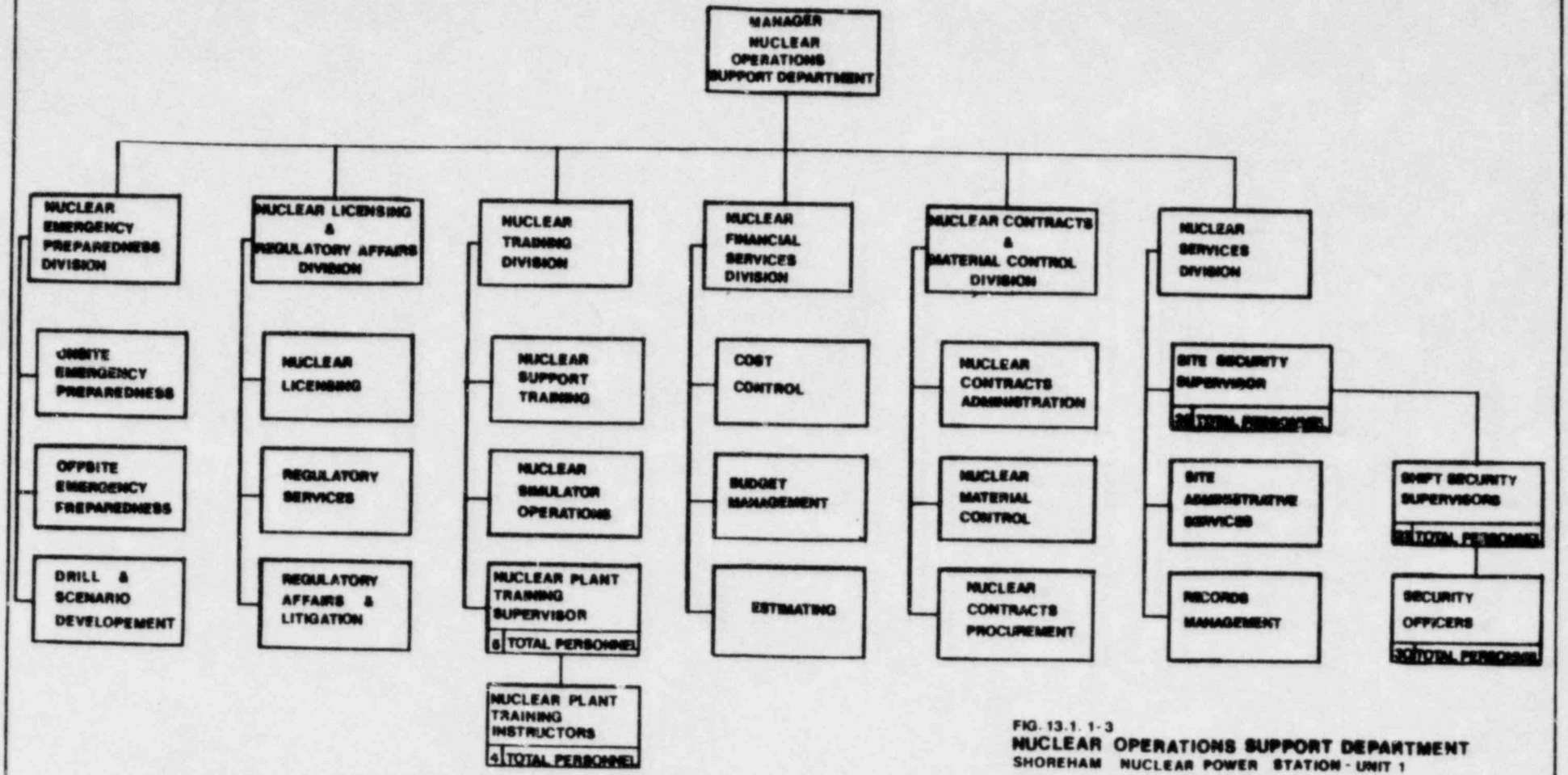


FIG. 13.1. 1-3
NUCLEAR OPERATIONS SUPPORT DEPARTMENT
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

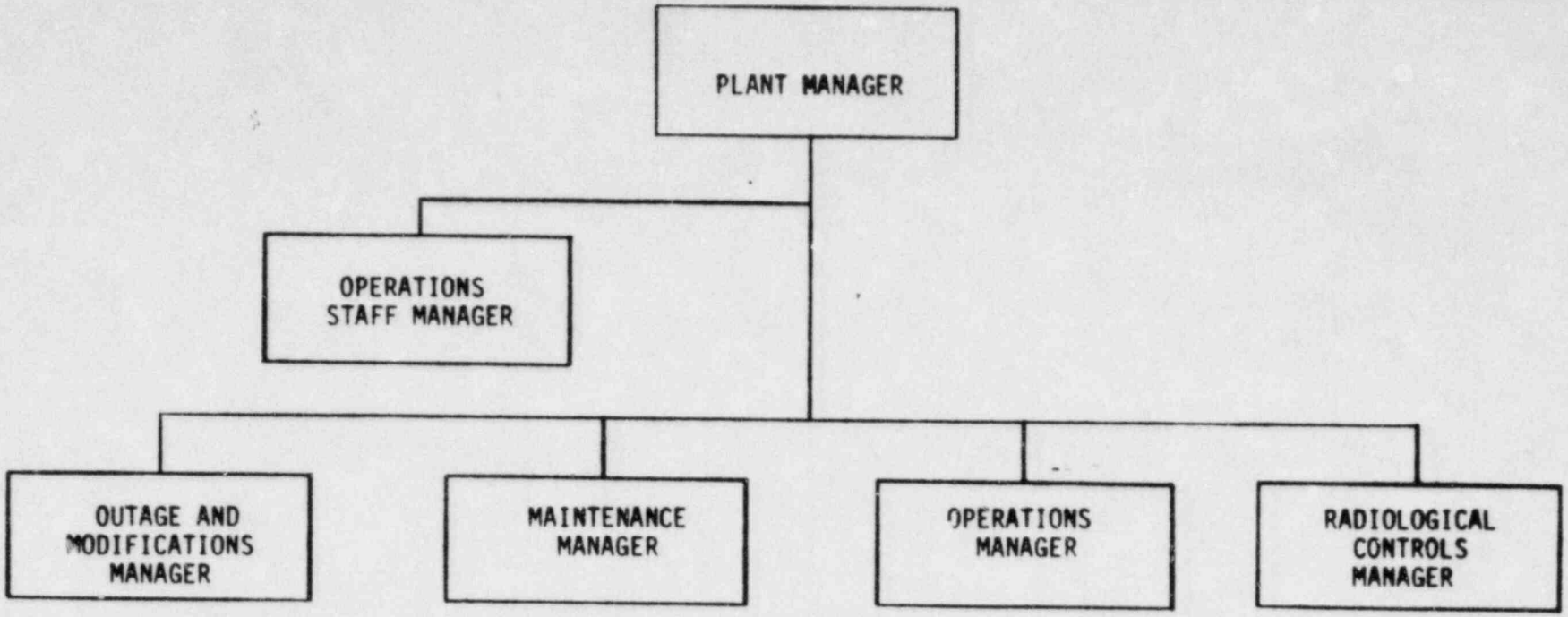


FIG. 13.1.2-1
SHOREHAM NUCLEAR POWER STATION STAFF
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

REVISION 33, SEPTEMBER 1984

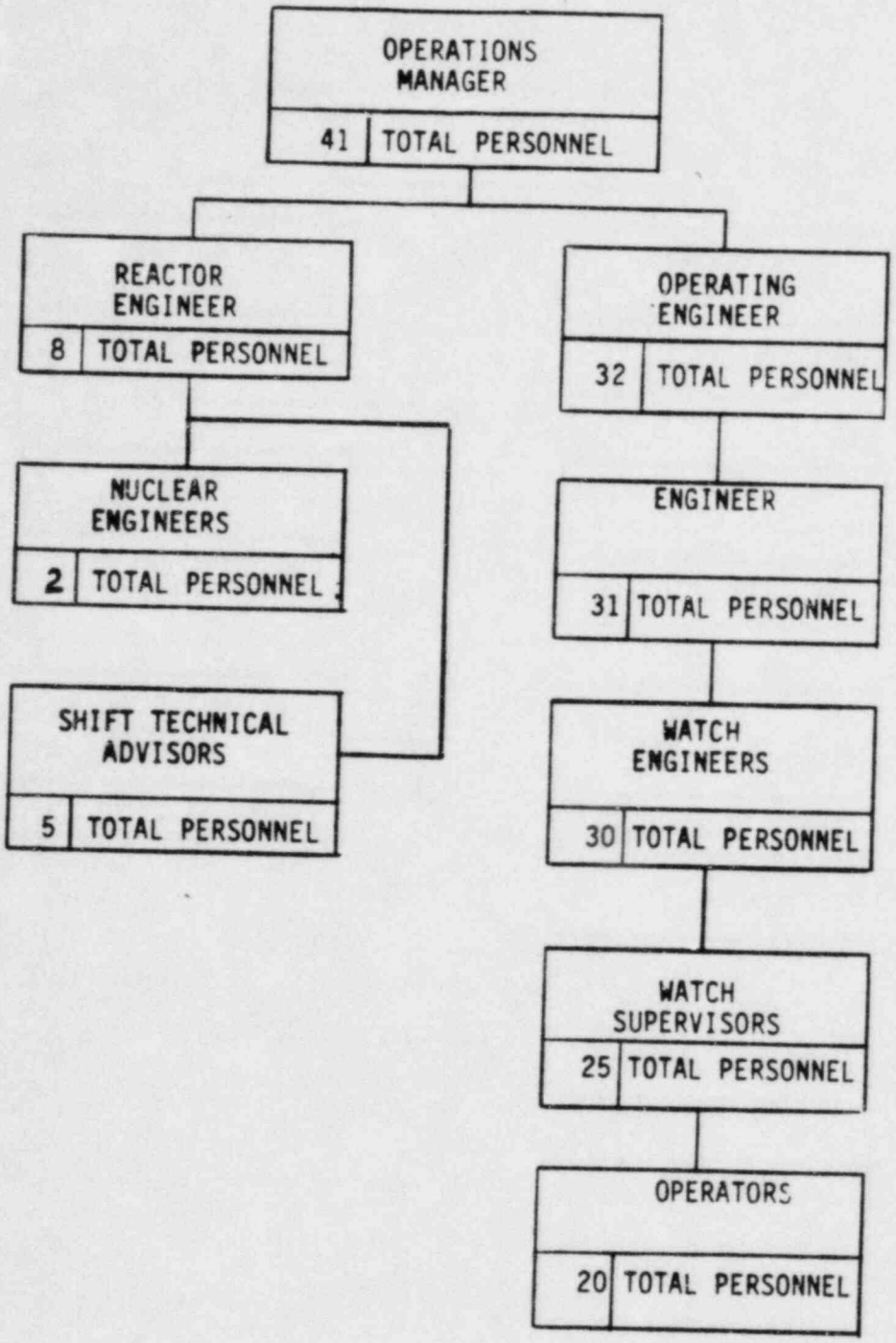


FIG. 13.1.2-2
SHOREHAM NUCLEAR POWER STATION STAFF,
OPERATIONS DIVISION
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

REVISION 33, SEPTEMBER 1984

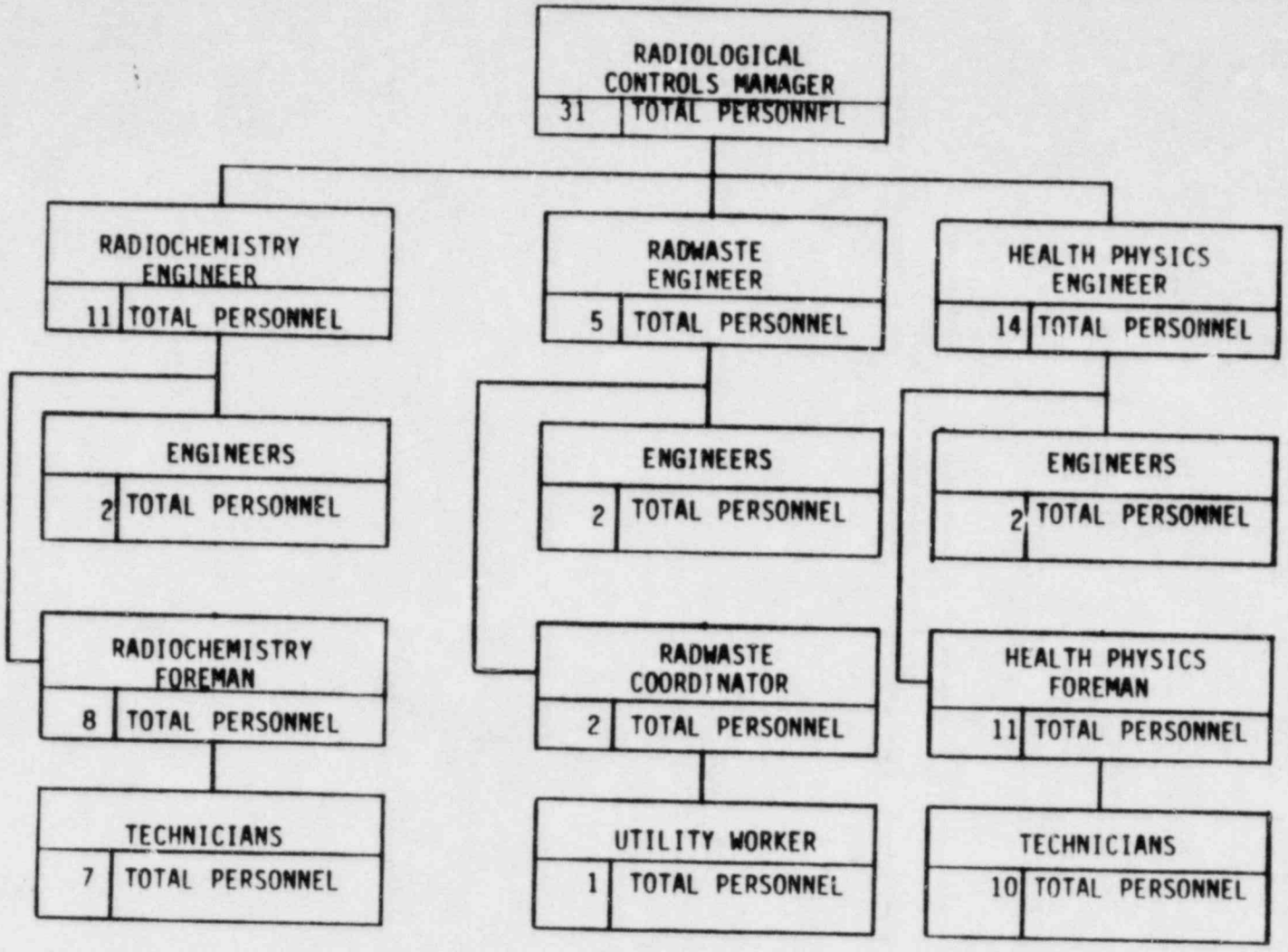


FIG. 13.1.2-3
SHOREHAM NUCLEAR POWER STATION STAFF,
RADIOLOGICAL CONTROLS DIVISION
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

REVISION 33, SEPTEMBER 1984

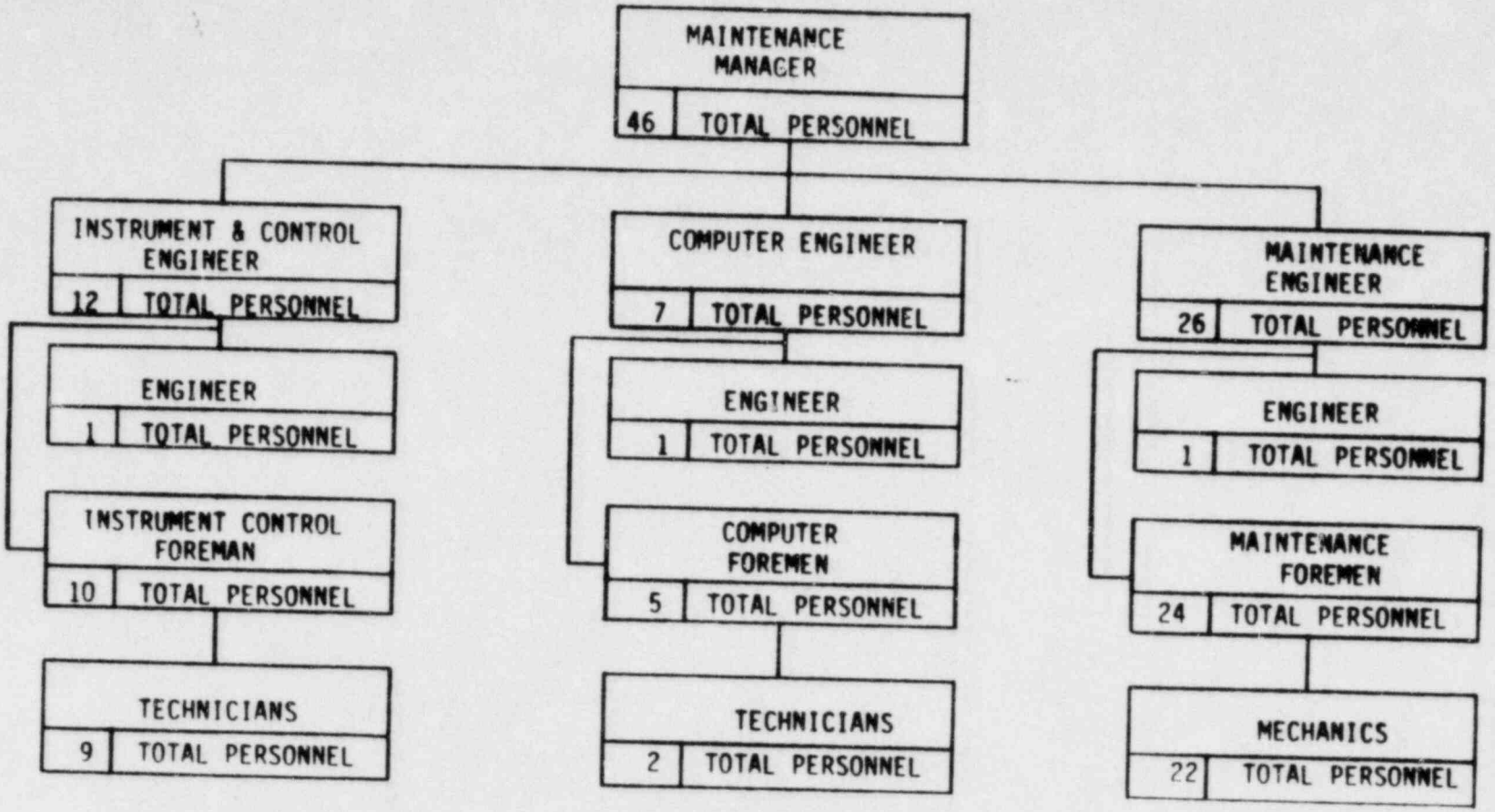


FIG. 13.1.2-4
SHOREHAM NUCLEAR POWER STATION STAFF,
MAINTENANCE DIVISION
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

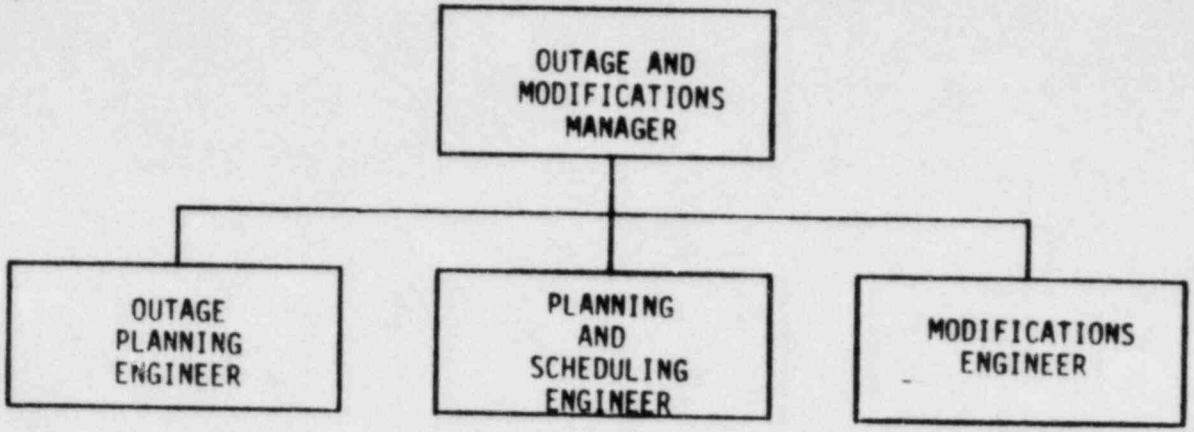


FIG. 13.1.2-5
SHOREHAM NUCLEAR POWER STATION STAFF,
OUTAGE AND MODIFICATIONS DIVISION
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

REVISION 33, SEPTEMBER 1984

13.2 TRAINING PROGRAM

13.2.1 Program Description

The objective of the Shoreham Nuclear Power Station training program is to provide fully trained and qualified operating, maintenance, and technical personnel to ensure safe and efficient operation of the station. To accomplish this objective, the nuclear training program for the staff of the Shoreham Nuclear Power Station has been arranged and is being implemented to meet the needs of the individual staff member. Training received by each individual is dependent upon background, previous training, and staff assignment.

This initial training program is designed to utilize experienced fossil plant operating personnel who have little or no nuclear experience. Guidance for the development of the training program was obtained using ANSI N.18.1-1971. "Selection and Training of Nuclear Power Plant Personnel," and WASH 1094 - November 1965, "A Guide for the Licensing of Facility Operators, Including Senior Operators."

The overall training program for the initial plant staff is divided into three areas:

1. Training programs for reactor operator, senior reactor operator, and senior reactor operator limited to fuel handling, license candidates.

2. Training programs for non-licensed personnel.

3. General employee training.

13.2.1.1 Licensed Operator Training Program

Licensed Reactor Operator (RO) candidates will receive formal training in the following subject areas:

1. Principles of reactor operation

2. Design features of the Shoreham Nuclear Power Station

3. General operating characteristics of the Shoreham Nuclear Power Station.

4. Instrumentation and control systems

5. Safety and emergency systems

6. Normal and emergency operating procedures

7. Radiation control and safety provisions

8. Heat Transfer, Thermodynamics, and Fluid Flow

Licensed Senior Reactor Operator (SRO) candidates will, in addition to the above subject areas, receive technical training in the following subject areas:

9. Reactor theory

10. Handling and disposal of, and hazards associated with, radioactive materials

11. Specific operating characteristics of the Shoreham Nuclear Power Station

12. Fuel handling and core parameters

13. Administrative procedures, conditions, and limitations

Licensed Senior Reactor Operator Limited to Fuel Handling (SRO-R) candidates will receive formal training in the following areas:

14. Reactor and fuel characteristics

15. Equipment instrumentation and design description

16. Procedures and limitations

17. Emergency systems and safety devices

18. Health Physics and radiation protection

The complete initial staff training program is conducted in conjunction with contracted training services from the General Electric Company, General Physics Corporation, and NUS Corporation. The program for licensed personnel as described in detail in this section is divided into the following phases:

1. Basic nuclear

2. BWR technology

3. BWR operator training (simulator)

4. BWR Observation

5. Onsite training

13.2.1.1.1 Basic Nuclear Course

The basic nuclear course is 13 weeks in duration and consists of a combination of video tape and classroom lectures presented by either contract instructors or LILCO personnel. The course is

designed to provide a thorough understanding of the basic principles, characteristics, and unique features of the nuclear steam supply system. The major areas covered are: basic nuclear physics, reactor operations, core performance, radiation protection, plant chemistry, instrumentation and control, heat transfer and thermodynamics. Student performance is evaluated through the administration of periodic written examinations.

13.2.1.1.2 BWR Systems Training

The BWR Systems Training course, presented by licensed or certified LILCO or contract personnel, consists of five weeks of classroom lectures on BWR components, core design, thermal-hydraulics, auxiliary systems, process and nuclear instrumentation design and operation, and interfaces with the balance of plant systems. Student performance is evaluated through the administration of periodic written examinations.

13.2.1.1.3 BWR Operator Training

The BWR operator training course is conducted by the General Electric Company or the General Physics Corporation and consists of up to 12 weeks of classroom lectures and simulator control room exercises designed to provide inexperienced BWR operator and senior operator license candidates with the necessary skills to safely and efficiently operate the Shoreham nuclear reactor. Suggested reading and study assignments are made daily. Written and oral examinations are given to monitor the candidates' progress. During simulator control room exercises, candidates rotate through the various control room positions, including Watch Engineer, so that all candidates may have equal opportunity to perform plant evolutions from each operating position. Simulators used during this training phase included the Dresden BWR simulator operated by the General Electric Company and the Limerick BWR simulator operated by the General Physics Corporation. The Shoreham simulator will be used for this purpose when it is operational.

13.2.1.1.4 BWR Observation

The BWR observation course prior to Shoreham operation consists of four or more weeks of guided observation on an operational BWR. The Dresden Nuclear Power Station and/or Millstone - Unit 1 Nuclear Power Station is utilized for this observation training. The course provides exposure to plant operating and maintenance evolutions, station record keeping and station procedures. Student performance is measured through administration of oral and written examinations.

13.2.1.1.5 Onsite Training

The Shoreham Onsite Training (OST) program consists of approximately 18 weeks of classroom lectures and field training. The onsite training program provides all cold license candidates with an in-depth study of SNPS systems and equipment; nuclear characteristics; normal, abnormal, emergency and administrative procedures; and technical specifications prior to NRC examinations. The primary management responsibility of the Watch Engineer to assure safe operation of the plant is emphasized in the procedure training. Candidates for a license limited to fuel handling will participate in those activities of the onsite training program relating to subject areas 14 through 18 as previously mentioned in Section 13.2.1.1 Licensed personnel supervising or performing fuel handling operations will receive training on fuel handling equipment and procedures prior to performing fuel handling operations.

Instructors for the various onsite training lectures will be supplied by the SNPS Staff, other LILCO organizations, vendors and/or consultants. Selection of the particular individual to conduct a specific training lecture will be based upon individual availability and knowledge of the subject matter involved. Evaluation of student performance will be accomplished through the administration of written and oral examinations.

13.2.1.1.6 BWR Refueling Observation

Candidates for a license limited to fuel handling will participate as trainees in the fuel handling activities of an operating General Electric BWR Plant similar to the Shoreham station, during a scheduled refueling outage.

13.2.1.1.7 Research Reactor Training

Research Reactor Training will be given to all cold NRC license candidates without previous nuclear experience. This training will consist of at least 10 meaningful reactor startups on the Brookhaven Medical Research Reactor (or similar available facility) administered by LILCO (or consultant) personnel. In all cases cold NRC license candidates will have completed 10 meaningful startups on a Nuclear Reactor prior to submitting an application for a cold license examination.

13.2.1.1.8 Coordination With Preoperational Tests and Fuel Loading

Whenever possible, the training program for each section of plant employees is coordinated with preoperational testing and fuel loading.

13.2.1.1.9 Practical Reactor Operation

Practical (on the job) plant operation for license candidates will commence with the preoperational test program. Practical reactor operation for licensed personnel will commence with fuel loading and continue through the startup test program.

13.2.1.1.10 Reactor Simulation Training

Reactor simulator training will be conducted at the Dresden or Limerick simulators as described in Section 13.2.1.1.3 for "cold" license candidates who require such training.

13.2.1.1.11 Previous Nuclear Training

Other nuclear training programs or experience that satisfy the intent of the program outlined in Section 13.2.1.1 may be substituted in lieu of portions of the training outlined for reactor operator and senior reactor operator candidates.

Examples of such training programs or experience that would be permissible for substitution are: attainment of a baccalaureate or higher degree in the fields of nuclear engineering or nuclear sciences; extensive participation in the design or design review of the station in nuclear related areas; holding or having held a reactor operator or senior reactor operator license at a comparable reactor facility subject to NRC licensing, e.g. licensed reactor facility; or determination of such experience at a comparable reactor facility not subject to NRC licensing, e.g. reactor facilities operated by the military services; satisfactory completion of an NRC administered written examination and operating test at a comparable licensed reactor facility without the issuance of a reactor operator or senior operator license; or certification of satisfactory completion of an NRC-approved training program which utilized a nuclear power plant simulator as part of its program.

13.2.1.1.12 Preparation of Station Operating Procedures

SNPS operations personnel will participate in the writing and/or review of station operating procedures with technical assistance furnished by General Electric Company, Stone & Webster Engineering Corporation, or other consultants as may be required. This training will familiarize personnel with the details of the reactor, turbine-generator, and associated systems.

13.2.1.1.13 NRC Exam Preparation

An appropriate refresher and exam preparatory period will be provided for all license candidates to ensure that they are fully prepared to satisfactorily complete the applicable NRC license examination.

13.2.1.1.14 Preoperational Testing of Equipment

This training will provide station operators with operating experience on station systems and equipment prior to fuel loading. Training emphasis will be placed, as system and component availability permits, in areas of component testing, system flushing, hydrostatic tests, system checkouts, and functional tests.

13.2.1.1.15 Initial Fuel Loading and Low Power Tests

Fuel loading will begin when a sufficient number of operating personnel have satisfactorily completed their SRO or RO "Cold" license examinations. Fuel loading, low-power testing, and power ascension testing, will be conducted by or under the supervision of operating personnel who hold SRO or RO "cold" licenses.

This training will enable operating personnel to perform all requirements for nuclear power plant operation with assistance as may be required from other LILCO departments, GE, S&W, or other consultant and vendor startup engineers and will serve as a transition period between the initial training program and the operation of the plant. Participation in this program may form the initial phase of the licensed operator retraining program.

13.2.1.2 Training Programs for Non-Licensed Personnel

General

Shoreham Nuclear Power Station managers, engineers, and technicians assigned to non-licensed positions are selected and trained in accordance with ANSI N18.1-1971. Initial non-licensed staff members participate in the Basic Nuclear Course described in 13.2.1.1.1, to a degree commensurate with their responsibilities, as an introduction to specific discipline training programs. Specialty training for each non-licensed category is described below.

13.2.1.2.1 Training for Instrumentation and Control Personnel

13.2.1.2.1.1 Instrumentation and Control Supervisors

Supervisors in the Instrumentation and Control Section participate in the following programs designed to prepare them for a broad range of section responsibilities. Selection for participation in these programs is based on supervisory needs in specialty areas.

1. General Electric Nuclear Instrumentation Course or equivalent.

2. General Electric Process Instrumentation and Control Course or equivalent.

3. Vendor supplied specialized equipment training.

4. SNPS Familiarization Training.

The General Electric Nuclear Instrumentation Course is 7 weeks in duration and consists of two basic segments; a 2 week classroom lecture segment accompanied by equipment demonstrations and a 5 week laboratory segment. During the classroom segment, the theory of operation and equipment demonstrations for the GE BWR nuclear, process and area radiation monitoring, control rod position information, rod worth minimizer, reactor protection, primary containment isolation, and reactor manual control instrumentation systems are presented. The laboratory segment provides students with the opportunity to test, calibrate, and troubleshoot plant specific instruments using equipment similar or identical to that used at the SNPS site. Evaluation of student performance in this course is based on a written examination following the classroom segment, and subjective evaluations by assigned instructors of student skills during the laboratory segment.

The General Electric Process Instrumentation and Control Course is 4 weeks in duration and consists of classroom and laboratory presentations in process theory, analog and digital sensors, signal conditioners, and control loops associated with the SNPS NSSS. During supporting laboratory sessions, students disassemble, inspect, and calibrate plant specific equipment. Hands-on training in the operation and maintenance of a functional three element control system is also provided. Evaluation of student performance in this course is through use of written and oral examinations.

Vendor supplied specialized equipment training is provided on selected balance of plant systems and components, and on selected NSSS components not included in 1 and 2 above. Examples of such short duration courses are: Electro-hydraulic Control System (GE), Alterex Excitation System (GE), et al. Student performance in the courses listed is evaluated through use of written and oral examinations.

SNPS Familiarization Training consists of a combination of classroom and on-the-job training sessions designed to familiarize personnel with the purpose, major equipment, and importance of plant systems related to the instrumentation and controls area. Classroom training is administered by the Long Island Lighting Company and is approximately 3-6 weeks in length. Written examinations are used to evaluate student performance. On-the-job training is accomplished through participation in the preparation and review of plant instrumentation calibration and surveillance procedures.

13.2.1.2.1.2 Instrumentation and Control Technicians

Personnel assigned as Instrumentation and Control Technicians possess a minimum of two (2) years experience, and at least one (1) year of technical training related to instrumentation and control as a prerequisite to their assignment. Following assignment, technicians participate in the programs described in 13.2.1.2.1.1 as the needs for additional technical expertise are identified. In addition to these programs, each technician participates in the I&C Technician Qualification Program. This program requires that each technician demonstrate skill and understanding in the following areas.

1. Plant systems related to instrumentation and control.

2. SNPS specific instrumentation and control components, including control circuits for electrically and pneumatically operated equipment.

3. Station procedures associated with instrumentation and control.

Demonstration of qualification in these areas is documented through completion of any of the following:

1. Successful completion of an approved topic related training course (LILCO or vendor supplied).

2. Observance of satisfactory on-the-job performance by a qualified supervisor.

3. Documented previous experience related to the topic.

Technicians initially assigned will gain additional familiarization with plant systems and equipment through participation in plant startup and the preoperational test program.

13.2.1.2.1.3 Requalification Training for Instrumentation and Control Personnel

Requalification training for instrumentation and control personnel will consist of refresher training associated with the General Employee Training Program (13.2.1.3) and individual study of the following materials:

1. New or revised SNPS procedures related to instrumentation and control.

2. Descriptions of plant modifications related to instrumentation and control.

3. Event and operating experience reports related to instrumentation and control.

Requalification training will exist on a continuous basis and will include the supervisory review of the individual study program described above.

13.2.1.2.2 Training for Radiochemistry and Health Physics Personnel

13.2.1.2.2.1 Radiochemistry and Health Physics Supervisors

Personnel assigned as supervisors in the Radiochemistry and Health Physics Sections participate in the following programs designed to prepare them for a broad range of section responsibilities:

1. General Electric BWR Chemistry Course or equivalent

2. SNPS Familiarization Training

Selection for participation is based on individual background and expected position assignments.

The General Electric BWR Chemistry course is 12 weeks in duration and consists of classroom and laboratory sessions. Students receive instruction and practical experience in the techniques associated with radiochemical and chemical analysis for process control, waste disposal, effluent monitoring, process and laboratory instrument calibrations and evaluations. Also presented are methods for compliance with, and interpretation of the chemical and radiochemical aspects of technical specifications, licenses, and plant warranties. Evaluation of student performance is accomplished through subjective evaluations completed by course instructors.

SNPS Familiarization Training consists of a combination of classroom and on-the-job training sessions designed to familiarize personnel with the purpose, major equipment, and importance of plant systems related to the radiochemistry and health physics areas. Classroom training is administered by the Long Island Lighting Company and is approximately 3-6 weeks in length. Written examinations are used to evaluate study performance. On-the-job training is accomplished through participation in the preparation and review of plant radiochemistry and health physics procedures. Successful performance is determined through supervisory review.

13.2.1.2.2.2 Radiochemistry and Health Physics Technicians

Technicians specializing in health physics also participate in the General Electric Health Physics Technology Training Course or

its equivalent. The Health Physics Technology Course is three (3) weeks in duration and consists of classroom and laboratory presentations. Participants receive instruction in radiation physics fundamentals, radiation detection instrumentation, regulations pertaining to radiation and radioactive materials, biological effects, exposure control, dosimetry, environmental monitoring, and monitoring procedures. Written examinations are administered to evaluate student performance.

Technicians specializing in radiochemistry participate in the General Electric BWR Chemistry Technician Training Course or its equivalent. This course is six (6) weeks in duration and consists of classroom and laboratory presentations. Participants receive instruction in radiation physics fundamentals, radiation detection instrumentation, regulations pertaining to radiation and radioactive materials, biological effects, exposure control, dosimetry, environmental monitoring, and monitoring procedures. Written examinations are administered to evaluate student performance.

In addition to the programs described, health physics and radiochemistry technicians participate in the Health Physics or Radiochemistry Technician Qualification Programs. These programs require that each technician demonstrate skill and understanding in the follow areas:

1. Plant systems related to health physics (health physics technicians)

2. Plant systems related to radiochemistry (radiochemistry technicians)

3. Station Procedures associated with health physics and radiochemistry.

Demonstration of qualification in these areas is documented through completion of any of the following:

1. Successful completion of an approved topic related training course (LILCO or vendor supplied).

2. Observance of satisfactory on-the-job performance by supervisory personnel.

3. Documented previous experience related to the topic.

Technicians initially assigned will gain additional familiarization with plant systems and equipment through participation in plant startup and the preoperational test program.

13.2.1.2.2.3 Requalification Training for Radiochemistry and Health Physics Personnel

Requalification training for radiochemistry and health physics personnel will consist of refresher training associated with the General Employee Training Program and supervised review of the following materials:

1. New or revised SNPS procedures related to radiochemistry or health physics.

2. Descriptions of plant modifications related to radiochemistry or health physics.

3. Event and operating experience reports related to radiochemistry or health physics.

Requalification training will exist on a continuous basis and will include supervisory review of the individual study program described above.

13.2.1.2.3 Training for Reactor Engineering Personnel

All engineers assigned to the Reactor Engineering Section participate in the General Electric Company Station Nuclear Engineering Course or equivalent. The course is 5 weeks in duration and consists of classroom instruction in fuel loading, startup testing, power distribution control, fuel exposure, isotopic content, cycle length predictions, and discharge requirements. Student performance is evaluated through the administration of mid-course and final written examinations.

Reactor engineering personnel responsible for process computer programming also participate in the Honeywell 4000 User Programming Course or its equivalent. The course is 5 weeks in duration and consists of classroom instruction in assembly language programming, RTMOS, Fortran IV language, scan, log and alarm programs, and the free time system. Also presented are 4000 user programming, 4000 system software and analysis, and analysis of SEER software. Written examinations are used to evaluate student performance.

In addition to the programs described, all reactor engineering personnel participate in SNPS Familiarization Training consisting of a combination of classroom and/or on-the-job training sessions. These sessions are designed to familiarize personnel with the purpose, major equipment, and importance of plant systems related to the reactor engineering area. Classroom training is administered by the Long Island Lighting Company and is approximately 3-6 weeks in length. Written examinations are used to evaluate student performance. On-the-job training for the initial staff is accomplished through participation in the preparation and review of plant and system startup test

procedures. Successful performance of this assignment is documented through supervisory review.

13.2.1.2.3.1 Requalification Training for Reactor Engineering Personnel

Requalification training for reactor engineering personnel will consist of refresher training associated with the General Employee Training Program and individual study of the following materials:

1. New or revised SNPS procedures related to reactor engineering.

2. Descriptions of plant modifications related to reactor engineering.

3. Event and operating experience reports related to reactor engineering.

Requalification training will exist on a continuous basis and will include the supervisory review of the self study program described above.

13.2.1.2.4 Training for Maintenance Personnel

Personnel assigned to the Maintenance Section possess a high degree of manual dexterity and ability and are determined to be capable of learning and applying basic skills in maintenance operations through entry level testing. Personnel assigned to supervisory positions have, as a minimum, three (3) years experience in one or more crafts. All maintenance personnel participate in the Mechanic Training Program which consists of the following segments:

1. Maintenance Skills Training

2. Power Plant Training

3. Advanced Mechanic Training

The Maintenance Skills Training Course is 12 weeks in duration and consists of classroom and laboratory instruction in basic mechanic skills, shop mathematics, millwright skills, machinist skills, welding skills, and basic electricity. Satisfactory student performance is documented through the administration of oral or written examinations, or observance of skills development by a qualified instructor. The Maintenance Skills Training Program is administered by the Long Island Lighting Company.

The Power Plant Training Course is approximately 4 weeks in duration and consists of classroom training in Station procedures related to maintenance, Station administrative policies and

documents, and SNPS Systems Familiarization Training. Also provided is on-the-job training which includes the performance of preventive maintenance or maintenance repair on plant systems during the preoperational test program (initial staff only). Evaluation of participant performance during this segment is through use of written examinations, oral examinations, or supervisory observance of satisfactory skills development.

Advanced mechanic training consists of vendor supplied training in the maintenance and repair of particular plant systems and components. Examples of such short duration courses are; DeLaval Diesel Maintenance, Recirculation Pump Seal Maintenance, Target Rock Relief Valve Maintenance, Control Rod Drive Maintenance, et al. Courses range in duration from 1 to 10 days and may be administered by the equipment vendor or qualified Long Island Lighting personnel. Student performance in the courses listed may be evaluated through instructor observance of satisfactory skills development.

The three segments of training described in detail above will qualify these personnel to perform normal maintenance on plant equipment including fire protection equipment maintenance and inspection.

13.2.1.2.4.1 Requalification Training for Maintenance Personnel

Requalification training for maintenance personnel consists of refresher training associated with the General Employee Training Program and periodic supervisory led review and discussions of the following topics:

1. Scheduled and completed maintenance courses
2. Scheduled maintenance (rehearsals)
3. Completed maintenance (review)

In addition, all maintenance personnel will participate in a continuing program of individual study of the following materials:

1. New or revised SNPS procedures related to maintenance
2. Descriptions of plant modifications related to maintenance
3. Event and experience reports related to maintenance

Requalification training exists on a continuous basis and includes supervisory review of the program components described above.

13.2.1.2.5 Training for Fire Protection Staff Members

Personnel responsible for the implementation of the SNPS Fire Protection Program will receive Fire Protection Technology Training which is taught by the SNPS Training Staff with assistance from suitable vendors. Fire Protection Technology Training will include the following topics:

1. Station building layout and fire protection system design.

2 Design and maintenance of fire detection, suppression, and extinguishing equipment.

3. Fire prevention techniques and procedures.

13.2.1.2.6 Training for Fire Brigade Members

Personnel who make up the Station Fire Brigade will be trained via a program of classroom instruction, practice sessions, and drills prior to their official assignment to the Fire Brigade. The training will be provided by qualified individuals knowledgeable and experienced in fighting the types of fires that could occur in the plant and in using the types of equipment available at Shoreham. The classroom phase will be taught by the plant training staff in conjunction with Suffolk County Fire Training Center staff and suitable vendors and will include the following topics:

1. Fire hazard identification by location and fire type, including locations where breathing apparatus is required.

2. Familiarization with plant layout, including routes for ingress and egress as well as the locations of fixed and portable firefighting equipment.

3. Methods and equipment appropriate to each type of fire, including electrical fires, cable and cable tray fires, hydrogen fires, flammable liquid fires, waste/debris fires, and record file fires.

4. Indoctrination in the Plant Fire Protection Program. Each fire brigade member will receive instruction in basic firematics, actual fire fighting, site familiarization, and fire protection systems. In addition, each fire brigade member will receive training as required to enable him to fulfill the responsibilities associated with his specific assigned position in the fire brigade, e.g., security personnel in the fire brigade will receive first aid, rescue, and CPR training, while operations personnel in the fire

brigade will receive sufficient training in or knowledge of plant safety related systems to understand the effects of fire and fire suppressants on safe shutdown.

5. Proper use of respiratory protection, communication, lighting and portable ventilation equipment.

6. Review of typical SNPS Pre-fire Plans, which identify the preferred firefighting equipment to be used in identified fire hazard areas. Training will also include a review of proper equipment and techniques to be used for the balance of the site.

7. Review of pertinent modifications, additions, or changes to the Plant Fire Protection Plan or firefighting equipment.

8. Methods for fighting fires in buildings or tunnels.

9. Toxic and corrosive characteristics of expected combustion products.

10. Station evacuation signals and routes.

Practice sessions will be held at the SNPS plant site or other suitable location, such as the Suffolk County Fire Training Center and will allow Fire Brigade members to train on actual fires. Each Fire Brigade member will attend at least one practice session per year and will don protective equipment (including respiratory protection) at least once per year.

Preplanned drills will be performed at least once per three months for each Fire Brigade, with each Fire Brigade member attending a minimum of two drills per year. At least one of these drills per year, per Fire Brigade, will be unannounced. At least one of these drills per year per Fire Brigade, will be on a backshift. At least one drill per year will involve the participation of the Wading River Fire Department onsite.

The drills will conform to the established plant firefighting plans where possible and will include operating fire fighting equipment where practical. The drill should include operation of self-contained breathing apparatus, communication equipment, and portable and/or installed ventilation equipment.

The drills will be critiqued in order to assess fire alarm effectiveness, response time and equipment selection, placement, and usage, as well as the leader's direction of the effort and each member's response. Unsatisfactory drills shall be repeated within 30 days.

13.2.1.2.6.1 Fire Brigade Refresher Instruction

All Station Fire Brigade personnel will be provided with at least four sessions of refresher instruction each year. These will be scheduled such that the topics will be repeated at least every two years, with appropriate updates in the detailed course material.

13.2.1.2.7 Fire Brigade Chief Training

Candidates for the position of Fire Brigade Chief will receive appropriate training. This training will include Fire Brigade Training (as described in Section 13.2.1.2.6), and Fire Brigade Leadership Training, designed to teach direction and coordination of firefighting activities. Both programs will be taught by plant training staff with assistance from suitable vendors.

13.2.1.2.8 Shift Technical Advisor Training

Personnel assigned as Shift Technical Advisors participate in an integrated program of theoretical and practical instruction. The components of this program are the following:

1. Base theory
2. Plant specific theoretical training
3. Plant systems/procedures training
4. Plant accident/transient analysis training
5. Mitigating core damage training
6. Management/Supervisor skills training

The Basic Theory training segment consists of university level course work presented by the Polytechnic Institute of New York or similarly accredited institutions. Courses are offered on the graduate level and are presented to those candidates who have not received previous university level instruction related to the following topics:

1. Basic fundamentals of nuclear and reactor engineering
2. Radiation protection
3. Thermodynamics
4. Heat transfer
5. Principles of fluid mechanics

Courses are presented in a classroom instructional format with written examinations used to measure student performance.

Plant specific theoretical training is provided in the form of the General Electric Station Nuclear Engineer Training Course. The course is 5 weeks in duration and consists of classroom instruction in fuel loading, startup testing, power distribution control, fuel exposure, isotopic content, cycle length predictions and discharge requirements. Student performance is evaluated through the administration of mid-course and final written examinations.

Plant systems/procedures training consists of classroom instruction in SNPS specific systems and procedures. Included as instructional topics are:

1. Nuclear Steam Supply Systems and their operation
2. BWR steam cycle systems and their operation
3. Station general operating procedures
4. Station general administrative procedures

The course is 8 weeks in duration, is administered by SNPS personnel, and uses periodic written examinations as the means for evaluating student performance.

Shift Technical Advisor candidates are provided with accident/transient analysis training through participation in a four week simulator training course. The initial course is provided by the General Physics Corporation utilizing the Limerick Simulator Facility. Basic plant operations, including plant startup and shutdown will be demonstrated. In addition, Shift Technical Advisor candidates will observe various plant accident and transient scenarios concurrently with the examination of the technical aspects of each event in the classroom. Evaluation of student performance will be accomplished through the administration of written and oral examinations.

Training in methods for mitigating core damage for Shift Technical Advisors is described in Section 13.2.1.2.9.

Each Shift Technical Advisor candidate will participate in a one week management/supervisory skills course presented by the Long Island Lighting Company or a qualified vendor. The course will include training in techniques associated with leadership, motivation, problem solving, decision making, and organizational management under stress. Evaluation of student performance in this course will be accomplished through the administration of written and/or oral examinations.

13.2.1.2.8.1 Shift Technical Advisor Requalification Training

The Shift Technical Advisor Requalification Training Program is two weeks in duration and is administered annually by the Long Island Lighting Company or a qualified vendor. The program consists of a one week classroom segment and a one week simulator segment. The classroom segment includes presentations related to the following topics:

1. A review of plant transient and accident analysis emphasizing the Shift Technical Advisor's role in accident assessment

2. A review of plant related industry and licensee event reports

3. A review of major plant modifications and procedure changes affecting the Shift Technical Advisor position.

The simulator training segment will consist of control manipulations and observance of plant transient/accident response. The simulator training segment will be conducted at the Limerick simulator or an equivalent facility.

Written examinations will be administered annually to provide a basis for determining Shift Technical Advisor knowledge and to assist in defining topics for which additional training is required.

13.2.1.2.9 Training for Mitigating Core Damage

The Mitigating Core Damage Training Program provides Shift Technical Advisors and operating personnel, from the Plant Manager through the operations chain to the licensed operators, with instruction related to degraded core recognition and methods for recovery from the degraded core condition. Managers and technicians in the instrumentation and control, health physics, and radiochemistry sections will participate in the program to a degree commensurate with their responsibilities. The course is one week in duration and is administered by the Long Island Lighting Company, the General Electric Company, or other qualified organizations. The course serves to draw together specific concepts and is considered the second phase of a two phase program. The first phase consists of participation in selected portions of those programs which constitute the Licensed Operator Training Program (13.2.1.1). The following course components are included:

1. Core cooling mechanics/accident recognition: topics included are; adequate core cooling, heat sources, core cooling mechanisms, and inadequate core cooling recognition.

2. Core damage mitigation: topics included are; fixed/movable nuclear instrument use, degraded core effects on coolant chemistry, process instrument response, corrosion effects, gas generation sources, and accident environment dose determination.

3. Core transient identification and damage mitigation through use of emergency procedure guidelines.

The course is administered in a standard classroom format accompanied by instructor guided procedural walkthroughs. Evaluation of student performance is accomplished through administration of written examinations and instructor evaluation of student use of procedural guidelines.

13.2.1.2.10 Training for Support Engineering Personnel

Support engineering personnel are assigned based on previous academic training and experience related to the assignment. Following assignment, personnel participate in the following additional programs to a degree commensurate with responsibility.

1. General Employee Training (when assigned to the plant site)

2. Plant systems familiarization training

The General Employee Training Program is described in Section 13.2.1.3.

Plant systems familiarization training for support engineering personnel is accomplished through participation in selected portions of the licensed operator training program (13.2.1.1.5), or the Shift Technical Advisor Training Program (13.2.1.8) associated with plant systems. The degree of participation in these classroom programs is based on the systems familiarization needs of each individual to complete particular job assignments.

13.2.1.2.10.1 Requalification Training for Support Engineering Personnel

Requalification training for support engineering personnel will consist of refresher training associated with the General Employee Training Program (13.2.1.3) and individual study of the following materials:

1. New or revised SNPS procedures related to Support Engineering Staff assignments or responsibilities

2. Descriptions of plant modifications requiring review by the Support Engineering Staff

3. Event and operating experience reports requiring review by the Support Engineering Staff

Requalification training will exist on a continuous basis and will include supervisory review of the individual study program described above.

13.2.1.3 General Employee Training

The SNPS General Employee Training Program provides general plant and Station orientation information to Long Island Lighting Company employees (permanent and temporary), contracted employees, and visitors, so that they are able to complete a wide range of general tasks in a safe and competent manner. The General Employee Training Program is presented during two days of instruction for approximately 14 hours, and includes the following topics:

1. General description of the station and facilities.

2. Station Security Program and procedures.

3. Station Fire Protection Program, including evacuation signals, fire and fire hazard reporting, fire watch training and basic firefighting equipment.

4. Radiological health and safety including applicable portions of 10CFR19 and 10CFR20.

5. Quality assurance.

6. Industrial health and safety.

7. Station emergency plan and implementing procedures.

The General Employee Training Program is presented by Training Section instructors. The program consists of video tape/slide or live instruction presentations related to each listed topic. Student performance is documented through administration of written examinations.

Satisfactory completion of General Employee Training is one of the prerequisites for being granted unescorted access to the site. An individual desiring unescorted access to the site must complete General Employee Training and meet existing security regulations to receive such access.

13.2.1.3.1 Security Personnel Fire Protection Training

In addition to training required to carry out their normal tasks, security personnel will be trained in the following areas related to the Station Fire Protection Program:

1. Entry procedures for Wading River Fire Department
2. Crowd Control (exiting of personnel during an evacuation).
3. Fire Hazard reporting

13.2.1.3.2 Wading River Fire Department Personnel Training

The Wading River Fire Department may be called in to assist the SNPS fire brigade in an emergency. In order that Fire Department personnel may safely carry out their tasks, training will be offered in the following areas:

1. Site security entry and exit procedure.
2. Health physics (basic radiation principles and practices and typical radiation hazards).
3. Station layout familiarization.
4. Station fire protection procedures applicable to the Wading River Fire Department.

This training will be performed under the direction of the plant training staff.

In addition to the above training, one fire drill per year will involve assistance from the Wading River Fire Department.

13.2.1.3.3 General Employee Refresher Training

Personnel who receive instruction in the initial General Employee Training Program topics, receive repeat instruction in the following topics and are examined on these topics annually as part of the refresher training program:

1. Radiological health and safety including applicable portions of 10 CFR 19 and 10 CFR 20.
2. Station emergency plan implementing procedures.
3. Station Fire Protection Program including signals, fire and fire hazard reporting, fire watch training and basic firefighting equipment.

13.2.2 Licensed Personnel Requalification

A continuing requalification program for licensed operators and senior operators will be established and implemented, in accordance with 10 CFR 55, Appendix A, for the Shoreham Nuclear Power Station. The program will commence no later than three months following the issuance of an operating license for the station, with low power testing being the initial training phase. Licensed operators and senior operators will participate in the requalification program as described in Sections 13.2.2.1 and 13.2.2.2.

The requalification program cycle shall be based on a two year period with training distributed over that period as required.

Plant Staff personnel whose normal duties are at the station on a day-to-day basis and who hold a license to provide backup capability for the operating staff will participate in the requalification program except to the extent that their normal duties preclude the need for retraining in specific areas.

As a minimum they shall:

1. Be administered the annual requalification exam and participate in the requalification lecture series based upon results of the annual requalification examination.

2. Perform reactivity control manipulations as specified in Section 13.2.2.1.2.

3. Review changes to station design, procedures and the license as specified in Section 13.2.2.1.4.

4. Review station abnormal and emergency procedures as specified in Section 13.2.2.1.5.

5. Be evaluated at least once during the term of the license by oral examination.

6. Participate in 5 days of simulator related training every 6 months, as specified in FSAR Section 13.2.2.1.6.

13.2.2.1 Program Description

13.2.2.1.1 Program Content

A planned lecture series will be presented covering, as a minimum, those areas where written examinations indicate the need for additional training in the following subjects:

1. Theory and principles of operation

2. General and specific plant operating characteristics
3. Plant instrumentation and control systems
4. Plant protection systems
5. Engineered safety systems
6. Normal, abnormal, and emergency operating procedures
7. Radiation control and safety
8. Technical specifications
9. Applicable portions of Title 10, Chapter I, Code of Federal Regulations.
10. Fundamentals of Thermodynamics, Heat Transfer and Fluid Flow.

The lecture series will be presented primarily by Shoreham Station personnel with some assistance by others, either live or on videotape or film. Videotape or film presentations shall be used for not more than 50 percent of the lecture series. The lecture series will be distributed throughout each 2 year retraining program. A minimum of 60 hours of preplanned lectures will be scheduled each year.

13.2.2.1.2 Reactivity Control Manipulations

Each licensed operator will, during the term of his license, perform a minimum of 10 reactivity control manipulations in any combination of reactor startups, reactor shutdowns, or other control manipulations which demonstrate his skill and/or familiarity with reactivity control systems. Each licensed senior operator will either manipulate the controls or direct the activities of others during 10 reactivity control manipulations. Reasonable effort consistent with the operating requirements of the station will be made to provide a variety of reactivity changes for each operator.

Control manipulations which meet the requirements of one or any combination of the following are considered as acceptable reactivity control manipulations:

1. Any plant or reactor startup, to include a range such that reactivity feedback from heat addition is noticeable
2. Any temperature change, heatup or cooldown, greater than or equal to 100°F
3. Plant or reactor shutdown

4. Plant shutdown to reactor hot standby

5. Control rod sequence changes

6. Shutdown margin checks

7. Control rod scram insertion time tests

8. Any reactor power change of 10 percent or greater including testing of equipment where load changes are performed with control rods, the "load selector" of the EHC system, or where the recirculation system is in manual speed control

9. Plant and reactor operation that involves emergency or transient procedures where reactivity is changing

10. Refueling operations where fuel is moved within the core.

If necessary to provide a minimum of 10 reactivity control manipulations or a reasonable diversity in reactivity control manipulations, the Limerick simulator, and when operable, the Shoreham simulator, may be used to meet the reactivity control manipulation requirements of the requalification program.

13.2.2.1.3 Station Design Features

In the performance of his duties, each licensed RO or SRO will demonstrate satisfactory understanding of the operation of systems, components, and other apparatus including knowledge of operating procedures pertaining to areas for which he has been licensed.

13.2.2.1.4 Station Design, Procedure, and Facility Changes

Each licensed operator and senior operator will be kept advised of station design changes, procedure changes, and station license changes appropriate to the technical requirements of an individual's license as defined in Section 13.2.1.1. To insure the individual's cognizance of such changes, any of the following methods of communication may be utilized:

1. Brief lectures conducted by section supervision or other appropriate personnel.

2. Staff or section meetings.

3. Written communications to each licensed individual.

4. Preplanned lecture series.

13.2.2.1.5 Abnormal and Emergency Procedure Review

Each licensed operator or senior operator will review the abnormal and emergency operating procedures on an annual basis. To ensure the individual's review of these procedures, any of the following methods may be utilized:

1. Actual performance under abnormal or emergency operating conditions.

2. Simulated walkthrough of the procedural steps necessary to cope with the situation.

3. Brief lectures conducted by the Watch Engineer.

4. Drills utilizing a simulator or on-site drill scenario.

5. Preplanned lecture series.

6. Individual study.

7. Procedures review and/or rewriting as a part of normal job function.

13.2.2.1.6 Simulator Requalification Training

Each licensed operator and senior operator will undergo at least five days of simulator related training every six months. Each five-day session will include at least three days of actual simulator training at Limerick, or when operable, the Shoreham simulator. Also, preparatory training, either at Shoreham or Limerick, will be utilized to identify and reinforce Shoreham specific plant characteristics and operator responses.

Shoreham - specific normal, abnormal, and emergency procedures will be utilized during simulator requalification training. Simulator requalification training will utilize a team concept; the team will be required to duplicate to the extent practical the functions and responsibilities of a typical Shoreham control room staff.

Plant walkthrough drills, designed to supplement simulator requalification training, will be conducted by reproducing control room events associated with abnormal operating scenarios. The team concept will be used and the team will respond as a control room staff from the initiating event through the required immediate actions to the subsequent actions utilizing the alarm response, abnormal, and emergency procedures.

As a minimum, the operator or senior operator will perform the evaluations listed below utilizing any combination of:

1. Actual in plant performance during normal power operation

2. Plant walk thru drills

3. Performance at Limerick, or when operable, the Shoreham simulator.

13.2.2.1.7 Operator Requalification Control Manipulations

Listed below are control manipulations for operator requalification. Asterisked items to be performed annually, others biennially. Personnel with SRO licenses are credited with the evolution if they direct or evaluate control manipulations as they are performed.

*A. Approach to critical from subcritical on the source range instrumentation to the point of adding nuclear heat as verified by establishing a predetermined heatup rate.

B. Plant shutdown.

*C. Manual control of feedwater during plant startup and shutdown.

*D. Any power change of 10 percent or greater using control rods or manual recirculation flow control.

*E. Loss of coolant:

1. Inside and outside primary containment

2. Large and small, including leak-rate determination

F. Loss of instrument air (must be performed via drill at SNPS).

G. Loss of electrical power (and/or degraded power sources).

*H. Loss of recirculation flow.

I. Loss of condenser vacuum.

J. Loss of Reactor Building service water.

K. Loss of RBCLCW to individual components.

*L. Loss of feedwater/feedwater system failure.

M. Loss of a protective system channel.

N. Mispositioned or dropped control rod or rods.

O. Inability to move control rods.

P. Conditions requiring use of the standby liquid control system.

Q. Fuel cladding failure or high activity in reactor coolant or offgas.

R. Turbine or generator trip.

S. Malfunction of automatic control system(s) which affect reactivity.

T. Malfunction of reactor pressure control system.

U. Reactor Trip.

V. Main steam line break (inside or outside containment).

W. Nuclear instrumentation failures(s).

X. Operation of the fuel handling bridges during refueling or core loading or unloading (licensed fuel-handling personnel only).

Y. Moving control rods in response to a xenon transient.

Z. Manual rod control prior to and during generator synchronization.

AA. Turbine/generator startup.

BB. Recirculation flow control malfunction.

CC. Abnormal reactor water level.

DD. Loss of shutdown cooling.

13.2.2.1.8 Requalification of Inactive Licensed Operators and Senior Operators

Licensed operators or senior operators whose normal duties are at the station on a day-to-day basis and who are involved in the daily activities at the station will be considered on "active status."

A licensed operator or senior operator who has been inactive for four or more months will, before resuming licensed activities, demonstrate his adequate knowledge of current station operations.

This demonstration will be accomplished by his satisfactory completion of a written and/or oral examination given by a qualified member of station management.

An unsatisfactory result in one or both of these examinations will require that the individual receive additional training in areas of weakness and/or observe station operations for a minimum of 16 hours prior to re-examination. The nature of the additional training provided will be determined based on the initial requalification examination results.

13.2.2.2 Requalification Evaluation of Operators and Senior Operators

13.2.2.2.1 Annual Requalification Examinations

Annually, written requalification examinations will be given to all licensed operators and senior operators to determine areas in which retraining may be needed to maintain or upgrade licensed operator or senior operator knowledge. This examination may be administered as two annual examinations to be given within a three month period. If the examination is administered in two parts, the annual grade will be the average of the two quarterly grades. These examinations may be prepared and evaluated by either Shoreham personnel or an outside organization. A minimum grade of 80 percent correct on any section will exempt an operator or senior operator from required attendance at requalification lectures pertinent to that section. Licensed individuals who are directly involved in the preparation and grading of the exam may be exempt from taking the exam.

13.2.2.2.2 Retraining Program Examinations

Written examinations will be given covering material presented in the retraining program. These examinations will be prepared and evaluated by members of the Shoreham Station staff or other persons who are knowledgeable in the material and its presentation in the requalification program.

A grade of less than 70 percent correct on any lecture series examination shall require an operator or senior operator to be rescheduled for update training and reexamination in that area.

13.2.2.2.3 Practical Operator Performance Evaluation

Actual performance is evaluated on an annual basis for all on-shift licensed personnel. These performance evaluations are reviewed by the plant Operations Section and training needs are identified.

13.2.2.2.4. Accelerated Requalification Program

An accelerated requalification program will be provided for those individuals who do not perform satisfactorily on their annual requalification examination. Any operator or senior operator who receives an average grade of less than 80 percent or less than 70 percent in any section of an annual written requalification examination will be removed from licensed duties and placed in an accelerated requalification program for training prior to retesting.

Training provided to operators or senior operators participating in an accelerated requalification program may include preplanned lectures, individual study, on the job instruction, or other training as required.

13.2.2.2.5 Requalification Exams Formats

There will be two separate requalification examinations administered as listed below.

Reactor Operator - this examination will be administered to holders of NRC Reactor Operator Licenses and will contain questions in the following categories:

1. Principles of Nuclear Power Plant Operation, Thermodynamics, Heat Transfer and Fluid Flow
2. Plant Design, including Safety and Emergency Systems
3. Instruments and Controls
4. Procedures - Normal, Abnormal, Emergency and Radiological Control

Senior Reactor Operator - this examination will be administered to holders of NRC Senior Reactor Operator Licenses and will contain questions in the following categories:

5. Principles of Nuclear Power Plant Operation, Heat Transfer, Thermodynamics and Fluid Flow
6. Plant Systems - Design, Control, and Instrumentation
7. Procedures - Normal, Abnormal, Emergency, and Radiological Control
8. Administrative Procedures, Conditions, and Limitations

13.2.2.3 Requalification Training Records

Records of the requalification program will be maintained to document the participation of each licensed operator and senior operator in the requalification program. These records will contain:

1. Copies of written examinations administered.
2. Answers given by the licensee to written examinations.
3. Results of performance evaluations (drill scenarios).
4. Documentation of additional training administered to operators and senior operators in areas where deficiencies have been demonstrated.
5. Records of attendance at preplanned lectures.
6. Documentation of licensed personnel cognizance of changes made to station design, appropriate procedures, and the station license.
7. Documentation of licensed personnel review of abnormal and emergency procedures.
8. Documentation of operator and senior operator participation in reactivity control manipulations (including use of simulator training, if required).

13.2.3 Non-Licensed Personnel Requalification

The requalification programs for Station non-licensed personnel are described in Sections 13.2.1.2 and 13.2.1.3.

13.2.4 Replacement Training

The purpose of the Shoreham Nuclear Power Station replacement training program is to ensure that replacement personnel satisfy the training requirements stipulated in ANSI N18.1, 1971 for the various plant positions.

13.2.4.1 Licensed Personnel Replacement

Personnel who have satisfactorily completed a reactor operator selection program and who are designated as "in training" for a reactor operator or senior reactor operator license will be given formal technical training and practical on-the-job training.

13.2.4.1.1 Replacement Personnel Technical Training

Formal technical training for reactor operator license candidates will be given in the following areas:

1. Principles of reactor operation.

2. Design features of the Shoreham Nuclear Power Station.

3. General operating characteristics of the Shoreham Nuclear Power Station.

4. Instrument and control systems.

5. Safety and emergency systems.

6. Normal and emergency operating procedures.

7. Radiation control and safety provisions.

In addition to the above areas, formal technical training for senior reactor operator license candidates will be given in the following areas:

8. Reactor theory.

9. Handling and disposal of, and hazards associated with, radioactive materials.

10. Specific operating characteristics of the Shoreham Nuclear Power Station.

11. Fuel handling and core parameters.

12. Administrative procedures, conditions, and limitations.

Reactor Operator and Senior Reactor Operator candidates without previous nuclear training or operating experience at a reactor facility, as outlined in ANSI N18.1, 1971, Section 5.2.1, will receive formal technical training in the following areas:

1. Basic Nuclear - equivalent to the Basic Nuclear Course conducted for initial training.

2. Onsite Training of Shoreham Nuclear Power Station systems and procedures - equivalent to initial staff Onsite Training Program.

3. License Study Time - three to four weeks - supervised study program prior to license examination.

13.2.4.1.2 Replacement Personnel Practical Reactor Operation Training

Comprehensive, practical on-the-job training for reactor operator and senior reactor operator candidates will include the following:

1. Performance of at least two reactor startups conducted at SNPS-1 or an approved simulator facility prior to the demonstrative portion of the license examination under the direction of appropriate licensed personnel, followed by a startup or simulated startup of the reactor as part of the operating test; or

2. Manipulation of the controls of the SNPS reactor facility during five significant reactivity changes, as described in Section 13.2.2.1.2, which may or may not include reactor startups; and participation in an approved NRC nuclear power plant simulator training program with subsequent certification from the simulator training center; and

3. Instruction on the appropriate day to day station administrative activities and procedures. Receipt of such instruction will be documented in the trainee's training folder; and

4. A thorough individual study program under the guidance of more experienced station personnel to facilitate the candidate's knowledge and understanding of plant operating characteristics and station operating and emergency procedures. A minimum of four weeks will be designated for the individual study program. Completion of the individual study program will be documented in the trainee's training folder.

13.2.4.2 Restricted Licensed Personnel Replacement

Personnel who are designated as "in training" for a restricted (fuel handling) license will be given formal technical training and practical on the job training.

13.2.4.2.1 Replacement Personnel Technical Training

Formal technical training for all restricted licensed replacement candidates will be given in the following areas:

1. Radiation control and safety provisions.

2. Handling, disposal of, and hazards associated with radioactive materials.

3. Fuel handling and core parameters.

4. Administrative procedures, conditions and limitations.

5. Onsite training of Shoreham Nuclear Power Station systems and procedures. Selected portions of this program will be given as required. Those portions selected will be equivalent to that given to initial restricted licensed candidates.

In addition, candidates for restricted (fuel handling) licenses who have not had previous nuclear training will receive the following:

1. Basic Nuclear - equivalent to that given for Reactor Operator and Senior Reactor Operator replacement candidates.

13.2.4.2.2 Replacement Personnel Practical Fuel Handling Training

Each restricted licensed candidate will have comprehensive, practical on-the-job training in the following areas:

1. Manipulation of SNPS fuel handling equipment, including periodic surveillance testing, using real or simulated fuel.

2. Participation in an actual refueling outage either at SNPS or a similar BWR.

3. Instruction on the appropriate refueling and station emergency procedures. Receipt of such instruction will be documented in the trainee's training folder.

13.2.4.3 Non-Licensed Personnel Replacement

Personnel filling positions not requiring an NRC operator or senior operator license shall meet the requirements stipulated in Section 13.1.3 and will receive training as outlined in Section 13.2.1.2.

13.2.5 Corporate Training Responsibility - Nuclear

Each department of the Long Island Lighting Company which performs safety-related activities in support of Shoreham plant operation is responsible to insure adequate training for their personnel in accordance with the support function performed. Individual departments are responsible to identify and define training requirements for their personnel and to maintain individual training records and documentation.

The overall coordination and evaluation of the Long Island Lighting Company Corporate nuclear training program is the responsibility of the Manager, Nuclear Operations Support Department. Direct responsibility for coordination of the corporate nuclear training program and the monitoring of its effectiveness is delegated to the Nuclear Support Training Supervisor under the direction of the Manager, Nuclear Training.

The Supervisor, Nuclear Support Training assumes the following responsibilities:

1. Develops the policy for nuclear support training and directs the establishment of standards for each department to utilize for development of departmental training programs.

2. Develops training programs or assists in their development for support departments.

3. Monitors, evaluates, and recommends improvements to nuclear training programs conducted by and for Company departments.

4. Provides coordination and interfacing for interdepartmental nuclear training programs.

5. Reviews departmental nuclear training records and documentation.

6. Reviews the training qualifications/programs of consultant personnel performing work in support of Shoreham plant operation.

The development of nuclear support training programs is undertaken using subject matter and program content input from throughout the Long Island Lighting Company.

13.2.6 Station Training Responsibility

The overall conduct and administration of all nuclear training is the responsibility of the Manager, Nuclear Training. Direct responsibility for administration of the training Program and monitoring of its effectiveness is delegated to the Training Sections under the direction of the Training Supervisor.

13.2.6.1 Station Training ction Organization and Responsibilities

The Station Training Section consists of the Nuclear Station Training Supervisor, specialists in the areas of licensed personnel training, non-licensed personnel training, and Station support training. The Nuclear Station Training Section assumes the following responsibilities:

1. Development, implementation, and improvement of Station licensed personnel training and requalification training programs.

2. Development, implementation and improvement of Station non-licensed personnel training and requalification training programs.

3. Evaluation and counseling of Station Training Program participants.

The development of Training Programs by the Nuclear Station Training Section is undertaken using subject matter and program content input from Station section supervisory personnel.

13.2.6.2 Instructor Training and Development

The Nuclear Support Training Section shall implement an Instructor Development/Evaluation Program to provide training to all assigned LILCO instructors and/or instructor trainees in the fundamentals of training methods, instructional technology and classroom management techniques. The Nuclear Support Training Section will also be responsible for conducting systematic evaluations of all assigned instructors and instructor trainees (LILCO and non-LILCO) classroom performance to assess their intructional capabilities, and to provide prompt feedback on their instructional skills.

13.2.6.3 Training Records

Records documenting the qualification, training, and retraining of all Station staff personnel (licensed and non-licensed) and support personnel will be maintained in accordance with the following:

1. ANSI N45.2.9 - 1974
2. ANSI N18.1 - 1971
3. 10CFR55 Appendix A

Training records will be maintained by the Nuclear Training Division under the direction of the Nuclear Training Administrator. Records will be kept in order to document the training history of both licensed and non licensed personnel and programs. Licensed personnel record keeping will include the following:

1. Current resume of qualifications and experience
2. Licenses
3. Certified history of Station training received
4. Requalification training documents according to 10CFR55, Appendix A

Non-licensed personnel records will include:

1. Current resume of qualifications and experience
2. Certified history of Station training received

Licensed and non-licensed program records will include those materials required to support the administration and ensure complete documentation of each program.

Training records will be used to monitor the effectiveness of the training programs and will be periodically reviewed by the Training Supervisors and Quality Assurance personnel.

13.3 EMERGENCY PLANNING

The emergency plan for the Shoreham Site has been submitted as a separate document entitled, "Emergency Preparedness Plan," via SNRC-896 dated May 31, 1983. The information contained in this document supersedes in its entirety the information originally submitted as part of the FSAR.

13.4 REVIEW AND AUDIT

A review and audit program, including in-plant and independent reviews, has been developed to: provide a system to ensure that plant design, construction, startup, and operation are consistent with company policy and rules, approved procedures, and license provisions; review important proposed plant changes, tests, experiments, and procedures; assure that unusual events are promptly investigated and corrected in a manner which reduces the probability of recurrence of such events; and to detect trends which may not be apparent to a day to day observer. For convenience of program administration, the review and audit program is divided into the construction phase and the operation phase.

13.4.1 Review and Audit - Construction

Review and audit during design and construction of the Shoreham Nuclear Power Station is a part of the Quality Assurance Program which is described in Section 17.1. This program does not utilize a formal review and audit committee, as such. Through a comprehensive system of planned audits, compliance with all aspects of the Quality Assurance Program are verified. Audits are performed on the design organizations, the construction site, and vendor facilities. The review and audit function during design and construction is fully described in Section 17.1.

13.4.2 Review and Audit - Test and Operation

Review and audit during the testing and operation of the Shoreham Plant is an integral part of the LILCO Quality Assurance Program. Provisions are established for a comprehensive system of planned and periodic audits to verify implementation of Quality Assurance Program requirements. These review and audit functions are fully described for the operational phase in Section 17.2, and for the transition phase from construction to operation, in Section 17.1D. In addition, LILCO will utilize a formal committee method for review and audit, functioning at two levels:

1. At the station operation level, the Review of Operation Committee (ROC)

2. At the corporate level, the Nuclear Review Board (NRB), which is independent of direct responsibility for plant operation.

Normally, the NRB's audit functions will be carried out by Quality Assurance personnel under the cognizance of the NRB and with NRB review of the findings.

The review and audit program has been established to assure that the operation of the plant is in conformance with established operating procedures, license provisions, and quality assurance

requirements, and to review and approve changes to station systems/equipment and procedures as described in the FSAR, or tests and experiments, which may not constitute an unreviewed nuclear safety question, as defined in 10 CFR, Part 50.59. All unreviewed safety questions and changes to the Technical Specifications will be reviewed by the NRB as described below. Review of nuclear safety related questions are made by the NRB as described below.

A continuing review is performed by the ROC to monitor plant operations, to plan future activities, and to screen subjects that might by of interest to the NRB.

Guidance in the development of the essential elements in LILCO's review and audit program for tests and operations was derived from the ANSI Standard N18.7, "Standard for Administrative Controls for Nuclear Power Plants" (1972). Development of the LILCO Quality Assurance Audit program is described in Chapter 17.

13.4.2.1 Administration of Review of Operations Committee

The Review of Operations Committee (ROC) has been established and is presently functional. The ROC will provide a continuing review of plant operations to assist the Plant Manager or his designated alternate in keeping abreast of general plant operating conditions. The ROC serves to screen subjects of potential concern to the NRB and to perform preliminary investigations as requested by the NRB. It is not the purpose of the committee to relieve the Plant Manager of the responsibility for overall safety of plant operations or for the referral of appropriate matters to the NRB.

1. Written Charter

   A written charter has been prepared covering such areas as group responsibility, subjects requiring review, reporting requirements, and organization.

   The charter of the Review of Operations Committee reflects the consideration that their review responsibilities for station activities and all proposed changes or modifications to station systems or equipment is not limited to those designated safety related.

2. Membership

   Membership of ROC is as follows:

   a. Operations Manager--Chairman and Member

   b. Maintenance Manager--Alternate Chairman and Member

   c. Plant Manager -- Alternate Chairman

d. Operating Engineering -- Member

e. Maintenance Engineer -- Member

f. Instrument and Control Engineer -- Member

g. Reactor Engineer -- Member

h. Health Physics Engineer -- Member

i. Radiological Controls Manager -- Member,

and alternates appointed to serve on a temporary basis as designated in writing by the ROC Chairman. No more than two alternates shall participate as voting members at any one time.

The responsibility for selecting qualified personnel rests with the Operations Manager, whether they are drawn from plant staff or from consultants inside or outside the company.

A quorum is defined in the Shoreham Station Technical Specifications and shall consist of the chairman or his designated alternate and the required number of voting members including alternates.

3. Meeting Frequency

The ROC shall meet at least once per calendar month and as convened by the ROC Chairman or his designated alternate.

4. Records

The Review of Operations Committee shall maintain written minutes of each ROC meeting that, at a minimum, document the results of all ROC activities performed under the responsibility and authority provisions of the Technical Specifications. Copies shall be provided to the Vice President, Nuclear Operations, the Nuclear Review Board and the Nuclear Training Manager.

5. Responsibilities

The ROC shall be responsible for:

a. Review of (1) all procedures and programs required by Technical Specification 6.8 and changes thereto, (2) any other proposed procedures or changes thereto as determined by the Plant Manager to affect nuclear safety.

b. Review of all proposed tests and experiments that affect nuclear safety.

c. Review of all proposed changes to the approved Shoreham Technical Specifications.

d. Review of all proposed changes or modifications to plant systems or equipment that affect nuclear safety.

e. Investigation of all violations of the Shoreham Technical Specifications including the preparation and forwarding of reports covering evaluation and recommendations to prevent recurrence to the Vice President, Nuclear Operations and to the Nuclear Review Board.

f. Review of events requiring 24 hour written notification to the Commission by regulations or Technical Specifications.

g. Review of station operations to detect potential nuclear safety hazards.

h. Performance of special reviews, investigations or analyses and reports thereon as requested by the Plant Manager or the Nuclear Review Board.

i. Review of the Security Plan and implementing procedures.

j. Review of the Emergency Plan and implementing procedures.

6. Authority

The Review of Operations Committee shall:

a. Recommend to the Plant Manager approval or disapproval of items considered under 13.4.2.1.5(a) through (d) above.

b. Render determinations in writing with regard to whether or not each item considered under 13.4.2.1.5(a) through (e) above constitutes an unreviewed safety question.

c. Provide written notification within 24 hours to the Vice President, Nuclear Operations and the Nuclear Review Board Chairman of disagreement between the ROC and the Plant Manager; however, the Plant Manager shall have responsibility for resolution of such disagreements pursuant to appropriate Shoreham Technical Specification(s)

7. Procedure

Generally an agenda is prepared prior to each formally scheduled meeting of the ROC listing those items of concern requiring review. The agenda may consist of proposals submitted by committee members, discussions of past agenda items, current or future station operations, requests of the NRB, review of applicable items described in Section 13.4.2.1 (5).

Records of the committee recommendations on those agenda items discussed during the meeting will normally be included in the minutes of the meeting.

The Plant Manager has the authority to approve or disapprove proposals or recommendations of the ROC. If there is disagreement between recommendations of the ROC and the Plant Manager on matters pertaining to nuclear safety, written notification of the disagreement will be provided in accordance with Section 13.4.2.1.6(c).

The Plant Manager, or his designated alternate may make a temporary change and/or authorize interim remedial action involving nuclear safety related matters, as deemed necessary, without prior approval of the NRB, providing the intent of the facility operating license or the Technical Specifications are not altered and there are no unreviewed safety questions involved.

The ROC may assign subcommittees as deemed necessary to: conduct studies, discuss items of operational or safety significance which may not be within the technical expertise of some of the committee members, review selected agenda items, witness tests, observe plant operations, review procedures, and other such similar matters as it considers appropriate. A subcommittee may consist of any number of committee members, other members of the plant staff who are not members of the ROC and when necessary, consultants to assist with the assigned task. Subcommittee members are appointed by the Operations Manager.

13.4.2.2 Nuclear Review Board

The function of the Nuclear Review Board (NRB) is to provide the management of Long Island Lighting Company, through the Executive Vice President, a mechanism for independently ascertaining that activities related to nuclear station operations are performed safely and efficiently in accordance with company policies and regulatory requirements.

The Nuclear Review Board is established and functional with its initial membership comprised of LILCO and consultant personnel.

Collectively, the membership has been selected to have the experience and capability to function effectively in the areas of responsibility as designated in License documents, the objectives being to ensure that a representative decision is reached on each issue and that the Executive Vice President and the Vice President, Nuclear Operations are appropriately advised. The NRB membership is selected so a majority of members are not directly responsible for plant operation. All members, whether LILCO employees or consultants, are afforded equal voting status along with a defined route to advise the Executive Vice President, of the assessment of dissenting voters. As a minimum, consultant membership is committed to the NRB through a period of commercial operation while sufficient expertise is developed within the LILCO organization.

1. Written Charter

A written charter has been prepared covering such areas as group responsibility, subjects requiring review, reporting requirements, and organization.

The charter of the Nuclear Review Board reflects the consideration that their activities are not limited to items and functions that are designated as safety related. It is intended that NRB review and audit activities will also cover nonsafety related structures, systems, components, and plant computer software to ensure that the safety significance given to them in the FSAR, the Technical Specifications, and the Emergency Operating Procedures will be maintained during the operation of Shoreham.

2. Membership

The NRB will consist of the NRB Chairman and five permanent members. As a group, they will collectively have the competence required to review problems in the following areas: nuclear power plant operations, nuclear engineering, chemistry and radiochemistry, metallurgy, instrumentation and control systems, radiological safety, mechanical and electrical systems, administrative controls and quality assurance practices.

The Chairman will be appointed by the Executive Vice President. The Chairman of the Nuclear Review Board is responsible for appointing individuals to Board Membership. Membership appointments are to be such that the collective membership includes the experience and capability noted in the foregoing subsection. Membership appointments are subject to concurrence by the Executive Vice President.

In the event a regular member is not able to participate in NRB activities, designated alternates are authorized to act in the place of the regular member. Any nominated alternates shall be appointed in writing by the Chairman of the Nuclear Review Board to serve on a temporary basis.

No more than a minority of the NRB membership will hold line responsibility for day to day operation of the Shoreham Nuclear Power Station. The NRB may obtain recommendations from scientific or technical personnel employed by LILCO or other consultant organizations whenever the NRB Chairman considers it necessary to obtain further scientific or technical assistance in carrying out its responsibility. Such individuals shall function as staff to the NRB, performing tasks and submitting reports as assigned by the action of the Board.

Minimum qualifications of NRB members are as follows:

a. The Chairman will be a college graduate or equivalent and will have at least 10 years of experience in the power generation field.

b. Other members of the NRB and their designated alternates will be graduate engineers or equivalent and will have at least 5 years experience in the appropriately related scientific, technical, engineering, or power generation field. Members, or their designated alternates, may possess competence in more than one specialty area.

c. If sufficient competence in the specialty areas as described in this subsection is not available within LILCO, the review and audit functions will be performed or supplemented by outside consultants or organizations.

The minimum quorum of the NRB necessary for the performance of review and audit functions shall consist of the Chairman (or his designated alternate) and at least four members, including alternates. Less than a majority of the quorum shall have line responsibility for the operation of the Shoreham Nuclear Power Station. A quorum shall be considered filled if conference telephone communications are established with the requisite number of members or alternates at remote locations. No more than two alternates shall participate as voting members in NRB activities at any meeting.

3. Meeting Frequency

The NRB shall meet at least once per calendar quarter during the initial year of the Shoreham Station operation following fuel loading and at least once every six months thereafter.

Any member may request a special Board meeting to consider a matter believed to involve a safety or radiological environmental problem.

4. Records

a. Minutes will be recorded for all meetings of the NRB. The minutes will identify all documentary material reviewed and the findings, recommendations and actions taken by the NRB. Meetings will be numbered in sequence, and minutes of meetings will be distributed to the Executive Vice President, and NRB members within two weeks following each meeting.

b. Reports of audits submitted to or conducted under the cognizance of the NRB including recommendations of the NRB will be made in writing to the Executive Vice President, the Vice President, Nuclear Operations and to the management positions responsible for the areas audited within 30 days after completion of the audit.

5. Review Responsibilities

The NRB shall review:

a. The safety evaluations for 1) changes to procedures, equipment, or systems and 2) tests or experiments completed under the provision of 10 CFR Section 50.59, to verify that such actions did not constitute an unreviewed safety question.

b. Proposed changes to procedures, equipment, or systems which involve an unreviewed safety question as defined in 10 CFR, Section 50.59.

c. Proposed tests or experiments which involve an unreviewed safety question as defined in 10 CFR, Section 50.59.

d. Proposed changes to the Shoreham Technical Specifications or the Shoreham Station Operating License.

e. Violations of applicable codes, regulations, orders, Technical Specifications, license requirements, or of internal procedures or instructions having nuclear safety significance.

f. Significant operating abnormalities or deviations from normal and expected performance of station equipment that affect nuclear safety.

g. Events requiring 24 hour written notification to the Commission by Regulations or Technical Specifications.

h. Significant recognized indications of an unanticipated deficiency in some aspect of design or operation of structures, systems, or components that could affect nuclear safety.

i. Reports and meeting minutes of the Shoreham Review of Operations Committee.

6. Audit Responsibilities

Audits of Shoreham station activities required by Technical Specifications shall be performed under cognizance of the NRB. These audits shall encompass:

a. The conformance of station operation to provisions contained within the Shoreham Technical Specifications and applicable license conditions at least once per 12 months.

b. The performance, training, and qualifications of the entire station staff at least once per 12 months.

c. The results of actions taken to correct deficiencies occurring in station equipment, structures, systems, or methods of operation that affect nuclear safety at least once per 6 months.

d. The performance of activities required by the Quality Assurance Program to meet the criteria of 10 CFR 50, Appendix B, at least once per 24 months.

e. The Emergency Plan and implementing procedures at least once per 24 months.

f. The Security Plan and implementing procedures at least once per 24 months.

g. Any other area of station operation considered appropriate by the NRB or the Executive Vice President.

h. The Fire Protection Program and implementing procedures at least once per 24 months.

i. An independent fire protection and loss prevention inspection and audit shall be performed at least once per 12 months utilizing either qualified offsite licensed personnel or an outside fire protection firm.

j. An inspection and audit of the fire protection and loss prevention program shall be performed by an outside qualified fire consultant at intervals no greater than 36 months.

k. The radiological environmental monitoring program and the results thereof at least once per 12 months.

l. The OFFSITE DOSE CALCULATION MANUAL and implementing procedures at least once per 24 months.

m. The PROCESS CONTROL PROGRAM and implementing procedures for solidification of radioactive wastes at least once per month.

n. The performance of activities required by the Quality Assurance Program to meet the criteria of Regulatory Guide 4.15, December 1977 or an acceptable substitute at least once per 12 months.

7. Authority

The NRB is organizationally responsible to the Executive Vice President, but is also advisory to the Vice President, Nuclear Operations.

8. Procedures

Written administrative procedures for the operation of the NRB will be prepared and maintained.

Those items submitted to the NRB as described in Paragraph 5.(b) through 5.(d) above, reviewed and accepted by the NRB, will be resolved as follows:

a. If the NRB is of the opinion that a proposed change, test, or experiment does not require approval by the NRC under the terms of the license provisions, it so reports in writing to the Plant Manager, together with a statement of the reasons for its decision. The Plant Manager may then proceed with the change, test, or experiment.

b. If the NRB is of the opinion that approval of the NRC is required, the SNPS staff, assisted by other LILCO nuclear organizations, or consultants, will prepare a request for such approval, including an appropriate safety analysis in support of the request in accordance with approved procedures.

If in the course of any of their additional reviews of facility operations, the NRB determines that a variation from the Technical Specifications or an unreviewed safety question exists, the NRB will immediately notify the Plant Manager, who will take the necessary steps to ensure nuclear safety.

13.4.3 Shoreham Independent Safety Engineering Group

The Shoreham Independent Safety Engineering Group (ISEG) is established and functional. The ISEG is composed of a minimum of five dedicated multi-discipline full-time engineers (one supervisor and four engineers) located onsite. Each shall have a bachelor's degree in engineering or a related science and at least two years professional experience in his field. At least one year of experience shall be in the nuclear field. The ISEG is functionally responsible to the Director, Quality Assurance, Safety and Compliance. The scope of the Independent Safety Engineering Group is not to be limited by safety or equipment type classifications. ISEG scope is to include any and all aspects of plant design or operation which will results in improved plant safety or reliability. During the performance of its functions, ISEG will accord to all plant features (structures, systems, components, design, software, etc.), at a minimum, the safety significance given to them in the FSAR, the Technical Specifications, and the Emergency Operating Procedures.

1. Functions

The principal functions of the ISEG shall include:

a. Assessment of the operating experience of the station and stations of similar design.

b. Examination of appropriate plant operating characteristics and industry/NRC issues.

c. Review of plant activities such as maintenance, modifications, operational problems, and operational analysis.

d. Surveillance of plant operations and maintenance activities to provide verification that these activities are performed correctly and with minimum human error.

e. Review other appropriate sources of plant design and operating experience information that may indicate areas for improving plant safety.

2. Composition

The ISEG shall consist of a Supervisor and four dedicated personnel, all located onsite.

3. Authority

Where useful improvements can be achieved, the ISEG shall develop and present detailed recommendations for such things as revised procedures or equipment modifications to corporate management through the Director, Quality Assurance, Safety and Compliance.

13.5 STATION PROCEDURES

13.5.1 Administrative Control

Shoreham Nuclear Power Station Administrative controls shall require that operations, maintenance and repair, testing and modifications to safety related portions of the station be performed in accordance with written, approved procedures. Administrative controls shall be established to comply with 10 CFR 50.54 (i), (j), (k), (l), and (m).

Station procedures affecting safety related portions of the station shall be prepared, reviewed, approved, and revised in accordance with established administrative controls. Portions of NRC Regulatory Guide 1.33-1978 applicable to BWR Stations shall be utilized for guidance in identifying procedures required for conducting operating and related maintenance activities on safety related equipment. Certain clarifications regarding the utilization of ANSI N18.7-1976 in the establishment of administrative controls are detailed in item 3B-1.33 of Appendix 3B.

Figure 13.5.1-1 outlines the origination, review, and approval path for station procedures.

Table 13.5.1-1 lists the procedures being provided for the Shoreham Nuclear Power Station. Procedures delineated in Table 13.5.1-1 Section A, Administrative Procedures and Section B, Operating Procedures shall be completed 6 months prior to fuel loading.

Table 13.5.1-2 lists the persons (by titles) responsible for procedure origination.

Administrative procedures for the preparation, review, approval, and revision of station procedures shall be prepared in accordance with the requirements of Section 5.2 and 5.3 of ANSI N18.7-1976. Specifically, these administrative procedures shall require that:

1. Procedures be appropriately titled and uniquely numbered.

2. Procedures be prepared in accordance with an approved format. Procedure formats similar to those shown in Table 13.5.1-3 shall be utilized.

3. Procedures be reviewed and approved prior to implementation.

4. Procedures be periodically reviewed after initial approval, and after any unusual incident.

Review of station procedures shall be under the direction of the responsible Section Head, Division Manager or the Plant Manager. Review of station procedures shall ensure compliance with the Technical Specifications, Safety Analysis Report, applicable NRC Regulatory requirements and National Standards previously committed to and other station procedures.

Station procedures shall be processed through the Review of Operations Committee (ROC) or the Plant Manager for approval as shown on Fig. 13.5.1-1. The Review of Operations Committee shall review and endorse the approval cycle for permanent station procedures prior to procedure issuance.

The Quality Control Manager shall be responsible for independent checks and audits to verify that procedures are followed.

Temporary procedures and temporary changes to approved station procedures are provided as discussed in Sections 13.5.2.13 and 13.5.2.14, respectively.

13.5.1.1 Normal Operations

During normal operations, including testing, the Plant Manager or his designated alternate has the responsibility and authority to operate the station within the limits of the facility license. The operation of the station will be performed according to written procedures that have been reviewed and approved per Fig. 13.5.1-1. Permanent changes to normal operating procedures will require the same review and approval as the original procedure. The Review of Operations Committee is responsible for, and may assign subcommittees to review station operations, to ensure that operation of the station is in accordance with approved station procedures. In addition, the Nuclear Review Board will arrange for periodic audits of station operations. In performing this function, the NRB will assign the audit task to a qualified person or persons without a direct line responsibility for execution of the day-to-day operation of the station.

13.5.1.2 Routine Maintenance, Repairs, and Refueling

Routine maintenance and repairs will be performed by the station maintenance force under the direction of the Maintenance Engineer. Outside personnel may be used to supplement station personnel, but will work under the direction of station personnel.

Procedures, as required by the Technical Specifications for performing maintenance and repairs to safety related equipment, will be prepared, reviewed, and approved per Fig. 13.5.1-1. Permanent changes to these procedures will require the same review and approval as the original procedure.

The written repair and maintenance procedures will indicate the inspections and checks which must be performed and will also indicate the records which must be kept. The procedures will indicate where independent verification of inspections or checks should be performed by other than those performing the maintenance. The responsible personnel implementing these programs for routine repair and maintenance of nonsafety related structures, systems, and components, shall, in exercising their judgment on the appropriate measures to be applied, maintain the safety significance accorded to them in the FSAR, Technical Specifications, and the Emergency Operating Procedures. This will be accomplished within the context of the written repair and maintenance programs and procedures.

Materials and parts utilized in the repair and maintenance of the safety related portions of the station will be of equivalent quality to the original materials. The procurement documents will be audited by LILCO Quality Assurance personnel to ensure that appropriate quality control requirements are fulfilled as defined in Section 17.2.

Storage and material identification procedures will assure that purchased materials and parts do not deteriorate in storage and are properly identified prior to their installation or use as defined in Section 17.2.

The Maintenance Engineer or his designated alternate will ensure that records of maintenance to safety related equipment are prepared in accordance with the applicable station procedures.

Fuel handling procedures will be prepared, reviewed, and approved per Table 13.5.1-1. The fuel handling procedures will indicate items which require verification by specified personnel other than those performing the operation.

13.5.1.3 Modifications

Proposed modifications to safety related systems or components are subject to review by the ROC. The design of modifications will be to the same or equivalent codes and requirements used in the original station design as defined in Section 17.2.

13.5.2 Procedures

13.5.2.1 Operating Procedures

Detailed written procedures and checkoff lists will be originated, reviewed, and approved prior to normal operation of safety related systems/components, per Fig. 13.5.1-1. Operating procedures are performed by, or under the direction of persons designated as holders of Reactor Operator or Senior Reactor Operator licenses. Operating Procedures consist of three basic

categories; General Operating Procedures, System Operating Procedures, and Emergency Operating Procedures.

1. General Operating Procedures describe Integrated Station Startup, Normal Operation, and Shutdown.

2. System Operating Procedures describe individual System Startup, Normal Operation, and Shutdown. Abnormal Operation will be included in appropriate System Operating Procedures.

3. Emergency Operating Procedures that outline operator action during failure of systems and/or components will be originated, reviewed, and approved, per Fig. 13.5.1-1, prior to the appropriate station operational status.

Procedures addressing the requirements of subsections 1, 2, and 3 above are contained in Table 13.5.1-1. Procedure format is contained in Table 13.5.1-3.

13.5.2.2 Alarm Response Procedures

Alarm Response Procedures (ARP) describe the causes of alarms, including instrument set points (where appropriate), and immediate operator action for all alarm windows associated with safety related equipment of systems. Format is provided in Table 13.5.2-1. Operators will be required to memorized the immediate action portions of all Alarm Response Procedures associated with the Reactor Protection System. These procedures will be classified according to panel number and subclassified by window number. These procedures will be maintained in the Main Control Room separate from other procedures in a color coded format for rapid retrieval by Main Control Room personnel.

13.5.2.3 Initial Test Procedures

The initial test program and the procedures to execute this program are outlined in Chapter 14.

13.5.2.4 Maintenance Procedures

Maintenance procedures will be developed as outlined in Section 13.5.1.2 and listed in Table 13.5.1-1.

13.5.2.5 Instrument and Control Systems Procedures

Procedures will be originated, reviewed, and approved, per Fig. 13.5.1-1, that describe Startup, Calibration, and Shutdown of instrument and control systems that are safety related. Table 13.5.1-1 contains a list of those Instrument and Control procedures that will be provided as a minimum.

13.5.2.6 Surveillance Procedures

Surveillance procedures for systems and equipment (as required by the Technical Specifications) will be originated, reviewed, and approved, per Fig. 13.5.1-1.

13.5.2.7 Shoreham Nuclear Power Station Emergency Plan

The Station has submitted a Radiation Emergency Plan designed to minimize radiation exposure to station personnel and the general public. It describes action levels and specific duties required of station personnel in the event of an accident or any unplanned incident producing high radiation levels. The Emergency Plan was submitted as a separate document.

13.5.2.8 Health Physics Procedures

Procedures are originated, reviewed, and approved, per Fig. 13.5.1-1, to minimize radiation exposure to station personnel and the general public, during normal operation, within the requirements of 10 CFR 20. A list of those activities for which procedures are provided prior to initial criticality is contained in Table. 13.5.1-1.

13.5.2.9 Chemistry Procedures

Procedures will be originated, reviewed, and approved, per Fig. 13.5.1-1, that describe the plant chemistry and radiochemistry program, and the methods required to implement this program.

13.5.2.10 Reactor Engineering Procedures

Procedures are originated, reviewed, and approved, per Fig. 13.5.1-1, that describe the methods of nuclear performance evaluation and process computer operation, including program changes.

13.5.2.11 Plant Security Procedures

Procedures will be originated, reviewed, and approved as outlined in the Security Plan (submitted separately). Administrative procedures for control of station security and personnel access (including visitors) will be as provided for in the Security Plan.

13.5.2.12 Radioactive Waste Management Procedures

Procedures will be originated, reviewed, and approved, per Fig. 13.5.1-1, that describe radioactive waste handling.

13.5.2.13 Temporary Procedures

Temporary Procedures may be issued during the operational phase: to direct operations during testing, refueling, maintenance, and modifications; to provide guidance in unusual situations not within the scope of the normal procedures, and to insure orderly and uniform operations for short periods when the plant, a system, or a component of a system is performing in a manner not covered by existing detailed procedures or has been modified or extended in such a manner that portions of existing procedures do not apply.

Temporary Procedures shall be approved by two members of the plant management staff prior to implementation and subsequent approval in accordance with administrative procedures.

Temporary Procedures shall have a maximum life of 31 days.

13.5.2.14 Temporary Changes to Approved Station Procedures

Temporary changes to approved station procedures shall be made in accordance with Section 6.8.3 of the Station Technical Specifications.

TABLE 13.5.1-1

PROCEDURES PROVIDED FOR SHOREHAM NUCLEAR POWER STATION

A. Administrative Procedures - will be provided to cover the following types of administrative activities:

1. Authorities and Responsibilities for Safe Operation and Shutdown (e.g. Reactor Operator and Senior Reactor Operator)*
2. Equipment Control (e.g., locking and tagging)
3. Procedure Adherence and Temporary Change Method
4. Procedure Review and Approval
5. Schedule for Surveillance Tests and Calibration
6. Shift and Relief Turnover - Recall of Personnel
7. Log Entries and Record Retention
8. Access to Containment
9. Bypass of Safety Functions and Jumper Control
10. Operating Orders
11. Special Orders
12. Materials Control
13. Requirements for Working Over or in Reactor Vessel
14. Radiation Work Permits
15. Access Control to Controlled Area

B. Operating Procedures

1. General Operating Procedures - have been provided to cover the following Integrated Plant Operating Activities:

   a. Start-up - Cold Shutdown to 20%

* "At the Controls," for this procedure is as specified in Regulatory Guide 1.114, January, 1976 and shown on Fig. 13.5.1-2

TABLE 13.5.1-1 (CONT'D)

b. Reactor Criticality

c. Operational Between 20% and 100% Power

d. Shutdown - to Cold Shutdown

e. Operational Surveillance

f. RPV Hydro

2. System Operating Procedures - These procedures describe Startup, Normal Operating, and Shutdown for the designated system. Abnormal Operation, where required, will be contained in a section of the System Operating Procedure. Procedures are available for operating the systems listed in a. through bk. below.

a. Automatic Depressurization System

b. Control Rod Drive System

c. Core Spray System

d. Diesel Generator

e. Diesel Fuel Oil Transfer System

f. 138 kV and 69 kV Power System

g. Main Transformer

h. Normal Station Service Transformer

i. Reserve Station Service Transformer

j. Well Water System

k. 4,160 V System

l. 480 V System

m. Station Lighting Panels

n. 120 V ac Instrument Bus

o. 120 V ac Reactor Protection System Bus

p. 120 V ac Uninterruptible Power Supply

q. 125 V dc System

TABLE 13.5.1-1 (CONT'D)

r. Fuel Pool Cooling

s. HPCI

t. LPCI (Mode of RHR)

u. Offgas (Incl. SJAE, HOGGER)

v. Primary Containment Inerting

w. HVAC-Drywell Cooling

x. Reactor Vessel Head Flange Leakage Detection System

y. Reactor Bldg Closed Loop Cool. System

z. Reactor Bldg Normal Ventilation System (RBNVS)

aa. RCIC

ab. RHR System

ac. Reactor Recirculation System

ad. Service Water

ae. Reactor Bldg Standby Ventilation System (RBSVS)

af. Standby Liquid Control System

ag. Radwaste (Liquid)

ah. Radwaste (Solid)

ai. Circulating Water System

aj. Communications System

ak. Condensate System

al. Condensate Transfer

am. Deluge and Sprinkler Systems

an. Demineralized Water Transfer

ao. Equipment and Floor Drains

ap. Extraction Steam and Reheater

aq. Feedwater System

ar. Fire Protection System

TABLE 13.5.1-1 (CONT'D)

as. HVAC - Control Room

at. HVAC - Turbine Building

au. HVAC - Radwaste Building

av. Generator Gas System

aw. Generator Seal Oil System

ax. Isolated Phase Bus Cooling System

ay. Main Steam System

az. Makeup Water Treatment

ba. Reactor Cleanup System

bb. Station Air System

bc. Smoke, Temperature, and Flame Detection System

bd. Steam Sealing System

be. Turbine Bldg, Closed Loop Cooling System

bf. Turbine Generator

bg. Turbine EHC

bh. Turbine Lube Oil System

bi. Containment Area Leakage Detection System

bj. RBSVS & CRAC Chilled Water

bk. Main Chilled Water

3. Emergency Procedures - have been provided for combating the following potential emergency conditions:

a. Acts of Nature

b. Abnormal Releases of Radioactivity

c. Control Rod Drop

d. Emergency Use of S.L.C.

e. Fire in Control Room

f. Fuel Cladding Failure

TABLE 13.5.1-1 (CONT'D)

g. Fuel Handling Accident

h. Emergency Shutdown

i. Plant Fires

j. Loss of Condenser Vacuum

k. Loss of Containment Integrity

l. Loss of Electrical Power

m. Loss of Instrument Air

n. Loss of Reactor Building Closed Loop Cooling Water

o. Loss of Service Water

p. Loss of Shutdown Cooling

q. Loss of Turbine Building Closed Loop Cooling Water

r. Shutdown from Outside Control Room

s. Level Control

t. Cooldown

u. Containment Control

v. Level Restoration

w. Rapid RPV Depressurization

x. RPV Flooding

y. Transient with Failure to Scram

4. Abnormal Operation - Those steps required to mitigate the consequences of the following abnormal conditions will be contained in the appropriate System Operating Procedures(s):

a. Reactor Recirculation Pump(s) Trip

b. Turbine Trip

c. Generator Trip

d. Load Reject

e. Malfunction of E.H.C.

f. Inability to Drive Control Rods

TABLE 13.5.1-1 (CONT'D)

g. Loss of Neturon Monitoring System

h. Feedwater/Level Control System Failure

i. Loss of, or Malfunction of Reactor Pressure Control (EHC)

Note: Procedures not designated as emergency procedures will be incorporated in Abnormal Performance section of appropriate system or general operating procedures.

C. Alarm Response Procedures (ARP)

Alarm Response Procedures will be provided as required for alarm windows in the Main Control Room associated with the operation of safety related systems or equipment.

D. Maintenance Procedures

Maintenance Procedures will be provided to cover the following maintenance activities.

1. Drywell Opening
2. Drywell Closing
3. Reactor Pressure Vessel Head Removal
4. Reactor Pressure Vessel Head Installation
5. Shroud Head and Steam Separator Removal
6. Shroud Head and Steam Separator Installation
7. Steam Dryer Removal
8. Steam Dryer Installation
9. Replacement of Reactor Recirculation Pump Seals
10. Removal of Reactor Jet Pump
11. Installation of Reactor Jet Pump
12. Removal of Control Rod Drive

TABLE 13.5.1-1 (CONT'D)

13. Installation of Control Rod Drive
14. Explosion Valve Test and Firing
15. Repair and Test of Main Steam Safety Valves
16. Control of Welding Processes, Materials, and Welder Qualifications

E. Instrument and Control Procedures - will be provided to cover the following Instrumentation and Control activities:

1. Nuclear Instrumentation
2. Measuring and Test Equipment
3. Protective Relaying
4. Instrument Records
5. Response Time Testing
6. Surveillance Testing
7. Preventive Maintenance of Process Instrumentation

F. Fuel Handling Procedures - Will be provided to cover the following Fuel Handling activities:

1. Special Nuclear Materials Control and Accountability Procedures
2. Receiving, Storing, and Handling of Un-Irradiated Fuel
3. Inspection and Channeling of Un-Irradiated Fuel
4. Fuel Bundle Repair
5. Refueling
6. Spent Fuel Handling and Shipment
7. Handling and Storage of Sealed and Unsealed Sources

6. Health Physics Procedures - will be provided to cover the following Radiation Protection activities:

1. Dose Rate Radiation Surveys
2. Surface Radioactive Contamination Surveys

TABLE 13.5.1-1 (CONT'D)

3. Personnel Contamination Survey
4. Personnel Decontamination
5. Areas and Equipment Decontamination
6. Monitoring for and Collecting and Recording of Occupational Radiation Exposure (ORE) data
7. Submission and review of suggestions by plant personnel for the reduction of ORE
8. Use of protective clothing and respiratory equipment

TABLE 13.5.1-2

RESPONSIBILITY FOR ORIGINATION OF STATION PROCEDURES

Procedure Type	Responsible for Origination
Administrative Procedures	Appropriate Section Head/ Division Manager[1]
Operating Procedures	Operating Engineer
Alarm Response Procedures	Operating Engineer
Maintenance Procedures	Maintenance Engineer
Instrument and Control Procedures	Instrument and Control Engineer
Health Physics Procedures	Health Physics Engineer
Radiochemistry Procedures	Radiochemistry Engineer
Reactor Engineering Procedures	Reactor Engineer
Solid Radioactive Waste Handling and Shipping Procedures	Radwaste Engineer
Gaseous and Liquid Radioactive Waste Effluent Control Procedures	Radiochemistry Engineer
Fuel Handling Procedures	Reactor Engineer
Surveillance Procedures	Appropriate Section Head[2]

Notes:

[1]Procedures applicable to a specific section, e.g., "Operating Orders" will be the responsibility of a specific Section Head, e.g., Operating Engineer. General Administrative Procedures will be the responsibility of the Operations Manager and the Operations Staff Manager.

[2]Procedures relative to a specific Section, e.g., "Calibration of Nuclear Instrumentation" would be the responsibility of a specific Section Head, e.g., Instrument and Control Engineer.

TABLE 13.5.1-3

FORMAT FOR STATION PROCEDURES

Submitted: _____

Reviewed/QA Engineer _____
Approved/Plant Manager _____

SP Number _____
Revision _____
Date Eff. _____
TPC _____
TPC _____
TPC _____

TITLE

1.0 PURPOSE

A brief description of the purpose for which the procedure is intended should be clearly stated.

TABLE 13.5.1-3 (CONT'D)

2.0 RESPONSIBILITY

Indicate the person responsible for ensuring the proper implementation of the procedures.

3.0 DISCUSSION

Provide a brief description of the applicable component, system or task in sufficient detail for a knowledgeable individual to perform the required function without direct supervision. Include a list of topics or table of contents generally describing the extent or scope of the procedure with page location.

4.0 PRECAUTIONS

General precautions should be listed in this section before the starting of the actual procedure.

Precautions should be established where applicable to alert the individual performing the task to those situations in which measures should be taken early or where care should be exercised to protect equipment and/or personnel. Precautionary notes applicable to specific steps in the procedure should be included prior to that step in the main body of the procedure and should be clearly identified.

5.0 PREREQUISITES

lt is necessary to identify those independent actions or procedures which shall be completed and plant conditions which shall exist prior to performing the procedure. Prerequesites applicable only to specific sections of a procedure should be so identified.

6.0 LIMITATIONS AND ACTIONS

Limitations on the paramenters being controlled and appropriate corrective measures to return the parameter to normal should be specified when applicable.

7.0 MATERIALS OR TEST EQUIPMENT

Special tools, instrumentation, measuring devices, materials, etc. required to accomplish the work.

8.0 PROCEDURE

Step-by-step instructions in the degree of detail necessary for performing the required function or task should be provided. These shall be numbered sequentially.

TABLE 13.5.1-3 (CONT'D)

Note 1: Operating Procedures (Table 13.5.1-1 Sections B.2 & B.4) - will as appropriate be divided into two categories:

Normal Performance - will include step-by-step instructions to complete the required operation. Sub-categories may include startup, routine operation at power, rotation of equipment and shutdown.

Abnormal Performance - will include instructions to recognize the existence of, and correct, out-of-normal conditions that occur during the normal performance. Included may be a statement of the out-of-normal condition, including limits of parameters and/or alarm annunciator action.

Note 2: Maintenance and/or Calibration Procedures

If technical manual instructions are written in sufficient detail to permit a safe and logical accomplishment of the required task, applicable sections of the technical manual may be referenced.

Note 3: Surveillance Procedures

The step-by-step instructions with appropriate sign-off or check-off provisions for each step shall be provided to ensure the proper performance of the surveillance activity.

9.0 ACCEPTANCE CRITERIA

Specific acceptance criteria against which the test results will be judged for approval/disapproval must be stated clearly. Acceptance criteria may contain qualitative data, i.e., a given event does or does not occur, and/or quantitative data such as set points, calibration curves, tolerances, etc., dependent upon the type of device being tested.

10. FINAL CONDITIONS

A listing of those tasks required to return the applicable component or system to operational status and to compile the proper documentation of the procedure. Where applicable verification of completion will be provided by a signature.

TABLE 13.5.1-3 (CONT'D)

11. REFERENCES

This section contains applicable references including appropriate sections of FSAR, appropriate sections of Tech. Specs., QA Manual, Flow diagrams and/or attached appendix drawings, electrical on-lines and/or attached appendix logic diagrams, manufacturer's equipment manuals, and calibration instructions, other station procedures, system descriptions, etc.

12. APPENDICES

Applicable appendices in the form of checklists, data sheets, diagrams, etc., should be included when necessary to support the proper implementation of the procedure.

TABLE 13.5.1-3 (CONT'D)

EMERGENCY PROCEDURE FORMAT

Submitted: _____ SP Number _____

Revision _____

Approved: _____ Date Eff. _____
(Plant Manager)

	TITLE	
1.	CONDITIONS:	Conditions should be included to aid in the identification of the emergency. They should include alarms, radiological conditions, and probable magnitudes of parameter changes. Conditions may be listed in a previous procedure and thus will not be repeated.
2.	IMMEDIATE ACTION:	This should specify the steps required to stop the degradation of conditions and mitigate their consequences.
3.	SUBSEQUENT ACTION:	This should specify the steps necessary to return the station to a normal condition or to a safe operating or shutdown mode.
4.	FINAL CONDITIONS:	This should specify the conditions at which the emergency may be terminated and how to perform this termination.
5.	DISCUSSION:	This section should contain background information, causes, effects, and other information that may assist in clarifying the procedure and analyzing conditions.
6.	APPENDICES:	This section should contain applicable appendices in the form of telephone lists, checklists, etc. when necessary to support the proper implementation of the procedure.

TABLE 13.5.2-1

ALARM RESPONSE PROCEDURE (ARP)
FORMAT

Submitted: _____ ARP _____
(Window Number)

Approved: _____ _____
(Plant Manager) (Panel Number)

Effective Date: _____ _____
(Panel Sub-Section)

Revision: _____

ALARM TITLE

Instr. No. _____ Set Point: Trip _____
Reset _____

POSSIBLE CAUSE

List those conditions that might have initiated the alarm, with the most probable cause first.

IMMEDIATE ACTION

List the immediate actions (s) in order for each possible cause.

SUBSEQUENT ACTION

List those procedures by title and number that would give follow-up action.

Note 1: ALARM RESPONSE PROCEDURES - will include specific instructions to mitigate the consequences of the condition indicated by the alarmed annunciator. Alarm Response Procedures should be filed in numerical sequence in Appendix I to Volume II of the Station Procedure Operating Manual.

REFERENCES

The procedure with which the ARP is associated should be listed.

The reference drawings(s) which details the input and/or control signal to the annunciator and/or its initiating device(s) should be listed.

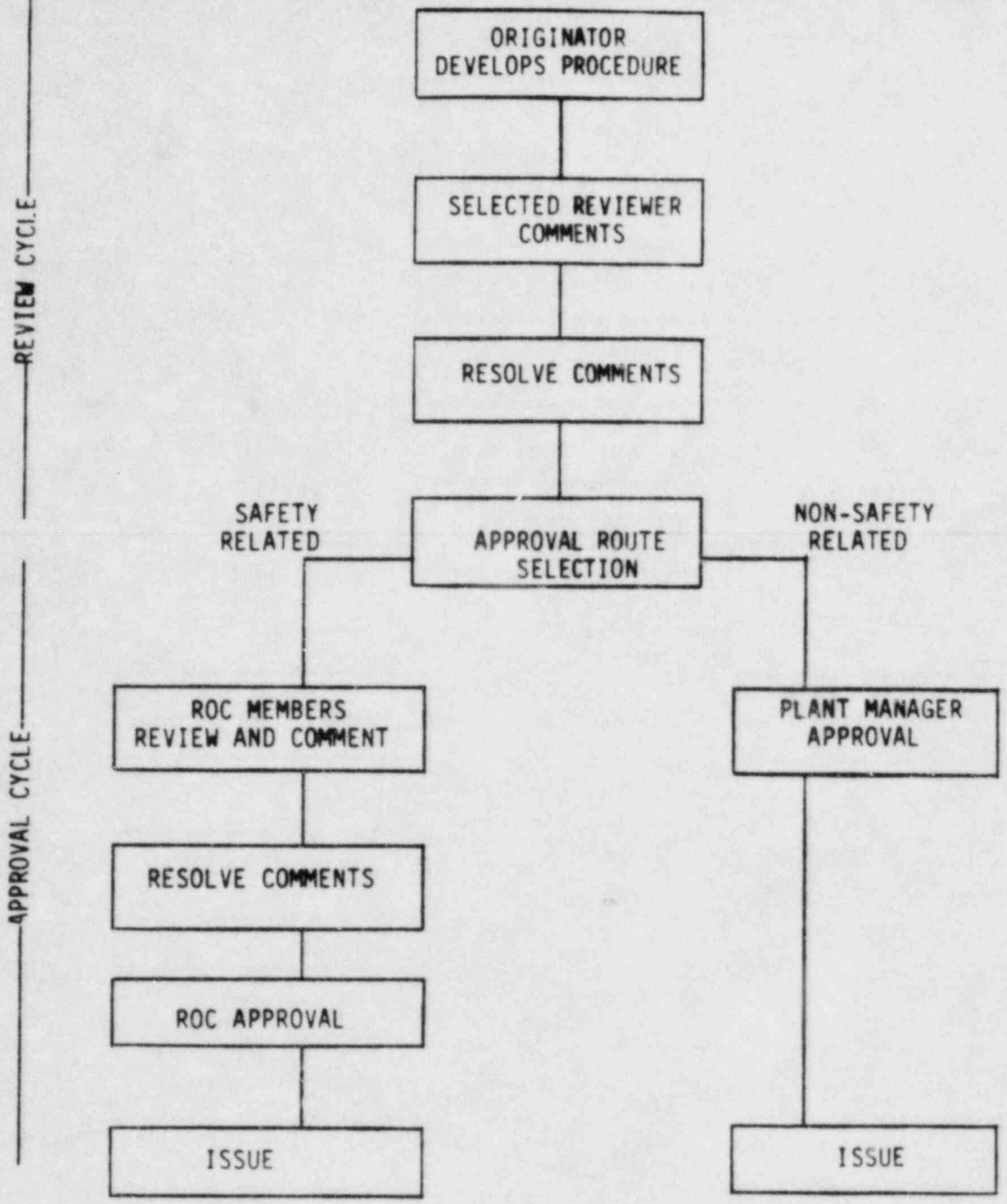
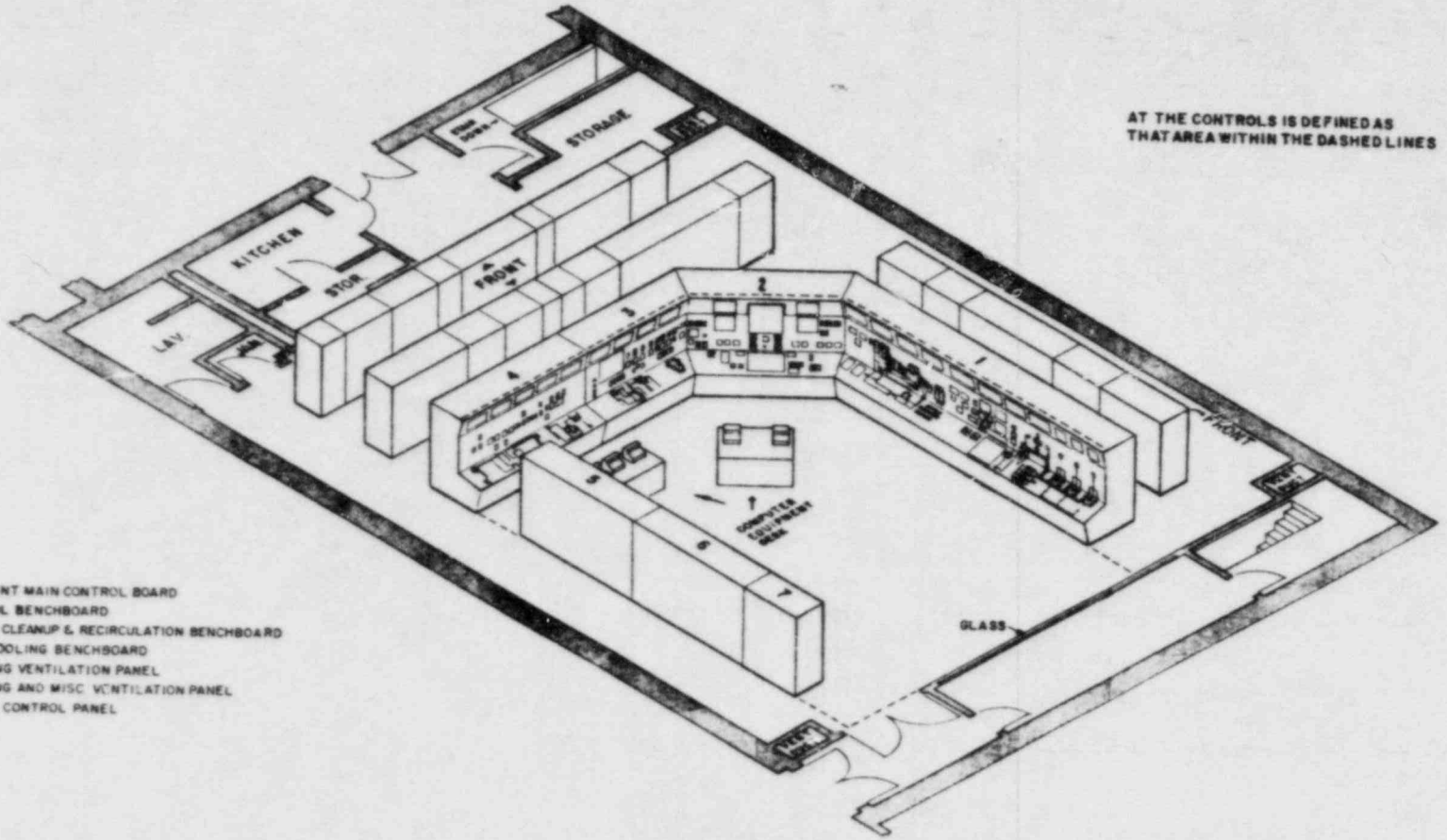


FIG. 13.5.1-1
PROCEDURE FLOW DIAGRAM
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT



AT THE CONTROLS IS DEFINED AS THAT AREA WITHIN THE DASHED LINES

KEY

1 BALANCE OF PLANT MAIN CONTROL BOARD
2 REACTOR CONTROL BENCHBOARD
3 REACTOR WATER CLEANUP & RECIRCULATION BENCHBOARD
4 REACTOR CORE COOLING BENCHBOARD
5 REACTOR BUILDING VENTILATION PANEL
6 TURBINE BUILDING AND MISC VENTILATION PANEL
7 MISCELLANEOUS CONTROL PANEL

FIG 13.5.1-2
MAIN CONTROL ROOM
SHOREHAM NUCLEAR POWER STATION - UNIT 1
FINAL SAFETY ANALYSIS REPORT

All plant records will be kept in accordance with the appropriate guides and will use ANSI Standards for guidance.

The storage facility(s) will follow the guidelines set forth in ANSI N45.2.9-1974 and Regulatory Guide 1.88, August 1974 except that the storage facility has a fire rating of 2 hours. The plant records are designated as historical, operating or event records.

13.6.1 Plant History

Plant historical records will be retained and maintained in accordance with 10 CFR 50, Appendix B, Criterion XVII, and will utilize Regulatory Guide 1.88, August 1974 for guidance. The responsibility for retention and maintenance of these records will be as set forth in the Station Administrative Procedures. The following types of records are considered historical records:

1. Design Records
2. Procurement Records
3. Manufacturing Records
4. Installation and Construction Records
5. Preoperational and Start-up Records
6. General Records
   a. As-built Drawings and Records
   b. Certification of Test Personnel
   c. Inspection Reports
   d. Field Quality Assurance Manuals
   e. Non-conformance Reports
   f. Construction Maintenance History Records

13.6.2 Operating Records

The Plant Manager or his designated alternate will be responsible for the compilation, retention, and maintenance of operating records as set forth in the Station Administrative Procedures. These records will be retained and maintained using Regulatory Guide 1.88, August 1974 for guidance. These records will include:

		Retention Time
1.	Records and drawing changes reflecting plant design modifications made to systems and equipment described in the Final Safety Analysis Report	Lifetime
2.	New and spent fuel inventory, transfers of fuel, and assembly histories	Lifetime
3.	Plant radiation and contamination survey records	Lifetime
4.	Current individual plant staff member qualifications, experience, training, and retraining records	Lifetime
5.	Reactor coolant system in-service inspection records	Lifetime
6.	Minutes of meetings of the Plant Nuclear Safety Committee and Company Nuclear Review Board	Lifetime
7.	Normal nuclear unit operation, including power levels and periods of operation at each power level	Five Years
8.	Principal maintenance activities, including inspection repair, substitution, or replacement of principal items of equipment pertaining to nuclear safety	Five Years
9.	Periodic checks, inspections and calibrations performed to verify that surveillance requirements are being met	Five Years
10	Special reactor test or experience records	Five Years
11	Changes made in the Operating Procedures	Five Years

13.6.3 Events Records

The Plant Manager or his designated alternate will be responsible for the compilation, retention, and maintenance of events record as set forth in the Station Administrative Procedures. These records will be compiled utilizing Regulatory Guides 1.21, June 1974 and 1.88, August 1974 for guidance. These records will include:

		Retention Time
1.	Radiation exposure records of all plant personnel and others who enter radiation control areas	Lifetime
2.	Radioactivity levels of liquid and gaseous waste released to the environment	Lifetime
3.	Off-site environmental monitoring survey records	Lifetime
4.	Abnormal occurrence records	Five Years
5.	Radioactive shipment records	Five Years

Note: For the purpose of record retention time, Lifetime refers to lifetime of the equipment or system, or station, as applicable to the record in question.

13.7 INDUSTRIAL SECURITY

The Industrial Security Plan for the Shoreham site has been submitted as a separate document withheld from public disclosure pursuant to 10CFR2.790(d), "Rules of Practice".

APPENDIX 13A

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

JOHN D. LEONARD, JR.
Vice President, Nuclear Operations
Long Island Lighting Company

The Vice President, Nuclear Operations has overall responsibility for the engineering, construction, licensing, startup testing, and operation of the nuclear facilities within the Company. He reports to the Executive Vice President of the Company. The Vice President, Nuclear Operations is responsible for the 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. He is also responsible for the implementation and management of the engineering and high level technical and administrative support functions for plant operations.

Graduated from Duke University in 1953 with a Bachelor of Science Degree in Physics. Also completed one year of graduate studies at Duke. Subsequently, he received a Master's degree in M.A. Physics/Nuclear Engineering with a minor in Radiation Biology in 1962 from the U.S. Naval Post graduate school.

January, 1976 - May, 1984. Employed by the New York State Power Authority as the resident manager of the James A. Fitzpatrick Nuclear Power Plant, located near Scriba, New York. As Chief Executive and Administrative Officer of this 821 megawatt BWR plant, Mr. Leonard reported directly to the company's Executive Director.

In addition to being responsible for the safe operation of the nuclear plant, he served as the plant's Emergency Plan Director and represented the Authority directly to the Nuclear Regulatory Commission Inspection and Enforcement Branch.

Promoted in March, 1980 to Vice President and Assistant Chief Engineer for Design and Analysis. Charged with the responsibility for the creation of the Design Analysis Department which ultimately consisted of one hundred twenty six technical professionals supplemented by seventy contract engineers and designers.

As Assistant Chief Engineer, was responsible for: the provision of engineering assistance to line operating departments, the technical evaluation of proposals submitted to the Power Authority and the design of many station modifications, previously performed by outside engineering firms.

September, 1974 - January, 1976. Employed by the Virginia Electric and Power Company as the Corporate Supervisor of Operational Quality Assurance. Responsible for the organization

of the operational quality assurance function at both the plant and corporate levels. Supervised the activities of twenty one experienced nuclear operating personnel which included onsite surveillance, procedural enforcement and audits of all plant activities. Also served as an alternate member on the System Nuclear Safety and Operating Committee for the Manager of Licensing and Quality Assurance.

1954 - 1974

Served in the United States Navy in Officer grades to and including the rank of Commander, USN. From 1969 until 1974, served as Commander of two nuclear ballistic missile submarines, the U.S.S. Abraham Lincoln and the U.S.S. Benjamin Franklin. Overall experience in nuclear power while in the Navy spanned a twelve year period; the balance was spent in other high technology areas.

In 1964, served as Manager of a Secretary of the Navy Study Group. This study group was concerned with analyzing a prospective advanced fleet ballistic missile design.

Other naval responsibilities included the preparation and preliminary examination of Chief Engineers for certification by Vice Admiral Rickover.

After twenty years of service, seventeen of which were at sea, Mr. Leonard retired from the Navy with an Honorable Discharge.

Qualified Engineer Watch Officer S-I-C Reactor. Decorations include the National Defense Service Medal with one Bronze Star, the Navy Commendation Medal and the Polaris Patrol Pin with two Silver Stars. Elected to membership in Sigma XI Honorary Research Society as a result of research in the field of plasma physics and advanced weapon systems.

ROBERT A. KUBINAK
Director, Quality Assurance, Safety and Compliance
Long Island Lighting Company

The Director, Quality Assurance, Safety and Compliance reports directly to the Executive Vice President and has overall responsibility for ensuring the implementation of the LILCO Quality Assurance Program for the design, construction and operation of the Shoreham Nuclear Power Station. The Director has the authority and organizational independence to: identify quality problems, recommend or provide solutions and verify the implementation thereof. In addition, responsible for the Independent Safety Engineering Group. The Director, Quality Assurance Safety and Compliance also serves as the Chairman of the Corporate Nuclear Review Board.

Graduated from Rensselaer Polytechnic Institute in 1953 with a Bachelors degree in Electrical Engineering (BEE). Received a Masters of Business Administration (MBA) from Dowling College in 1979. Received a Master of Science (MS) Degree in Computer Science in December 1982 from Polytechnic Institute of New York.

Received a New York State Professional Engineering License in 1975.

Completed the General Electric Boiling Water Reactor Simulator Training Program and was certified as a Senior Reactor Operator. Tested by Atomic Energy Commission examiners and received a dual certificate as a Reactor Operator for Dresden Nuclear Power Plant Units 2 and 3.

Completed the following industry seminars and training programs:

a) Introduction to Nuclear Power - NUS Corporation
b) Radiation Protection - LILCO Evening Institute (Instructor)
c) Nuclear Power - LILCO Evening Institute (Instructor)
d) Quality Assurance for the Nuclear Industry - General Physics
e) Ultrasonic Nondestructive Testing - Magnaflux Corporation
f) Radiographic Examination - General Dynamics Corporation
g) PWR Operation and Simulation - Westinghouse Corporation
h) Nuclear Reactor Safety - MIT
i) Boiling Water Reactor Simulator General Electric Company

1978 - April 1984

Manager, Nuclear Operations Support Department. Responsible for the provision of technical and nontechnical support to enhance the safe, reliable and economic operation of the nuclear facility by maintaining an effective interface and flow of information between the nuclear station and regulatory agencies, company departments and outside resources. Within this objective, the Department is charged with the specific responsibility of accomplishing long range operating type functions 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 participation and coordination for major nuclear plant additions and modifications, licensing and regulatory representation, industry representation, evaluation of plant performance, coordination of corporate nuclear policy, the conduct of special programs, nuclear budget and cost control, independent safety engineering studies and nuclear training coordination.

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 representation 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 working member of the General Electric startup team for the Commonwealth Edison Dresden Nuclear Station Units 2 and 3 for a period of 15 months. Responsible for the startup and preoperational testing of the Reactor Recirculation System and the Circulating Water System including auxiliaries and support systems from initial construction turnover through 100% power operations. Directly assisted the responsible engineers in the startup and testing of the Control Rod Drive System, Core Spray System, LP and HP Coolant Injection System, Isolation Condenser and the Containment Leak Rate.

Assigned as assistant to the General Electric Shift Superintendent. Operated at the reactor control board and performed three (3) reactor criticals and one (1) turbine roll as unit was returning to service. Performed numerous generator load changes while above and below 50% reactor power using recirculation flow and control rod positioning. Performed an additional two (2) training criticals. Operated at the reactor control board and performed stuck control rod surveillance testing and control rod friction tests.

Participated in unit startup and shutdown procedures which included surveillance testing, valve checkoff list verifications, drywell inspection, and heatup and cooldown activities. Participated in fueling and refueling activities on both Units 1 and 2 reactor cores. Assisted in reactor core and jet pump inspections, fuel channeling, spent fuel inspection and sipping, reactor core radioactive source and instrumentation removal and installation.

Prepared or verified procedures written for non-normal shift operation. Participated in daily plant staff coordination meetings and was an observer in periodic plant and Corporate Safety Review Committee meetings.

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 - 1969

Operations Engineer for 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 foreman and mechanics. Responsible for the design, instrumentation and installation of subsystems including power piping and electrical power distribution.

1957 - 1961

Plant Instrument and Control Engineer at the Port Jefferson Power Station. Directed the efforts of engineers and technicians in startup and maintenance of power plant electronics, 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, development of 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.

Member, New York State Society of Professional Engineers. Registered member Professional Engineers Society, State of New York. AEC Certified Reactor Operator, Dresden Units 2 and 3, Commonwealth Edison Company.

EDWARD J. YOUNGLING
Manager, Nuclear Engineering Department
Long Island Lighting Company

Assigned as the Manager of the Nuclear Engineering Department in May, 1984, reporting to the Vice President, Nuclear Operations. Responsible for the overall operation of the Nuclear Engineering Department. The Nuclear Engineering Department is charged with providing the technical direction for engineering, fuel management, and radiation protection for the purpose of maintaining the design basis of the Shoreham Nuclear Power Station.

Responsible for the organizational development of the Nuclear Engineering Department and the definition of functions and responsibilities of the Nuclear Systems Engineering, Nuclear Fuel, Nuclear Project Engineering, Engineering Assurance and Radiation Protection Divisions.

Provide timely technical support to the Shoreham plant operating staff for routine and abnormal operations in the areas of nuclear engineering, licensing, core analysis, radiation protection, health physics, chemistry and radiochemistry. Administer programs and approve procedures to provide engineering and engineering management for plant modifications and engineering studies. Establish reliability and risk assessment capability aimed at improving plant safety and availability. Provide engineering support to Shoreham in the disciplines of thermal-hydraulics, heat transfer, stress analysis, systems engineering, instrumentation and controls, materials engineering, nuclear fuel design, core physics, safety and reliability analysis, risk assessment, radiation protection, shielding, health physics, radiation chemistry, non-destructive examination, corrosion analysis, and nuclear waste technology. Direct engineering work to the Office of Engineering on matters encompassing the disciplines of electrical, civil, power and environmental engineering for projects related to Shoreham. Direct activities related to nuclear fuel cycle management and establish nuclear material accountability. Establish core analysis systems to provide core follow support and advice on control rod withdrawal patterns. Provide technical direction for the Company's Radiological Environmental Monitoring Program. Provide radiation protection engineering and health physics technology assessments for incorporation in the Company's ALARA radiation dose reduction program. Responsible for the Company's ALARA radiation dose reduction program. Participate with Nuclear Operations Support and Plant Operating Staff in the development and implementation of the Corporate Licensing Policy. Prepare and approve all budgets related to departmental activities necessary to comply with Corporate requirements. Prepare testimony and participate in appearances before federal, state

and local hearing boards as required (PSC Prudency, PSC Rate Case, NRC Hearings, etc.). Administer R&D efforts within the Department in support of the Corporate R&D program.

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:

a) Introduction to Nuclear Power - NUS Corp.
b) Boiler Control Fundamentals - General Electric Co.
c) Fundamentals of BWR Operation (at the Dresden Simulator) - General Electric Co.
d) Process Computer Concepts and Practices - General ELectric Co.
e) Shoreham Research Reactor Training Program - Brookhaven National Laboratory Medical Research Reactor (NRC SROC license candidate research reactor training requirement)
f) Planning for Nuclear Emergencies by Harvard School of Public Health
g) Interagency Course in Radiological Emergency Response Planning in Support of Fixed Nuclear Facilities - Nuclear Regulatory Commission
h) Customer Engineer Training Program in the Methods Used to Conduct Maximum Turbine Capacity Tests and Analyze Results to Detect and Correct Cycle Losses - General Electric Co., Large Steam Turbine Division
i) Shoreham Nuclear Power Station Onsite Training Program (NRC SROC license candidate plant system training requirement)
j) Advanced Supervisory Workshop - LILCO
k) Assertiveness Training Workshop - LILCO
l) Management Workshop - LILCO
m) Shoreham General Employee Training
n) Achieved a Senior Operator Certification from the General Electric Company on the Duane Arnold Energy Center Boiling Water Reactor.

1981 - April, 1984

Assigned as Startup Manager in March 1981. Responsible for the Preoperational test activities for the Shoreham Nuclear Power Station. Including the coordination of all Checkout & Initial Operations and Preoperational Testing. Set initial construction priorities by system/subsystem and monitored construction progress as it relates to the startup schedule. Had the authority to modify construction schedule as conditions demanded. Chaired construction release meetings at which the status of construction, as it relates to systems scheduled to be released, was discussed. Member of the Joint Test Group (JTG). Ensured

that the established procedures of documentation control were 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. Certified Level III per ANSI N45.2.6 -- 1978.

In August, 1983, named as Manager for the Shoreham Delaval Emergency Diesel Generator Crankshaft Failure Recovery Program. Responsible for coordinating the failure analysis, rebuilding, retesting and requalification of the three diesel generator units.

Prepared testimony, was depositioned and testified before the Atomic Safety and Licensing Board regarding Shoreham contentions dealing with quality assurance, startup testing and emergency diesel generators. Prepared testimony and testified before the New York State Public Service Commission. Responsible for direct interface with NRC Resident, Regional and Staff personnel for matters related to the preoperational test program and emergency diesel generator recovery effort.

1979 - 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 included 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. Also coordinated long-range planning activities associated with plant maintenance, fuel cycle strategy and budget and cost control, monitoring overall plant and individual equipment performance. Maintained 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, crisis management and overall company emergency preparedness following the Three Mile Island Unit 2 accident. Chairman of the Shoreham Review Task Group, responsible for developing action plans for implementing post TMI Recommendations. Responsible for the Shoreham Control Room human factor design review.

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

1975 - 1979

Assigned as Chief Technical Engineer of the Shoreham Nuclear Power Station Unit 1 in January 1975. Responsible for the activities of the Instrumentation 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.

1974 - 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.

1973 - 1974

Named the Instrumentation and Control Engineer for the 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. 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.

1972 - 1973

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

1971 - 1972

Reassigned to the Northport Power Station for participate in the startup of Northport Unit 3. Directly responsible for the startup of the boiler for this 380 MW unit including the fuel safety system, the combustion control system, and the associated mechanical equipment. Assumed overall plant shift operations responsibility during the latter stages of startup. Was an instructor in the Unit 3 systems training program given to plant supervisors, operators, technicians, and mechanics.

1969 - 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 and Webster, the NSSS supplier, General Electric Company, various vendors and visits to several nuclear stations.

1968 - 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 routine 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.

1966 - 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, 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 AEC. 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 routine 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 the 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. Held a Guest Associate Engineer appointment in the Reactor Division at Brookhaven National Laboratory. Member, Pi Tau Sigma. Holds an Engineer in Training Certificate - State of Pennsylvania (State Registration Board for Professional Engineers). Senior Operator Certification from the General Electric Company on the Duane Arnold Energy Center Boiling Water Reactor.

JEFFREY L. SMITH
Manager, Nuclear Operations Support Department
Long Island Lighting Company

The Manager, Nuclear Operations Support Department reports to the Vice President - Nuclear Operations and has overall responsibility to provide technical and nontechnical support for the operating nuclear power station. The primary 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 organizations and regulatory agencies, company departments and outside resources. In addition, this support effort involves the management and administration of specific support functions for the Office of Nuclear Operations.

Within this objective, the department is charged with the specific responsibility of administering all support functions with the exclusion of engineering and design in support of the operation and maintenance of the Shoreham Nuclear Power Station. These support functions include: overall responsibility for the management and coordination of all licensing and regulatory matters within the Office of Nuclear, including the licensing proceedings before the various Atomic Safety and Licensing Boards; overall responsibility for management and administration of financial support services of the Shoreham Nuclear Power Station, overall responsibility for the formulation of contracts, contract administration and material control for the Shoreham site; overall management and administration of nuclear training programs including the Licensed Operator Training Program; overall management and administration of the site security program; overall management and administration of the Office of Nuclear Emergency Preparedness Program and overall responsibility for other site support programs such as Nuclear Records Management, Site Administrative Services and Site Facility Services.

Graduated from Clarkson College of Technology in 1967 with a Bachelor of Science in Mechanical Engineering. Received a Master of Science degree in Nuclear Engineering in 1978 from tne 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 the following industry seminars and training programs:

a) BWR Observation Training - General Electric Company
b) Nuclear and Core Physics - General Physics Corp.
c) PWR Orientation Course - Westinghouse Electric Corp.

d) Practical Nuclear power Plant Technology - General Physics Corp.
e) Ginna Station Systems Training - Rochester Gas and Electric Corp.
f) QA Audit Techniques - L. Marvin Johnson & Associates, Inc.
g) QA Introduction - Rochester Gas and Electric Corp.
h) Lead Auditor Qualification - Rochester Gas and Electric Corp.
i) Practical Welding Metallurgy - American Welding Society
j) Industrial Radiography - Eastman Kodak Company
k) BWR Operating Fundamentals (Simulator) - General Electric Company
l) Energy QA Seminar - American Society for Quality Control

1983 - April 1984

Assigned to the position of Manager, Colt Diesel Generator Project in December, 1983, reporting to the Vice President - Nuclear. Responsible for all engineering, construction and procurement activities associated with an alternate emergency diesel generator system. Directly responsible for planning and scheduling, cost control and contractual negotiations for the project.

1981 - 1983

Held the position of Manager, Special Projects, reporting to the Director, Office of Nuclear. Had overall responsibility and management of technical licensing matters associated with the Shoreham project. Had responsibility for the coordination of all matters dealing with NRC Inspection and Enforcement. Had responsibility for the direction and coordination of incoming and outgoing NRC correspondence. Had responsibility for the Shoreham Plant Configuration Review Program, for the coordination of the ASME N-5 Certification Program, Large Bore and Small Bore Piping "As-Built" Program, Maintainability Task Force, Small Bore Piping and Instrumentation Design Groups, and Station Modification Support Program.

1979 - 1981

Held the position of Regulatory Supervisor reporting to the Manager, Nuclear Operations Support Division. Had overall responsibility for the management and coordination of nuclear regulatory matters which are under the jurisdiction of the Vice President - Nuclear. These regulatory matters included: 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. Directed and participated in the development of corporate policies and department procedures for these activities. Provided direct support to the

Vice President - Nuclear for special management and technical projects.

1976 - 1979

Held the position of Manager, Operational Quality Assurance at the Long Island Lighting Company. 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. During this period, directed engineering personnel in the development of an Operation Quality Assurance Program and Procedures Manual and participated in audits of Shoreham Station. As the Manager, Operational Quality Assurance, conceptualized and developed a Nuclear Operations Corporate Policy Manual which is presently utilized to define corporate organizational interfaces and responsibilities relative to the operation and support of Shoreham Station.

1975 - 1976

Promoted to the position of Manager, Operational Quality Assurance. Assigned to the Rochester Gas and Electric Corp. Quality Assurance Department, reporting to the Manager, to develop an orientation into the quality assurance functions of an operating nuclear station. During this assignment, worked on the Station QC staff, participated in surveillances and inspection activities, led audits of station, operations, equipment deficiency, measuring and test control. In addition, participated in audits of two emergency plan drills, station organization and training, surveillance testing and station modifications. Received certification as a qualified lead auditor.

1974 - 1975

Assigned to Hicksville Operations Center as the Staff Engineer in the Electric Production Department responsible for coordination and liaison with the Jamesport Nuclear Project on all matters dealing with operations staffing, training, Service Building layout and operation reviews. In addition, was responsible for the direction of turbine, boiler, capability and equipment performance testing of all electric generating stations on the LILCO system.

1972 - 1974

Held the position of Operations/Controls Engineer at the Northport Power Station (three 400 MWe units) on the Long Island

Lighting Company system. Responsible for the direction of all operations, instrumentation, controls, testing and water chemistry functions at the station. Also involved with the startup and initial operation of Unit 3 at the Northport Power Station.

1969 - 1972

Resumed employment at the Long Island Lighting Company. Held the positions 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, was responsible for the formulation of investigative testing programs to determine the cause of malfunctioning munitions released to the field. 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. 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 the American Society of Mechanical Engineers.

WILLIAM E. STEIGER, JR.
Plant Manager
Long Island Lighting Company

Assigned as Plant Manager for the Shoreham Nuclear power Station in November, 1983. Directly responsible for the safe, reliable and efficient operation of the plant in compliance with the requirements of the facility license. Specific duties include: assurance of proper procedural and personnel support during the preoperational testing, startup and power operation phases, maintenance of occupational radiation exposures as low as reasonably achievable and detection and control of environmental releases.

Graduated from the United States Merchant Marine Academy in 1965 with a Bachelor Degree in Marine Engineering. Received a 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.

Completed a SRO certification training program conducted by General Physics Corp at the Limerick Simulator Facility, which established Cold Licenses eligibility for the Shoreham Station.

Completed the following industry seminars and training programs:

a) Boiler Control Fundamentals - General Electric Co.
b) Fundamentals of BWR Operation - General Electric Co.
c) Process Computer Concepts & Practices - Honeywell
d) Maintenance of Electrical Equipment - National Electric Coil
e) NDE - Ultrasonic Testing - Rockwell International
f) Advanced Supervisory Workshop - LILCO
g) Management Workshop - LILCO
h) Fire Fighting Training - Suffolk County Fire Training Center
i) Maintenance Welding in Nuclear Power Plants - AWS and EEI

1983 - 1984

Promoted to Shoreham Operations Manager in April, 1983, reporting directly to the Plant Manager. Responsible for the supervision of the plant operating organization via the Chief Operating Engineer, Chief Technical Engineer, Chief Maintenance Engineer and the Plant Administrative Section.

1975 - 1983

Assigned as Chief Operating Engineer of Shoreham in January 1975. Responsible for managing, administering, evaluating and coordinating all functions in the Operating, Maintenance, Training, Security and Administrative Sections within the plant organization. These responsibilities include: operation and maintenance of the station's nuclear reactor, electrical generating and mechanical equipment; formulation of training programs for licensed and non-licensed operators, licensed and non-licensed fuel handling personnel, maintenance and security personnel; review and implementation of training programs for technical and supervisory personnel; management of the station fire protection program and fire brigade; identification and procurement of necessary plant equipment and spare parts to support the activities of assigned station sections; management of the station security program; and development and review of the operations, maintenance, training, security and administrative portions of the station operating manual and corresponding areas of the SNPS FSAR.

September 1980 - November 1980

Assigned to the Vermont Yankee Nuclear Power Station during the 1980 refueling and maintenance outage. The scope of this assignment included management review and continuous updating of the major critical path activities and outage schedule with recommendations for future improvements.

Participated in daily outage and Plant Operations Review Committee meetings, and NRC I&E Inspection exit interviews during the outage. Participated in reactor refueling and inspection activities.

August 1978

Assigned to Vermont Yankee Nuclear Power Station to observe startup of the unit following a refueling outage. Witnessed the completion of the integrated leak rate test and reactor inservice hydrostatic pressure test. Observed preparations for and accomplishment of approach to criticality, plant heatup and transfer to run.

April 1973 - December 1974

Assigned as Operations Engineer for the Shoreham Nuclear Power Station. During this period, completed assignments with the LILCO Project Engineering Group as Lead Nuclear Engineer, and the General Electric Company Startup Organization at the Cooper Nuclear Station. Responsibilities included development of the licensed operator training program and preparation of Chapter 13.2 of the SNPS FSAR.

July 1973 - June 1974

Assigned to the General Electric Company Startup organization at the Cooper Nuclear Station. Responsibilities included preparation of preoperational test procedures, conduction of preoperational test and preparation of test results analysis for NSSS and BOP systems. Participated in initial core loading and assisted General Electric Company Startup, Test, Design and Analysis (STD&A) personnel as a member of the GE Co. startup group during the power ascension test program. During this assignment was trained, examined and received SRO certifications from both the General Electric Company and the Atomic Energy Commission for the Cooper Nuclear Station.

July 1972 - July 1973

Assigned as Lead Nuclear Engineer to the LILCO Shoreham Project Engineering Group. Responsible for LILCO's design review of NSSS systems, and monitoring the design interface between the NSSS supplier (GE Co.) and the architect-engineer (S&W). This included review against AEC safety guides, ASME Codes and IEEE Codes for all NSSS systems and equipment. Also responsible for design basis inputs and design review of the radwaste building and radwaste systems.

October 1971 - July 1972

Assigned as a Startup Engineer (BOP) for LILCO's 385 MWe Northport Unit 3. Responsible for initial checkout and preoperational testing for all Balance of Plant systems including the turbine-generator; preparing BOP sections for the Unit No. 3 operating manual; instructing personnel in the operation, testing and maintenance of new equipment; and shift supervision of initial plant startup.

April 1971 - September 1971

Assigned to the LILCO Engineering Department to assist the Shoreham Nuclear Project Licensing Engineer in the detailed design review of the Shoreham Nuclear Power Station.

1968 - 1971

Assigned to LILCO's Glenwood Power Station as Assistant Engineer (7/68 - 12/69) and Associate Engineer (1/70 - 1/71). Responsible for review and approval of mechanical and electrical engineering design changes to convert oil handling systems to handle, store and burn low sulfur fuel oil. Also responsible for planning and supervising major generating turbine and boiler overhauls, and manpower requirements for routine and outage maintenance activities.

1965 - 1968

Assigned by First Atomic Ship Transport, Inc. (FAST) as Marine Engineer aboard the N.S. Savannah. Trained and received AEC Reactor Operator license OP-2103 and Senior Reactor Operator license SOP-914. Responsible as RO and SRO for safe operation of the reactor and all plant systems and equipment. Qualified as plant shift chemist with responsibility for analyzing and maintaining plant chemistry limits. Completed all required training for shift health physics coverage.

Assisted in training reactor operator trainees by instructing and supervising plant startups, shutdowns and power changes during training periods and AEC license examinations. (Approximately 60-70 reactor startups)

As Senior Reactor Operator, responsible for calculating fission product inventories and time to melt calculations, and for supervising core physics and control rod worth test. Also responsible during reactor shutdowns for performing maintenance on nuclear and balance of plant equipment, and functional and hydrostatic testing of plant systems and components.

Member of the American Nuclear Society and the ANS-Reactor Operations Division Executive Committee. Licensed Marine Engineer Steam and Diesel Vessels of unlimited horsepower - United States Coast Guard. Atomic Energy Commission Reactor Operator License (OP-2103) for N.S. Savannah. Atomic Energy Commission Senior Reactor Operator Certification for the Cooper Nuclear Station Docket No. 55-4746 dated May 28, 1974. Member BWR Owners Group - Standard Technical Specifications Committee and Emergency Procedures Guidelines Committee.

JOHN A. SCALICE
Operations Manager
Long Island Lighting Company

Assigned as Operations Manager in May, 1984. Responsible for the overall management of the Operations and Reactor Engineering section including, the generation of electrical power in compliance with the rules of the governing regulatory agencies and the monitoring of the various station parameters to maximize plant availability and performance.

Graduated from Polytechnic Institute of Brooklyn in 1970 with a Bachelor of Science degree in Mechanical Engineering. Received a Master of Science (Nuclear Engineering) degree at Polytechnic Institute of New York, 1979.

Completed the General Electric Boiling Water Reactor (BWR) Simulator Program in December 1979 and obtained a Senior Reactor Operator Certification. Completed Simulator refresher training in September 1981.

Obtained NRC Senior Reactor Operator License (SOP-4424) November 12, 1982.

Completed the following additional training and qualification programs:

a) BWR Design Orientation - General Electric Co.
b) BWR Technology - General Electric Co.
c) Comprehensive Assets Security - American Society of Industrial Security
d) Research Reactor Training (RRT) (including tne training criticals) Brookhaven National Laboratory Medical Research Reactor
e) Station Nuclear Engineering - General Electric
f) Concepts and Practices Computer Course - Honeywell
g) Process Assembly Language (PAL) Programming Course for the HS4000 series computer - Honeywell

<u>April, 1984</u>

Four week field assignment to CP&L's Brunswick Steam Electric Plant in the Operations Group. Witnessed Plant evolution at high power levels and participated in daily management and planning activities.

<u>July 1980 - September, 1980</u>

Sixteen week field assignment to CP&L's Brunswick Steam Electric Plant in the Nuclear Engineering Group. Actively participated in Units 1 & 2 refueling outage and pot refueling Start up Test

Program. Successfully completed BSEP's qualification program for an on-shift Nuclear Engineer. Participated in reactor power maneuvers and issued reactivity change request to operators including rod movements and flow changes.

1979 - May, 1984

Assigned to the position of Reactor Engineer at the Shoreham Nuclear Power Station in July, 1979. 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.

1974 - 1979

Joined the Shoreham Nuclear Power Station Plant Organization in January 1974, and was assigned to the Shoreham Project as Assistant Project Engineer - Nuclear. Responsible for coordinating and monitoring the design, scheduling, procurement and construction activities related to all nuclear plant systems, including liquid and solid Radwaste, Reactor Building Standby Ventilation System, Primary Containment Atmospheric Control, Fuel Pool Cooling and Fuel Pool Cleanup.

Assigned to the LILCO Startup team in May 1975 as Nuclear Startup Engineer. Responsible for definition of System Turnover packages, initial phases of startup scheduling, preparation of system checkout and initial operation test procedures for all nuclear plant systems, and coordination of spare parts ordering program.

Assigned as Performance and Compliance Section Head at the Shoreham Nuclear Power Station in October 1975. Responsible for supervising the section activities which included: coordinating technical consultant activities for station software, 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 overviewing and coordinating the schedule of procedure writing by maintaining the computerized procedure index status report, witnessing preoperational tests, and writing of general plant administrative procedures.

Assigned as Site Security Supervisor at the Shoreham Nuclear Power Station in April 1977. Responsible for the planning, development and administration of the Station's Security Program.

Detailed program activities include: administration and direction of the plant security force, maintaining electronic security devices, administration of the security force training program, formulation of security procedures and a continuing evaluation of their effectiveness and adequacy to satisfy company and NRC regulatory requirements, maintaining current working knowledge of industry and regulatory security practices and policies.

1970 - 1974

Employed by the Long Island Lighting Company as an Assistant, Associate and Plant Engineer in the Electric Production and Nuclear Projects Department. Held Supervisory position in Maintenance, Operations, and Instrumentation and Controls Section in a 350 MwE fossil fueled multi-unit power station. Particular responsibilities included: planning and supervising maintenance and major overhauls of all plant equipment including four (4) General Electric Co. Turbo-Generators and their associated oil, gas fired Boilers. Was also given full responsibility for engineering design and startup of several plant subsystems such as automatic minimum flow recirculation for four (4) Boiler feed pumps, and complete automation of the magnesium-oxide injection system.

While in the Instrument and Controls Section, was responsible for maintaining and testing all plant electric and pneumatic controls systems, Turbine Boiler performance tests and calculation and improvement of the station Heat Rate.

As Operations Supervisor, was responsible for the reliable, safe, and efficient operation of all plant equipment, personnel scheduling and training, coordination of equipment outages, and preparation of operating reports. Subsequently transferred to the Shoreham Plant Staff in January 1974.

Member, American Nuclear Society.

DAVID D. TERRY
Maintenance Manager
Long Island Lighting Company

Assigned as the Maintenance Manager (formerly called Chief Maintenance Engineer) for the Shoreham Nuclear Power Station - Unit No. 1 in April, 1983. Responsible for all maintenance activities inclusive of mechanical, electrical and Instruments and Controls and any supplementary maintenance contractors.

Graduated from Maine Maritime Academy, 1964 with a Bachelors Degree in Marine Engineering.

Completed the General Electric Co. BWR Technology and Simulator Program and received SRO Certification in October, 1976.

Successfully completed the following industry seminars and training programs:

a) Boiling Water Reactor Maintenance - General Electric Co.
b) Elements of Nuclear Power Reactor Engineering - University of Michigan
c) Fulfilled requirements of NDT Level II per SNT-TC-1A supplements A through E - General Dynamics Convair Aerospace Division

1967 - Present

Employed by the Long Island Lighting Company and assigned as Assistant Engineer to the Northport Power Station for the Preoperational Checkout and the Startup of Northport Unit 2. Responsibilities included the writing of the preoperational cleaning procedures, mechanical and electrical equipment checkout, and preparation of construction progress reports. Transferred to the Operations Department at the Northport Power Station in August, 1968. Responsibilities included the preparation of operating schedules, coordination of unit outages with the system operator, and assisting in the supervision of the daily operation of both units. Assigned to the position of Plant Engineer in January, 1969 and transferred to the Results Department at the Northport Power Station. Responsibilities included the calculation of monthly heat rate data and various equipment and unit efficiency testing. Assigned as acting Maintenance Engineer in July, 1969 at the Northport Power Station. Responsibilities included the organizing, planning and conducting of maintenance repairs on all mechanical and electrical station equipment. Responsible for Northport Power Station Unit 3 operations input to design and coordination of capital improvement for Northport Unit 2. Promoted to Plant Engineer in January, 1971 and assigned to the Northport Power

Station as Results Engineer. Responsibilities included efficiency testing, calculating monthly heat rate, and maintenance and repair of all control systems and recorders. Assigned as Plant Engineer to the maintenance section in January, 1972 at the Northport Power Station. Responsibilities included the planning and scheduling of daily maintenance and repair activities as well as major boiler and turbine overhaul, personnel training, and daily direction of the maintenance forces in all phases of maintenance and repair operations.

Assigned to the position of Maintenance Engineer for Shoreham Nuclear Power Station Unit 1 in June, 1973 and transferred to the Stone & Webster Engineering Corporation Field Construction Forces as Reactor Area Resident Engineer. Responsibilities included the coordination of problems arising between construction and engineering, scheduling of construction activities, interfacing with subcontractors, and insuring that timely and proper supervision is provided for various construction disciplines. Reassigned in June, 1975 by Stone & Webster as Chief Supervising Engineer-Mechanical Contractors for the construction and erection of the mechanical equipment within the reactor building area, in accordance with established standards and specifications; maintaining an awareness of the provisions of labor agreements affecting areas of responsibility and handling day to day problems; administering onsite maintenance programs for equipment and components, and reviewing specifications for completeness and adequacy.

Completed General Electric Co. training, resulting in SRO Certification in October, 1976. Upon completion of training, fulfilled the position of Maintenance Engineer for Shoreham Nuclear Power Station until reassigned to UNICO as Assistant Superintendent of Construction of Turbine Area in September, 1977. Responsibilities included supervision of ten construction supervisors, overall area coordination of various contractors, both structural and mechanical; adherence to schedule completion dates, resolution of engineering/construction problems, and immediate direction of contractors installing Turbine/Generator Unit, Condenser, and Fire Protection Systems.

Assigned as Lead Startup Engineer-Balance of Plant, for Shoreham Nuclear Power Station - Unit 1 in December 1978. Responsible for organizing, planning and scheduling section work to place over one-hundred systems and subsystems into correct operations and comply to all requirements for the station. This includes writing and reviewing flushing and preoperational test procedures; reviewing and approving test results; and supervising twenty-one Startup Test Engineers.

Assigned as Assistant Startup Manger for Shoreham Nuclear Power Station - Unit 1 in May, 1981. Responsible for directing

Preoperational and Acceptance Test activities, technical and administrative activities of the Lead Startup Engineers and Startup Support. Coordination of all special test programs requiring an interface of Engineering, Vendors and Startup Test Engineers, and review of all procedures for the Startup Manager.

Supervise system turnovers from Construction to Startup and Startup to Plant Staff. Liaison with LILCO Project for Engineering and Plant Staff for operating, maintenance, and technical support.

1964 - 1967

Employed by American Trading and Production Corporation as an Engineering Officer in the United States Merchant Marine, sailing in tank ships. Responsibilities consisted of overall plant operation and maintenance, both electrical and mechanical, while standing eight hours of watch each day in the engine room.

Member, United State Naval Reserve (inactive) with a rank of L.T.J.G. Held a United States Coast Guard License of First Assistant Engineer - steam any horsepower and a Third Assistant Engineer - diesel any horsepower.

JOHN F. SCHMITT
Radiological Controls Manager (Acting)
Long Island Lighting Company

Assigned as the Radiological Controls Manager (Acting) for the Shoreham Nuclear Power Station in May, 1984. Responsible for the protection of the public, environment and station personnel from the effects of exposure to radiation and the hazards of industrial chemical products. Specific duties include: minimizing the radiation doses to the station personnel and the public (ALARA) and assuring the proper handling, processing and disposal of radioactive materials.

Graduated from Manhattan College in 1966 with a Bachelor of Science degree in chemistry. Received a Master of Science degree in Environmental Health Science, specializing in Radiological Health (Health Physics), from the University of Michigan in 1974.

Completed the General Electric Boiling Water Reactor Chemistry Course in November 1975 and an eight month assignment in the Chemistry and Radiation Protection Department at the Dresden Nuclear Power Station in September 1975.

Satisfied the experience and examination requirements of the American Board of Health Physics and became a Certified Health Physicist in June 1982.

Completed the following industry seminars and training programs:

a) Radiation Protection - LILCO Evening Institute
b) Fire Fighting Training - Suffolk County Fire Department
c) Radiation Protectio Workshops - Health Physics Society
d) BWR Chemistry Training - General Electric Company
e) Introduction to Computers - State University of New York
f) Health Physics Review - Rockwell International
g) Accelerated Health Physics Instruction - NUS
h) Accelerated Nuclear Plant Chemistry Instruction - NUS
i) Health Physics Review - Brookhaven National Labs
j) Environmental Radiation Surveillance - Harvard School of Public Health
k) Radioactive Waste Management for Nuclear Power Reactors - ASME/University of Virginia
l) Annual Workshops on Radwaste Management - ASME/EPRI
m) Semiannual Meetings of Power Station Chemistry Committee - Edison Electric Institute
n) Semiannual Meetings of Nuclear Chemistry Supervisors - New England Nuclear Superintendents Association
o) Meetings of Power Reactor Health Physicists
p) Post Accident Sampling Workshops - Sentry Equipment, EPRI
q) Control of Plant Radiation Fields - EPRI, General Electric Company

r) Orientation to Microprocessor Applications - Instrument Society of America
s) Atomic Absorption/Atomic Emission Spectrometry - Instrumentation Labs
t) Gamma Spectrometer Operation - Canberra Industries
u) Recognition of Degraded Core Conditions - General Electric
v) Emergency Plan Implementing Procedures Training and Drills - Shoreham NPS

1975 - 1984

Assigned as the Radiochemistry Engineer for Shoreham in January, 1975. Responsible for the overall development of the chemistry, radiochemistry and effluent monitoring programs and the implementation thereof, as appropriated, during preoperational testing. Specific duties included: supervision of all work related to chemical and radiochemical analyses, treatment of process systems and detection and control of environmental releases, implementation and coordination of the activities associated with the Preoperational Environmental Monitoring Program and the development and implementation and coordination of the activities associated with the Preoperational Environmental Monitoring Program and the development and implementation of the technical input for radwaste operation, shipment and disposal. An additional responsibility as a member of the Source Users Committee requires familiarity with the latest practices and procedures for maintaining exposures to workers ALARA.

1973 - 1975

Assigned to the Shoreham Plant Staff as Associate Engineer and Plant Engineer. During this period, in preparation for becoming the Radiochemistry Engineer, engaged in an extended training program which included participation in accelerated instruction in Health Physics and Chemistry Principles by the NUS Corporation at their Rockville, Maryland facilities; studied at the University of Michigan in the Masters program in Environmental Health Science specializing in Radiological Health; assigned for four months of training at the SAE Savannah River Plant; and assigned for eight months to the Commonwealth Edison Company at their Dresden Nuclear Power Station in the Radiation Protection and Chemistry Department.

While at the University of Michigan, coauthored a paper comparing the health hazards associated with a state-of-the-art coal fired and modern nuclear electric generating plant. Also authored a paper analyzing the existing data on the health effects of low chronic radiation doses such as may be experienced by nuclear workers and inhabitants in the vicinity of a nuclear plant. During this period, also studied Radiochemistry at Eastern

Michigan University on a part-time basis. At the Savannah River Plant, the training included work assignments at their three nuclear reactors, a fuel and target fabrication plant, two chemical separation plants, a heavy water production plant, an environmental lab, and a research laboratory. Specific activities included environmental monitoring, waste management, reactor shutdown radiation control, emergency operations, dosimetry, and analytical laboratory work. During eight months at the Dresden Station, assignments included participation in the routine chemical and radiochemical analyses for operation of three units, failed fuel location by "sipping", routine health physics activities including surveys, records keeping and determination of plant releases, observing the writing of the annual Environmental Report for the plant, and designing the HP facilities at a reactor being planned. Participated in two refueling outages involving some vessel internals replacement with the associated elaborate health physics measures. Successfully completed the General Electric Company's Boiling Water Reactor Chemistry Training Course at the Vallecitos Nuclear Training Center. This twelve-week course teaches the chemistry and radiochemistry associated with a G.E. BWR in detail via lecture and laboratory/county room work.

1972 - 1973

Assigned to Long Island Lighting Company's oil-fired Glenwood Power Station as Assistant, and then Associate Engineer. Coordinated special projects, new installations, and participated in boiler overhauls and general plant operation.

1967 - 1972

On military leave of absence from the Long Island Lighting to serve in the U.S. Air Force. Attended Officer Training School and several courses on radar to become a Radar Operations Officer on both computerized and manual radar systems. Assigned in Syracuse, New York and the Phillipine Islands.

Also served in a staff position overseeing all Air Force training of Radar Operations Officers while assigned at Biloxi, Mississippi. Received several decorations including the Air Force Commendation Medal and attained the rank of Captain. Coordinated the Disaster Preparedness arrangements for about six thousand military personnel and their dependents on the base.

1966 - 1967

Employed as an Assistant Engineer for the Long Island Lighting Company at their Far Rockaway Power Station. Received training in plant operation and maintenance and assisted in a major boiler and turbine overhaul.

Member, Health Physics Society (New York Chapter. Power Reactor Health Physicists. Member, American Nuclear Society (Long Island Chapter). Enjoy guest status at EEI Chemistry Committee meetings. Regularly attend meetings of the Chemistry Supervisors sponsored by the New England Nuclear Superintendents Association. Member of the LILCO Nuclear Speakers Bureau. Awarded Certified Health Physicist status by the American Board of Health Physics.

JACK A. NOTARO
Outage and Modifications Manager
Long Island Lighting Company

Assigned as Outage and Modifications Manager in May 1984. Responsible for the implementation of design changes to plant systems or equipment as required by the regulatory agencies or for plant operational/reliability considerations. Specific duties include: supervision of the Planning and Scheduling, Modification Engineering and Outage Planning sections to maximize station availability and to optimize the size of the modification related work forces.

Graduated from City College of New York in 1970 with a Bachelors Degree in Mechanical Engineering. Received a Masters of Business Administration Degree in 1974 from Adelphi University.

Completed the General Electric Co. Boiling Water Reactor Simulator Program in July, 1976, and obtained certification as a Senior Reactor Operator.

Completed the following industry seminars and training programs:

a) BWR Design Orientation - General Electric Co.
b) BWR Technology - General Electric Co.
c) Nuclear Power Plant Technology - General Physics Corp.
d) BWR Observation Training - General Electric Co.
e) Degraded Core Conditions - General Electric Co.
f) Refueling Activities - General Electric Co.
g) Radiation Protection - LILCO Evening Institute
h) Basic Applied Health Physics - Brookhaven National Laboratory
i) Vibration Analysis - IRD Mechanalysis, Inc.
j) Statics, Strength of Materials & Dynamics - LILCO Evening Institute
k) Management of Maintenance Storekeeping & Inventories - Management Dynamics Institute
l) QA for the Nuclear Industry - Stat-A-Matrix and General Physics Corp.
m) Inservice Inspection & QA During Operations - Southwest Research Institute
n) Basic Radiography - Corvair Division of General Dynamics
o) Magnetic Particle & Liquid Penetrant Testing - Magnaflux Corp.
p) Basic Ultrasonics - Automation Industries
q) Nuclear Power QA - Long Island Section of AQSC
r) Inservice Inspection Symposium - Mirror Insulation
s) Operations Quality Assurance - Stat-A-Matrix
t) Reactor Research Training - Brookhaven National Laboratory

1983 - 1984

Assigned as the Shoreham Chief Operating Engineer in April, 1983. Responsibilities include: the formulation and implementation of the training programs for all Station personnel; development and review of the Operations, Training and Security Sections of the Station Operating Manual; and the overall management of the Operations, Training and Security Sections of the Station. Additional responsibilities include the maintenance of Nuclear Regulatory Commission Senior Reactor Operator License #SOP-4419 obtained in November, 1982.

1978 - 1983

Assigned as Operating Engineer of the Shoreham Nuclear Power Station in July, 1978. Responsible for the development and implementation of the Station's operational activities including the direction of day to day operation of the unit; startup, operation and shutdown of all station .equipment; implementation of initial, requalification and replacement training programs for licensed and unlicensed operators; the development, review, and implementation of the Operations Section of the Station Operating Manual.

1973 - 1978

Assigned to the Shoreham Nuclear Power Station in the Quality Assurance Section and subsequently promoted to Station Operating Quality Assurance Engineer responsible for the Section in July, 1974. Responsibility included initial development of the operational quality assurance program. Responsible for al aspects associated with its implementation at the station including reviews, audits, surveillance, inspections, selection and training of personnel, development of procedures and instructions, and the utilization of consultants and contractors. Additional responsibilities included licensing and inspection activities associated with the U.S. Nuclear Regulatory Commission and interfacing with external and internal organizations required to implement the operation quality assurance programs.

1972 - 1973

Assigned to the Electric Production Department Staff. Assigned duties included maintenance scheduling, manpower allocation, equipment testing, station performance analysis and special projects.

1970 - 1972

Assigned to the Maintenance Section in the Northport Power Station. Assigned duties included assisting in outages of both a

scheduled and forced nature as well as maintaining plant equipment and systems, and completing special projects.

Member of the American Society for Quality Control. Member, Edison Electric Institute - Quality Assurance Task Force (EEI-QATF) and the EEI-QATF Operations Subcommittee.

Chapter 17

QUALITY ASSURANCE

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17.2 QUALITY ASSURANCE DURING THE OPERATIONS PHASE

17.2.1 Organization

The Long Island Lighting Company (LILCO) is responsible for the establishment and execution of the Quality Assurance (QA) Program during the operational phase as required by 10 CFR 50, Appendix B. LILCO has established the organizational structure shown on Fig. 17.2.1-1 to fulfill this responsibility. The LILCO QA Program during design and construction, including the transition from the construction phase to the operational phase, is described in Section 17.1.

The Executive Vice President, who reports directly to the Chief Executive Officer and President of the Company, is ultimately responsible for LILCO Nuclear Operations and for the QA Program that has been established to support those operations. The Executive Vice President's Corporate Statement of Quality Assurance Policy commits LILCO to strict adherence to the policies and requirements stipulated in the LILCO Quality Assurance Manual and imposes the requirements on all personnel and organizations who perform quality affecting functions. The Office of Nuclear Operations and the Office of Quality Assurance, Safety and Compliance have been formed to assist the Executive Vice President to fulfill his obligations.

The Vice President, Nuclear Operations, who reports to the Executive Vice President, has overall responsibility for the engineering, modification, licensing, testing, startup, operation and maintenance of the Shoreham Nuclear Power Station. This responsibility includes ensuring that organizations and personnel under his jurisdiction comply with the LILCO QA Program requirements in the performance of their duties. The Vice President, Nuclear Operations, has delegated the responsibilities for the various functions to the Managers of the Nuclear Engineering and Nuclear Operations Support Departments, and the Plant Manager.

The Director, Office of Quality Assurance, Safety and Compliance, reports directly to the Executive Vice President. He is responsible for directing the activities of the QA Department, the Nuclear Review Board (NRB), the Independent Safety Engineering Group (ISEG), and the Reliability Group. The Director's principal objective is to ensure that the nuclear power station and all support organizations establish and conform to adequate quality, safety and reliability policies, standards and procedures. He has the authority to stop work when circumstances so warrant. The Director has delegated specific QA functions to the QA Manager; he personally serves as chairman of the NRB; and he has appointed supervisors to direct the affairs of the ISEG and the Reliability Group.

The Plant Manager of the Shoreham Nuclear Power Station reports to the Vice President, Nuclear Operations. The Plant Manager has the direct responsibility for the safe and reliable operation of the nuclear station. To assist him in this effort, he has formed within the plant staff five divisions as follows: Operations Staff Division; Operations Division; Maintenance Division; Radiological Controls Division; and Outage and Modifications Division. The Plant Manager is responsible for enforcing within the station those QA Program requirements that are applicable to station functions and duties. He is required to maintain lines of communication, coordination and cooperation with the QA Manager and to advise him of occurrences that might require special attention by the QA Department. He has the authority to stop work on any activity in the station including removal of the unit from service.

The Manager, Quality Assurance Department (QA Manager), is responsible for the development and implementation of the overall QA Program during design, construction, preoperational testing, operation, and modification of the nuclear power plant. A complete description of the program through preoperational testing, including organization and responsibility, is presented in Section 17.1.1A.

The minimum qualifications for the position of QA Manager during operations are the following. A Bachelor of Science or Engineering degree from an accredited university plus at least five years experience, requiring technical and administrative abilities in nuclear-related quality assurance, engineering, construction, or operations. At least two of the five years shall have been in quality assurance or in a responsible nuclear power plant position that required implementation of a quality assurance program. At least six months of the two years experience shall have been obtained within a QA organization.

The QA Manager reports to the Director, Quality Assurance, Safety and Compliance. This organizational and functional relationship assures that LILCO QA and QC personnel who audit or otherwise verify quality related activities are free from undue cost and scheduling influences and are independent of personnel who are responsible for or perform the activities being verified.

The Quality Assurance Manager is responsible for maintaining a working interface and communication with other LILCO organizations, regulatory agencies, consultants, contractors, inspection firms, and others as required to effectively execute the policies stipulated in the QA Program. He is responsible for assuring the establishment and continuous implementation of the quality assurance indoctrination and training program for LILCO quality assurance and other concerned personnel. The indoctrination and training will cover the quality related policies, procedures, and requirements applicable to the personnel involved. He is responsible for review and approval of

applicable documents to assure the inclusion of appropriate quality requirements as indicated in Section 17.2.6. He is responsible for the performance of audits as described in Section 17.2.18. In determining the applicability of the QA Program, the QA manager shall consider the safety significance accorded to nonsafety related structures, systems, components, and plant computer software given to them in FSAR, Technical Specifications, and Emergency Operating Procedures.

The QA Manager is responsible for defining the content and changes to the LILCO Quality Assurance Manual subject to review and approval as indicated in Table 17.2.6-1.

The QA Manager is authorized to evaluate the manner in which all activities both at the station and offsite are conducted with respect to quality by means of checks, reviews, audits, surveillance, and/or inspections. He shall perform this evaluation on a planned and periodic basis to verify that the QA Program is being effectively implemented. He is responsible for periodically evaluating and reporting on the status and adequacy of the QA Program to the appropriate LILCO management. He has the authority and organizational freedom to identify quality problems, to initiate, recommend or provide solutions through designated channels, and to verify implementation of solutions. He has the authority to initiate stop work action, or control further processing, delivery, or installation of nonconforming material through appropriate channels as described in the applicable QA Procedure.

The QA Manager is assisted in carrying out his responsibilities by the QA Department comprising three Quality Divisions. The Quality Control (QC), Division is located within the station and the Quality Systems (QS) and Quality Assurance (QA) Divisions are located outside of the station. The divisions are composed of engineers, and technical and nontechnical personnel as needed. Additionally, the staff of the QA Department shall be supplemented when necessary by consultants, contractors or other organizations within LILCO. Line responsibility, coordination and communication during such exigency shall be through the Quality Division Managers.

The Quality Division Managers report directly to the QA Manager. Minimum qualifications for the position of Quality Division Manager are as follows: Bachelors degree in engineering or science plus a minimum of 4 years experience in a responsible area of operations or quality assurance requiring both technical and administrative ability. Four years of acceptable experience will include at least 2 years of quality assurance experience or 2 years of nuclear operations experience under the auspices of an established quality assurance program plus formal quality assurance training. A high school diploma plus a minimum of 9 years experience in a responsible area of operations or quality assurance activities, at least 5 years of which must be in the

area of quality assurance, will be considered equivalent qualification for the position. These education and experience requirements may be modified by other factors such as previous performance, satisfactory completion of proficiency testing, formal QA education, etc., when these other factors provide reasonable assurance that a person can competently perform required tasks.

The Quality Division Managers are jointly responsible for assuring full implementation of the LILCO QA Program including additions and changes thereto. Each is responsible within his delegated scope of duties to establish and implement appropriate QA/QC procedures and instructions; review applicable documents as indicated in Section 17.2.6; and perform audits, surveillance and/or inspections as indicated in Sections 17.2.10 and 17.2.18. Each has, within his scope of responsibilities, the authority and organizational freedom to identify and report quality problems; initiate, recommend, or provide solutions through designated channels; and verify implementation of solutions. He has the authority to initiate stop work action through channels or control further processing, delivery, or installation of nonconforming material as described in the applicable QA procedures.

The QC Division Manager is physically located inside the operating plant for the purpose of assuring implementation of the LILCO QA Program at the station. He reports directly to the QA Manager and maintains a working interface and communication with the Plant Manager. He is responsible for evaluating and reporting the status and adequacy of the QA Program at the station to the Plant Manager and the QA Manager on a periodic basis.

The Nuclear Review Board, the Independent Safety Engineering Group, and the Review of Operations Committee are responsible for safety reviews, approval of programs, procedures, tests, repairs, and modifications. Complete descriptions, including structures and responsibilities, are presented in Section 13.4.

The Vice President, Engineering and Administration, reports to the Executive Vice President. He has within his jurisdiction Computer Services and the Departments of Purchasing, Environmental Engineering, Power Engineering, Electrical Engineering, Engineering Design and Mapping, and Engineering and Administration Systems Analysis. These organizations provide support services as needed to the Office of Nuclear Operations. Such services are subject to the policies and requirements of the QA Program.

The Vice President, Fossil Production, who reports to the Executive Vice President, includes among his responsibilities jurisdiction over the General Services and Maintenance Services Departments. The former department provides training of nuclear

station personnel as requested, and the latter provides qualified personnel as needed to perform maintenance, repair and modification activities. Under such conditions, these organizations are subject to the policies and requirements of the QA Program.

The Vice President, Gas Operations, reports to the Executive Vice President. He has within his organization the Gas System Operation and Production Department which, when so requested, provides the nuclear station with calibration services for shop standards and measuring and test equipment. These services are subject to the policies and requirements of the QA Program.

The Vice President, Electrical Operations also reports to the Executive Vice President. He has within his organization the Electrical Systems Operations Department which provides calibration and maintenance services for the nuclear station's protective relays. These services are subject to the policies and requirements of the QA Program.

17.2.2 Quality Assurance Program

Responsibility for assuring that SNPS-1 will perform safely and reliably over the life of the station rests with LILCO. The LILCO Corporate Statement of Quality Assurance Policy imposes a QA Program which is designed to meet the requirements of Title 10 of the Code of Federal Regulations, Part 50, Appendix B and identifies the QA Manual as the document which establishes the requirements for quality-affecting activities during the operational phase of nuclear power plants. The QA Manual, which is distributed on a controlled basis to responsible managers and key supervisory and QA personnel, contains this corporate policy statement.

The QA Program is designed to assure that activities such as operation, maintenance, modification, repair, refueling, inspection and testing, which affect safety related structures, systems, and components, are accomplished in accordance with the criteria of 10 CFR 50, Appendix B. The QA Program is applied to the safety related structures, systems and components listed in Table 3.2.1-1. Nonsafety related structures, systems components, and plant computer software shall be accorded, as a minimum, the safety significance given to them in the FSAR, the Technical Specifications, and Emergency Operating Procedures. This will assure that the safety significance accorded to nonsafety related structures, systems and components is maintained during the operation of Shoreham. The charters of the Review of Operations Committee, the Nuclear Review Board, and the Independent Safety Engineering Group shall also reflect these considerations. Also, the Shoreham preventive and corrective maintenance program, the design change control program, procedures for procurement of equipment, and procedures for modification and removal of equipment from service, shall ensure that LILCO continue to apply

the safety significance accorded to nonsafety related structures, systems, and components given to them in the FSAR, Technical Specifications and Emergency Operating Procedures. Thus, the responsible personnel implementing these programs and procedures, shall, in exercising their judgment on the appropriate measures to be applied to nonsafety related structures, systems, and components, do so in accordance with the corporate QA policy.

The QA Program, described in the LILCO QA Manual, is supplemented by QA Procedures and Instructions which provide the detailed instructions and checklists necessary to implement, or verify implementation of QA Program requirements. These procedures are delineated in Section 17.2.5. Quality Assurance Procedures and Instructions are issued, reviewed, and approved as shown in Table 17.2.6-1. The QA Manual, Procedures and Instructions shall be controlled in accordance with the requirements of Section 17.2.6. The transfer of LILCO QA responsibility from the design and construction phase to the operations phase is described in Section 17.1D.

The QA Program requires that activities affecting quality shall be accomplished in accordance with documented policies, procedures, and instructions throughout the life of the station. These activities shall be accomplished under suitably controlled conditions. Controlled conditions include, as applicable, appropriate equipment, suitable environmental conditions, and assurance that required prerequisites have been satisfied. Also considered shall be the need for special controls, processes, test equipment, tools, qualification of personnel, and requirements for verification of quality by inspections, examinations, or tests.

The QA Procedures for operations are derived from the program requirements established in the QA Manual. Organizations performing activities which affect quality shall prepare their procedures incorporating requirements of the QA Manual and referenced codes, standards, and guides. These procedures shall also receive a quality assurance review to assure that all program requirements have been addressed.

The Corporate Statement of Quality Assurance Policy contained in the LILCO QA Manual imposes the mandatory QA Program requirements on all personnel and organizations performing activities affecting the quality of safety related structures, systems, and components during the operational phase of station life. The Director, QA, Safety and Compliance is responsible for periodically engaging an organization independent of the organization being reviewed to assess LILCO quality related activities and evaluate the scope, implementation, and effectiveness of the QA Program as applied to operations to assure that the program is adequate and complies with corporate QA policies, goals, objectives, and 10 CFR Part 50, Appendix B criteria. The requirement for independent QA Program evaluation

is further imposed, as appropriate, on other organizations participating in the LILCO QA Program. The LILCO QA auditing system is described in Section 17.2.18.

Direct responsibility for establishing and implementing the QA Program has been delegated to the QA Manager. Provisions have been established for the referral of quality related problems to the highest level of management necessary for resolution. The QA Manager is responsible for regularly assessing the status and adequacy of the QA Program, both internal and external to LILCO, and for reporting the results of this evaluation to the Director, QA, Safety and Compliance, and Vice President, Nuclear Operations who will advise Corporate Officers on the status and adequacy of the Program as required. This regular assessment shall be conducted in accordance with the requirements outlined in Section 17.2.18 and detailed in Section 18 of the QA Manual. The requirement for regular QA Program evaluation shall be extended to other participating organizations for the portions of the program they are executing.

The QA Program requires that procedures be established for the indoctrination and training of station and offsite personnel performing quality affecting activities. These procedures shall document the scope, objective, and method of implementing the indoctrination and training program and contain provisions for documenting training sessions including content, date, attendance, and results. The QA indoctrination and training shall include instruction as to the purpose, scope, and implementation of quality assurance manuals, procedures, and instruction. Training and qualification in the principles and techniques of particular activities shall be provided to personnel. Responsibility for accomplishment there of rests with the respective managers, as described below. The QA Manager is responsible for the quality assurance indoctrination of management, nuclear plant, and nuclear support personnel who perform functions affecting quality, and for the training of quality assurance personnel. This indoctrination and training shall include both original and refresher programs as well as maintenance of associated qualification records. In general, the LILCO engineering personnel will receive QA indoctrination as part of the LILCO QA Program described.
Respective managers shall be responsible for establishing and maintaining formal training programs and procedures for initial training, qualification, and retraining of their personnel to assure that proficiency to perform their activities in quality related areas is achieved and maintained. The training programs shall be audited in accordance with the requirements stipulated in Section 17.2.18.

The QA Program meets the requirements of 10 CFR Part 50 Appendix B and 10CFR Part 55 and conforms to the guidance provided in NRC Regulatory Guides which have been identified in Appendix 3B as pertaining to the operational phase of nuclear power plants, In

addition, the QA Program shall conform to the guidelines and requirements contained within the following ANSI Standards:

1. ANSI N45.2.8-1975, Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical and Systems for the Construction Phase of Nuclear Power Plants.

2. ANSI N45.2.12-1977 Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants

3. ANSI N45.2.13-1976, Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants

Outside agencies which perform functions such as design, manufacture, installation, inspection, or other technical services on safety related structures, systems, or components shall be required to comply with those portions of 10 CFR 50, Appendix B and the LILCO QA Program that are applicable to the services provided. LILCO QA Procedures shall require that a review and evaluation report of a supplier's QA Program be available and accepted by LILCO QA prior to the issuance of a purchase order for safety related material, components, or services to assure that this program meets those elements of 10 CFR 50, Appendix B, which apply to the materials, components, or services to be rendered.

Compliance with Quality Assurance Program requirements by both internal and external organizations shall be assured by a comprehensive system of audits and reviews performed by the QA Department under the direction of the Quality Assurance Manager. Significant changes to the FSAR which may occur during the interim of the general review cycle shall be transmitted to organizations as defined in the applicable administrative procedures.

17.2.3 Design Control

The LILCO QA Program establishes measures to control design activities which affect the quality of safety-related structures, systems, and components during the operational phase. These measures are applicable to all organizations performing design, design review, or design audit activities including changes or modifications thereto. Section 3 of the LILCO QA Manual describes the QA Program requirements established to provide this control.

The program requires that design activities be accomplished in a planned, controlled, orderly manner in accordance with established procedures. Design control measures shall assure the translation of applicable design bases, regulatory requirements, codes, and standards which include the selection of suitable

materials, parts, equipment, and processes into specifications, drawings, and documented procedures and instructions. The program requires that the quality requirements be included in the design documents.

Deviation or changes to specified quality requirements in design documents shall be controlled. Suitable design control measures are required for design analysis such as reactor physics, stress, thermal, hydraulic, radiation, and accident analysis; compatibility of materials; accessibility for inservice inspection, maintenance and repair; and acceptance criteria for inspections and tests. Design control procedures shall identify and control design interfaces both internal and external to LILCO. Design verification, such as design reviews, alternate calculations, or qualification testing, shall be properly selected and accomplished. Responsibility for such verification is described later in this section. Where qualification testing of a prototype is used to verify adequacy of design, testing shall be performed under the most adverse design conditions. The program requires that design verification be performed by individuals or groups other than the original designer and the designer's immediate supervisor, but who may be from the same organization. Design changes shall be subject to design control measures commensurate with those applied to the original design. Design control measures shall provide for the suitable review and selection of standard "off the shelf" commercial or previously approved material, parts, equipment and processes that are essential to safety related structures, systems, and components. Design documents and revisions thereto shall be distributed to the responsible individuals in a timely and controlled manner to prevent inadvertent use of superseded documents. Control of design documents is further described in Section 17.2.6. Design documents and reviews, records and changes thereto are collected, stored, and maintained in accordance with Section 17.2.17. Errors or deficiencies which may arise during the design process shall be addressed in accordance with Sections 17.2.15 and 17.2.16.

Organizations supplying equipment and/or services are responsible for imposing the applicable requirements of this section on their internal operations and on those vendors and contractors performing work within the scope of their activity as required by the procurement documents. They are responsible for assuring by means of audit or surveillance that design control as defined in their respective programs is being effectively implemented. LILCO is responsible for assuring program adequacy and implementation for external suppliers through planned and periodic audits.

The design change control programs also include provisions to ensure that nonsafety related structures, systems, components, and plant computer software shall continue to be accorded the safety significance given to them in the FSAR, Technical Specifications, and Emergency Operating Procedures.

In order to ensure a continuing level of engineering support, QA, and design control, an interim Management Control Program for Station Modification shall be implemented prior to fuel load and covering the period through approximately the first refueling. This program shall be implemented in accordance with approved administrative procedures.

The qualified Architect/Engineer of record for the plant construction will be retained under this program to supply the necessary effort to maintain the safety and operability of the plant under existing, modified, or new, approved procedures.

After this interim period, internal LILCO organizations shall accomplish design activities such as preparation, review, approval, and issuance of appropriate design documents, including changes thereto, as described in Table 17.2.6.1. Design changes, including those made by plant operating personnel, shall be governed by design control measures commensurate with those applied to the original design. Corrective action, as described in Section 17.2.16, shall be applied to design process deficiencies that adversely affect safety related structures, systems, and components. The Nuclear Engineering Department Manager is responsible for determining, initially, whether proposed modifications or repairs involve unreviewed safety questions or changes in technical specifications as described in 10 CFR 50.59. This review shall be forwarded to the Plant Manager for approval and review by the Review of Operations Committee. Procedures shall provide documentation and control of such determinations. Technical evaluation, including design verification, shall be the responsibility of the appropriate organization such as, Nuclear Engineering, Nuclear Operations Support, or a qualified independent organization. The LILCO Quality Assurance Department is responsible for verifying overall program establishment and implementation through planned and periodic audits.

17.2.4 Procurement Document Control

The LILCO QA Program provides for the control of procurement documents for safety related material, equipment, and services whether purchased by LILCO or their designated agents during the operational phase. Section 4 of the LILCO QA Manual describes the QA Program requirements established to assure procurement document control.

The program requires that procedures establish measures to assure control of the preparation, review, approval, and concurrence for procurement documents. Document control as described in Section 17.2.6 and delineated in Table 17.2.6-1 shall be applied to procurement documents including changes and revisions thereto. The procurement documents shall be reviewed by qualified personnel, as defined within this section, assuring the adequacy of the quality requirements. The review shall be utilized to

assure that the quality requirements, including preparation, review, and approval, have been properly defined, that the procured items are inspectable and controllable, and that the acceptance criteria are adequately specified.

The program requires that procurement documents such as purchase specifications contain or reference the design bases technical requirements which include codes, industry standards, and regulatory requirements; material and component identification requirements; drawings and/or specifications, test and inspection requirements; and special process instructions. In addition, they are required to identify the requirements of 10 CFR 50 Appendix B with which the supplier QA Program must comply; the document requirements for drawings, specifications, procedures, personnel and procedure qualifications, material, chemical, and physical test results, and inspection and test records which must be prepared, maintained, submitted, or made available for review and/or approval; the requirements for the retention, control, maintenance, and/or delivery of records; and the procuring agency's right of access to supplier's facilities and records for source inspection and audits. Procurement documents for spare or replacement parts shall be subject to program requirements which are equivalent to those used for the original equipment or those specified by a properly reviewed and approved revision.

The LILCO Purchasing Department is responsible for the commercial aspects associated with procuring items or services which includes the processing of purchase orders. The internal LILCO organizations such as the Shoreham Plant Staff and the Nuclear Engineering, Nuclear Operations Support, and Quality Assurance Departments are responsible for assuring that the procurement documents contain technical and quality requirements as indicated above. Authorized release, assuring acceptability of both technical and quality content, is required prior to releasing a purchase order.

The Shoreham Nuclear Power Station Staff and the various support organizations shall prepare those procurement documents pertaining to their scopes of responsibilities and present them to the Purchasing Department for processing. The QA Department is responsible for reviewing the procurement documents for quality requirements, and for the review of and concurrence with selected suppliers' QA Programs.

Agents such as consultants, architect-engineers, testing companies, etc., designated responsibility by LILCO for procurement activities associated with safety related material, equipment, or services shall impose the control requirements indicated above. They shall establish the requirements in procedures, instructions, drawings, etc. These requirements shall be imposed on their internal operations and on any vendors or contractors performing work within the scope of their activities as required by the procurement documents. They shall

assure the adequacy of program implementation through audit or surveillance. LILCO shall verify program adequacy and implementation by suppliers through planned and periodic audits consistent with the complexity, importance, and quality of items or services.

Personnel exercising their judgment with regard to procurement of nonsafety related structures, systems, components, and plant computer software shall assure that the safety significance accorded to them in the FSAR, Technical Specifications, and the Emergency Operating Procedures is maintained throughout the operating life of Shoreham.

17.2.5 Instructions, Procedures, and Drawings

The LILCO QA Program establishes provisions for activities affecting the quality of safety-related structures, systems, and components during the operational phase to be accomplished and controlled in accordance with instruction, procedures, and drawings. Section 5 of the LILCO QA Manual describes the QA Program requirements for the control of instructions, procedures, and drawings. Organizational procedures delineate the sequence of actions to be accomplished in the preparation, review, approval, and control of instructions, procedures, and drawings.

Suppliers, vendors, and contractors have the responsibility for establishing instructions, procedures, drawings, and other documents to control the quality related activities of their own operations and those of their subsuppliers as required by the procurement documents. A description of the associated procurement document control requirements is in Section 17.2.4.

LILCO nuclear operations and nuclear support organizations are responsible for establishing instructions, procedures, and drawings, or utilizing established procedures, instructions, etc., and other documents to control the quality-related activities they perform. The required station procedures are described in Section 13.5. All responsible organizations establish provisions such that the development and implementation of instructions, procedures, and drawings, including changes thereto, are clearly identified and controlled.

The LILCO QA Department is responsible for performing review, surveillance and audit to verify that the instructions, procedures, drawings, and other documents used for safety-related structures, systems, and components are controlled to meet the requirements of 10 CFR 50 Appendix B.

Activities affecting the quality of safety-related structures, systems, and components are defined in specifications, instructions, procedures, drawings, and other documents. They include qualitative and quantitative acceptance criteria for the activity being conducted. These criteria are used for

controlling the quality-affecting activities. They define special process controls, codes, standards, and regulatory requirements.

Table 17.2.5-1 contains a listing of the QA Department documents used to assure conformance to 10CFR50 Appendix B. The LILCO QA Department reviews all safety-related test, calibration, special process, maintenance, modification and repair procedures, the inservice inspection program, drawings and specifications, and changes thereto, with respect to quality requirements as indicated in Section 17.2.6 and delineated in Table 17.2.6-1.

17.2.6 Document Control

The LILCO QA Program provides for the control of documents, including changes thereto, which affect the quality of safety-related structures, systems, and components during the operational phase. The applicable documents include, but are not limited to, the QA Manual; QA Procedures and Instructions; Final Safety Analysis Report; design specifications; procurement documents; design, manufacturing, construction, and installation drawings; and inspection and test procedures and instructions. Section 6 of the LILCO QA Manual describes the QA Program requirements established to assure document control.

The program requires that a document control system be established in accordance with approved procedures and instructions for review, approval, and issuance of the documents, including changes thereto, to assure that they are adequate and incorporate the quality requirements prior to release. Document control procedures shall establish provisions for the identification of individuals or groups responsible for performing review, approval, issuance, or revision activities.

The program requires that changes to documents be reviewed and approved by the organization responsible for conducting the original review and approval or, as deemed necessary by LILCO, such changes will be reviewed and approved by another qualified responsible organization. In the event that another qualified organization is charged with the responsibility for revision, it shall have access to pertinent background information and adequate understanding of the requirements and intent of the original document. Procedures and instructions provide measures to assure the prompt distribution of approved changes and revisions including control of obsolete or superseded documents to prevent their inadvertent use. The program requires that the documents be available at the location where the activity will be performed prior to the start or work. Change or revision level identification will be established and verified through the utilization of document distribution lists. Updating and distribution to personnel of such lists will be consistent with the nature of the document.

Suppliers of safety-related items and services are responsible for imposing the above document control requirements on their internal operations and on those vendors and contractors performing work within the scope of their activities as required by the procurement documents. They shall assure program adequacy and implementation through planned and periodic audits. LILCO is responsible for assuring program adequacy and implementation for external suppliers through planned and periodic audits.

LILCO organizations who issue, review, and approve documents, including changes thereto, are responsible for establishing and implementing a document control system in accordance with the requirements indicated above. The LILCO QA Department is responsible for assuring overall program adequacy and implementation through planned and periodic audits. Table 17.2.6-1, Quality-related Document Control Responsibility, describes the established control for preparation, review, approval, and distribution of LILCO generated documents.

17.2.7 Control of Purchased Material, Equipment, and Services

The LILCO QA Program establishes measures to assure that safety-related material, equipment and services, procured during the operational phase, either directly or through contractors, conform to the procurement document requirements. Section 7 of the LILCO QA Manual describes the QA Program requirements established to provide this control.

The program establishes provisions for source evaluation and selection. Source evaluation and selection may be based upon historical quality performance data, source surveys or audits, or source qualification programs. This will determine the supplier's capability to supply the item or service in compliance with the design, manufacturing and quality requirements as stipulated in the procurement documents. Measures are established to provide for both a technical and quality evaluation of those suppliers providing safety-related components or services. LILCO organizations such as the Shoreham Plant Staff and the Nuclear Engineering, or Nuclear Operations Support Departments shall perform the technical evaluation and the QA Department shall perform the quality evaluation. These functions may also be accomplished through the utilization of qualified independent organizations. Personnel performing the evaluations, such a auditors, will be qualified. Source evaluation and selection information will be documented and filed.

The program provides for source inspection, surveillance, and audit of suppliers to assure conformance to procurement document requirements. They shall be conducted in accordance with documented procedures. Source inspection procedures provide for instructions to be established for specifying the characteristics to be witnessed, inspected or verified, and accepted; indicating responsibility; and determining documentation requirements.

Source audits or surveillance shall be conducted, as necessary, to assure compliance with quality requirements. Source inspection or audit may not be necessary when the quality of the item can be verified by review of test reports, inspection upon receipt, or other means.

The program requires that receiving inspection be accomplished in accordance with documented procedures and instructions. The receiving inspection procedures and instructions establish measures to assure that the item is properly identified and corresponds to the receiving documentation, that the inspection of the item and acceptance records are determined to be acceptable in accordance with the inspection instructions prior to use, that the receiving documentation is available at the plant prior to use, and that the inspection status is identified as indicated in Section 17.2.14. The QA Program specifies that procurement documents require suppliers to furnish documentation identifying any procurement requirements which have not been met together with a description of these nonconformances dispositioned "accept as is" or "repair" and that responsible QA and technical personnel shall perform a review and approval of the supplier's recommended disposition. Nonconforming items will be identified and controlled as indicated in Section 17.2.15. Inspections shall be conducted based upon the nature of the item being procured.

Where required by code, regulation, or other contract requirements, documentary evidence that items conform to procurement requirements shall be available at the plant and filed. This documentary evidence shall be retrievable and it shall specifically identify the item and codes and/or specifications met by the item. Where not precluded by other requirements, such documentation may take the form of written certification of conformance identifying the requirements met by the items. LILCO QA Procedures require that suppliers' certificates of conformance be periodically evaluated by audits or tests to assure that they are valid.

Suppliers of safety-related material, equipment, and service are responsible for imposing the control requirements indicated above on their internal operations and on any vendors or contractors performing work within the scope of their activities as required by the procurement documents. They must assure through audit or surveillance the adequacy of program implementation. The LILCO Purchasing Department is responsible for commercial aspects associated with procuring items or services. The LILCO organizations who requisition items and/or services and the QA Department are responsible for assuring that the procurement documents contain the information as required above. Procedures have been established to control the spare and replacement part procurement documents, through technical and QA review, to ensure that the controls for safety-related items are equal to or better than the original equipment. The QA Program requires that a

technical evaluation and QA review be performed to determine the requirements to be applied to the procurement of spare and replacement parts when the original equipment requirements are not known. Procurement document control is described in Section 17.2.4. LILCO shall assure program adequacy and implementation of suppliers through planned and periodic audits consistent with the complexity, importance, and quality of the item or service. The LILCO QA Department will be responsible for evaluating suppliers. This will include the utilization of qualified independent organization surveys. Source inspection, as necessary, shall be conducted by LILCO or a qualified independent organization. The Shoreham Plant Staff is responsible for receipt of items at the station. The QA Department is responsible for conducting receiving inspection of items with respect to quality requirements, and assures overall program establishment and implementation through planned and periodic audits and surveillances.

17.2.8 Identification and Control of Materials, Parts, and Components

The LILCO QA Program requires the establishment of an identification and control system to prevent the use of defective, unapproved or incorrect safety-related material, parts and components during the operational phase. Section 8 of the LILCO QA Manual describes the QA Program requirements established for this purpose.

The program requires that the identification system, including unique part or mark numbers, developed during the design and construction phases, be maintained and expanded as necessary during the operational phase. A system for identification and control of materials, parts, and components, including partially fabricated subassemblies shall be based on documented procedures and/or instructions. Identification is referenced in specifications, drawings, purchase orders, or other appropriate documents providing traceability to associated documentation such as manufacturing and inspection documents, deviation reports, heat numbers, and mill test reports. The identification may be placed either on the item or on records directly and readily traceable to the item. Physical identification shall be used to the maximum extent possible and shall be applied in such a manner as not to affect the function of the item. Verification of identification shall be accomplished at appropriate stages throughout fabrication, assembly, shipping, and prior to installation.

Suppliers of safety-related material, parts and components, during the operational phase, are responsible for establishing a system of identification and control which addresses the requirements as outlined above. They are responsible for imposing the requirements on their internal operations and on those vendors and contractors performing work within the scope of

their activities as stipulated in the procurement documents. They shall assure through audit or surveillance the adequacy of program implementation. LILCO shall assure program adequacy and implementation through planned and periodic audits of the suppliers.

Within the station, the Shoreham Nuclear Power Station Staff is responsible for maintaining and expanding the identification and control system for safety-related material, parts, and components which was established during the design and construction phase. In the event that a design change is necessary, during the operational phase, the Shoreham Nuclear Power Station Staff is responsible for supplying identification requirements to the associated organizations assuring the continued implementation of the established identification and control system. They are responsible for phasing the supplier identification systems into the plant system so as to maintain the required traceability. The QA Department is responsible for assuring overall program establishment and implementation through planned and periodic audits, surveillance, and inspections at the station.

17.2.9 Control of Special Processes

The LILCO QA Program imposes on organizations performing special processes the requirement to develop a system of special process controls. Special processes include, but are not limited to, processes such as unique production or fabricating processes, inspection or test processes, welding, heat treating, nondestructive examination, and cleaning processes. Section 9 of the LILCO QA Manual describes the QA Program requirements established for control of special processes.

The program requires that organizations performing special processes on safety-related equipment at the nuclear power plant or at an offsite facility do so to approved procedures, instructions, or the equivalent, and that equipment and personnel are qualified in accordance with applicable codes, standards, specifications, or special requirements. Special process procedures, in addition to providing for the qualification of equipment and personnel, shall provide for the documentation of accomplished activities. Where special processes are not covered by existing codes or standards, or where item quality requirements exceed the requirements of established codes or standards, the necessary qualification of personnel, equipment, or procedures shall be required. Special process procedures and qualification records shall be filed, maintained, and available for verification.

Suppliers of equipment and services whose scope of activity includes utilization and control of special processes are responsible for imposing these requirements on their internal operations and on those suppliers, vendors, or contractors performing work within the scope of their activity as required by

the procurement documents. Special process controls shall be submitted to the suppliers for approval as specified in the procurement documents. They shall verify through audit or surveillance the adequacy of program implementation.

LILCO shall verify overall program adequacy and implementation of internal organizations and suppliers through planned and periodic audits.

17.2.10 Inspection

The LILCO QA Program provides for inspection of activities which affect the quality of safety-related structures, systems and components during the operational phase. Section 10 of the LILCO QA Manual describes the QA Program requirements established for inspection.

It provides for an inspection program to be implemented in accordance with applicable procedures, instructions and checklists. The program requires that inspections be performed by individuals other than those who performed or directly supervised the activity being inspected. Inspection procedures, instructions, or checklists contain identification of responsibility for performance of the inspection, method of inspection, characteristics to be inspected, acceptance/rejection criteria, verification, evaluation and documentation of the results of the inspection. The program requires that inspection procedures or instructions be made available for use, with supporting documents such as drawings and specifications, prior to the performance of inspection operations. Information concerning inspections shall be obtained from design specifications, drawings and/or other controlled documents which include codes, standards, and regulatory requirements. The inspections are conducted by inspectors who have been qualified and certified in accordance with codes, standards, and/or LILCO training programs. The inspection program requires that inspector qualifications be kept current. The respective managers shall be responsible for certifying their inspection personnel.

When notification or hold points are established in procurement or other documents, the inspection program requires that:

1. Work does not progress beyond the hold point until released by the designated authority.

2. The notification and acknowledgement has been satisfied prior to continuation of work.

Inspection of rework, repair, replacement, or modification activities shall be conducted in accordance with the original design criteria and inspection requirements, or by means of an approved alternate. Such alternates shall be evaluated on both a

technical and quality basis. When direct inspection is not possible, provisions are established for indirect control by monitoring of processing methods, equipment, and personnel.

Suppliers of safety-related material are responsible for imposing the above requirements on their internal operations and on those vendors or contractors performing work within the scope of their internal operations and on those vendors or contractors performing work within the scope of their activities as required by the procurement documents. They shall assure through audit or surveillance the adequacy of program implementation. LILCO, through planned and periodic audits, surveillance and participation in selected inspections, shall verify conformance of inspection programs delegated to external organizations. When inspections or other safety-related activities are conducted by the plant staff or an outside contractor at the station, the QA Department is responsible for verifying that the inspection program complies with the requirements as outlined above. The LILCO QA organization is responsible for reviewing maintenance and modification procedures to assure that requirements such as the need for inspection, identification of personnel, and documentation of results have been addressed.

17.2.11 Test Control

The LILCO QA Program establishes provisions to assure that testing required to demonstrate that safety-related structures, systems, and components will perform satisfactorily in service is conducted in accordance with an approved documented test program. Section 11 of the LILCO QA Manual describes the QA Program requirements established for test control during the operational phase.

It is required that the test program be identified, documented, and accomplished in accordance with procedures that are written, approved, and controlled. The basis for determining when proof, preoperational and operational tests are required to demonstrate that an item will perform satisfactorily in service are addressed in Chapter 14 and in the LILCO QA and Startup Manuals. The QA Program has established that modifications, repairs, and replacements shall be tested in accordance with the original design and testing requirements or acceptable alternatives. Technical and QA reviews provide assurance that the testing does accomplish this end. The test procedures contain or reference the requirements and acceptance limits from the applicable design or procurement documents. They establish provisions to assure that prerequisites for a given test have been met. Prerequisites include: test equipment is adequate and in satisfactory operating condition; test instrumentation has been properly calibrated; personnel are trained, qualified, and certified if necessary for the various test functions; preparation, condition, and completeness of the item to be used has been satisfactorily accomplished; suitable environmental conditions are available;

provisions for data acquisition have been established; if necessary, mandatory inspection hold points for witness by the designated authority are included; appropriate acceptance/rejection criteria are established; and methods for documenting data and results are established. The program requires that test results be documented in sufficient detail to prevent misinterpretation, that they be evaluated to the established criteria, and that the acceptance status be identified by a qualified, responsible individual or group. Test records shall be appropriately filed upon completion of the test and evaluation.

Suppliers of safety related material and services are responsible for imposing the above requirements on their internal operations and on those vendors and contractors performing work within the scope of their activities as stipulated in the procurement documents. They shall assure through audit or surveillance the adequacy of program implementation. LILCO shall verify program adequacy and implementation of external suppliers through planned and periodic audits.

Responsibility for the station testing programs has been assigned to the LILCO startup organization during the checkout and initial operation and the preoperational phase, and to the plant staff during the operational phase. The LILCO QA Department is responsible for verifying overall program establishment and implementation through planned and periodic audits and surveillance.

17.2.12 Control of Measuring and Test Equipment

The LILCO QA Program imposes requirements for control of measuring and test equipment on organizations whose activities affect the quality of safety related structures, systems, and components. The program requires calibration control for the measuring and test instruments, tools, gauges, fixtures, reference and transfer standards, and nondestructive test equipment. Section 12 of the LILCO QA Manual defines the QA Program requirements established for control of measuring and test equipment.

The program requires that calibration procedures describe the technique, frequency, and maintenance for measuring and test equipment. The QA Program requires procedures to establish methods for identification of measuring and test equipment and associated calibration data including provisions to assure that equipment is labeled, tagged, or uniquely numbered to a documented control system to indicate the date of the next calibration. The frequency of calibration is established for measuring and test equipment on an individual basis or generic grouping thereof. It is based upon the type of equipment, required accuracy, stability characteristics, purpose, degree of usage, experience, manufacturers' recommendations, and recognized industry standards. The reference and transfer standards are traceable to nationally recognized standards and, for any exceptions, provisions are established to document the basis for calibration. The calibration program requires that in the event an instrument is found to be out of calibration, an investigation shall be conducted and documented to determine the validity of previous measurements. It is required that calibration records be established and maintained to provide objective evidence that measuring and test equipment is being controlled, calibrated, and maintained in accordance with approved procedures.

Provisions assure that calibrating standards have an accuracy, range and stability, which are adequate to verify that the equipment being calibrated is within specified tolerance and can meet all other specified requirements.

The reference standard which acts as the working (shop) standard shall have a tolerance not greater than one-fourth the specified tolerance of the M&TE being calibrated except when equipment acceptable for nuclear power plant applications is not commercially available. In those cases, instruments of equal or greater accuracy shall be used. The reference standards which are used to calibrate the working (shop) standards shall have an accuracy greater than that of the working (shop) standard. When reference standards which are used to calibrate the working (shop) standard have an accuracy equal to that of the working (shop) standard, the basis for the use of standards having the same accuracy shall be documented and shall be approved by responsible management.

Procedures shall be written to control and monitor the use of M&TE and Reference Standards in order to assure that the above requirements are maintained within the limitations noted. These procedures also assure that permanently installed operating instrumentation is calibrated against M&TE having a tolerance not greater than the specified tolerance of the installed instrumentation.

Suppliers of equipment and services whose scope of activity includes the utilization of measuring and test equipment on safety related structures, systems, and components during the operational phase are responsible for imposing the above control requirements on their internal operations and on those vendors and contractors performing work within the scope of their activities as required by the procurement documents. They shall assure through audit and surveillance the adequacy of program implementation. LILCO shall verify program adequacy and implementation through planned and periodic audits of suppliers. The operating plant staff is responsible for imposing the above requirements for control of measuring and test equipment utilized in the station. In general, this responsibility is retained by the Instrumentation and Control Section. The LILCO QA Department is responsible for verifying program establishment and implementation through planned and periodic audits and surveillance.

17.2.13 Handling, Storage, and Shipping

The LILCO QA Program imposes control requirements on organizations whose scope of activity includes the handling, storage, and shipment of safety-related structures, systems and components during the operational phase. Section 13 of the LILCO QA Manual describes the QA Program requirements established for handling, storage, and shipment.

The program requires that organizations performing handling, storage, and shipping activities including cleaning, packaging, and preservation do so to written procedures or instructions. These procedures shall be developed in accordance with applicable design and specification requirements and provide for control of the aforementioned activities to preclude damage, loss, or deterioration of safety-related material, components, and equipment. Special environmental conditions such as special coverings, inert gas atmosphere, allowable moisture content, and temperature level shall be detailed and their existence verified and documented. Provisions for necessary cleaning operations as required by the nature of the material or equipment shall be included and their verification documented. Special handling requirements shall be provided and controlled to ensure safe and adequate handling, including associated verification and documentation. The procedures or instructions provide for inspection operations to verify conformance to establish criteria, use of qualified personnel, and associated

documentation. In addition, they shall provide for the controlled release of safety-related material, components, or equipment from storage for shipment or installation and for the verification and documentation thereof.

The program requirements are applicable to the stages of fabrication, manufacturing, and installation associated with the operational phase. Suppliers are responsible for imposing the requirements, as specified in the procurement documents, on their internal operations and on those vendors and contractors performing work within the scope of their activities. They also assure through audit or surveillance the adequacy of program implementation. At the station, the operating plant staff is responsible for imposing the indicated requirements for the associated activities.

The LILCO QA Department shall verify overall program adequacy, and implementation by internal organizations and by suppliers, through planned and periodic audits.

17.2.14 Inspection, Test, and Operating Status

The LILCO QA Program provides measures for indicating the inspection, test, and operating status of safety-related structures, systems, and components. Section 14 of the LILCO QA Manual describes the QA Program requirements for identification and control of inspection, test, and operating status.

The Program requires that the organizations responsible for fabrication, storage, installation, test, and operation of safety-related components and systems identify and control the inspection, test, and operating status of these items. The status is identified and controlled through the utilization of status indicators such as, tags, markings, logs, shop travelers, stamps, inspection, or test records. In addition, the Program requires the establishment of measures to control the use of the status indicators including responsibility and authority for their application and removal and the unique identification of the individual involved. Associated procedures establish provisions to assure the performance of required tests and inspections including requirements that the identification of the status be known at any given time. The bypassing of required inspections, tests, and other critical operations is controlled through station administrative procedures. These administrative procedures shall be reviewed by the QA Department. Procedures establish measures to indicate the operating status to prevent inadvertent operation of safety-related systems, equipment, and components. They establish provisions so that the identification of operating status be known at any given time.

The programs assure that functions performed out of sequence are adequately documented and do not compromise system integrity.

Procedures provide for the positive identification and control of nonconforming items in accordance with Section 17.2.15, to prevent their inadvertent use.

The program requirements are applicable to stages of fabrication, installation, test, and operation associated with the operational phase. Suppliers are responsible for imposing the requirements, as specified in the procurement documents, on their internal operations and on those vendors and contractors performing work within the scope of their activities. They also assure through audit or surveillance the adequacy of program implementation. The operating plant staff is responsible for imposing the indicated requirements within the station.

The LILCO QA Department shall verify overall program adequacy, and implementation by internal organizations as well as by suppliers, through planned and periodic audits.

17.2.15 Nonconforming Materials, Parts, or Components

The LILCO QA Program imposes requirements for control of nonconforming safety-related material, parts, and components. These requirements are applicable to organizations whose activities affect the quality of such safety related items during the operational phase. Section 15 of the LILCO QA Manual describes the QA Program requirements established to assure control of nonconforming items to prevent their inadvertent use or installation.

The program requires that a control system be established to address nonconformances in accordance with documented, approved procedures. The procedures establish measures to assure that nonconforming items and services are properly identified, documented, reviewed, segregated if practical, dispositioned, and reported to affected organizations. In addition, they establish provisions for designation of responsibility and authority for approval of the dispositioning of nonconforming items. The program requires that nonconforming items be documented and that such documentation include a clear identification of the nonconformance, a description of the nonconformance, the appropriate disposition including the approval signature, and the applicable inspection requirements. Nonconforming items shall be clearly identified as such and placed in a controlled segregated area, when practical, until proper disposition has been effected.

Nonconforming items may be dispositioned by accepting "as is," scrapping, repairing, or reworking. The acceptability of repaired or reworked nonconforming items is verified by reinspection. The reinspection of the item will be in accordance with the original inspection requirements or by a method which is equivalent to the original inspection method. The program requires that the appropriate repair, rework, and inspection procedures be documented. Nonconformance reports verifying

"accept as is" or "repair" disposition shall be made part of the required inspection records.

Suppliers of safety-related materials, parts, and components are responsible for imposing the above requirements on their internal operations and on those vendors and contractors performing work within the scope of their activities as required by the procurement documents. They also assure, through audit or surveillance, program adequacy and implementation. LILCO is responsible for conducting audits to verify program adequacy and implementation by suppliers. The LILCO QA Department is responsible for assessing the adequacy and implementation of supplier's nonconformance control systems. This is in addition to technical reviews of applicable nonconformance reports by other LILCO organizations such as Shoreham Operations, Nuclear Engineering and Nuclear Operations Support Departments. Safety-related nonconformance reports shall be analyzed periodically to determine the existence of quality trends. Trends, if any, shall be reported to the appropriate LILCO management.

When a LILCO organization discovers a nonconformance related to a LILCO activity, it is that organization's responsibility to generate and control a nonconformance report in accordance with the requirements stated herein. In general, the organization responsible for the nonconforming condition is responsible to provide an acceptable disposition. The reporting organization and the QA Department are required to review and accept the disposition before it may be implemented.

17.2.16 Corrective Action

The LILCO QA Program provides measures to assure that conditions adverse to quality are promptly identified, reported and corrected. Section 16 of the LILCO QA Manual describes the QA Program requirements for corrective action and control thereof.

The program provides for a corrective action system implemented through the use of approved written procedures. The procedures provide for an evaluation of deficiencies, including nonconformance reports, and determination of the need for corrective action. They provide for the reporting, to LILCO station and offsite management, the cause of the conditions significant to quality and the corrective action taken. The program requires that upon determination of significant conditions adverse to quality prompt corrective action be initiated to preclude repetition. In addition, verification is required to assure that these actions have been implemented. Follow-up action is conducted to verify that specified corrective action has been properly implemented and corrective action documentation has been closed out.

Suppliers are responsible for establishing and implementing a corrective action system. The supplier systems provide measures which comply with the requirements outlined above and are imposed on internal operations as well as on vendors and contractors performing work within the scope of their activities as required by the procurement documents. They also assure through audit or surveillance the adequacy of implementation. LILCO shall verify overall program adequacy and implementation through planned and periodic audits.

The LILCO QA Department shall be informed of corrective action determinations associated with safety-related structures, systems, and components. In addition, they are responsible for verifying proper implementation of internal corrective action associated with safety-related structures, systems, and components.

17.2.17 Quality Assurance Records

The LILCO QA Program imposes requirements on organizations performing safety-related functions for quality assurance records which furnish documentary evidence of the quality of items and of activities affecting quality during the operational phase. Section 17 of the LILCO QA Manual describes the QA Program requirements established for quality assurance records.

The program requires that records documenting evidence of the quality of items and activities include results of reviews, inspections, tests, audits, and material analyses; monitoring of work performance; qualification of personnel, procedures, and equipment; operating logs; maintenance and modification activities; abnormal occurrences; and other documentation such as drawings, specifications, procurement documents, calibration procedures and reports, nonconformance reports, and corrective action reports. Requirements for identification, transmittal, retention, and maintenance of quality related records subsequent to completion of work or prior to release of material or equipment for installation are to be indicated in procurement documents, specifications, procedures, or instructions, and are to be consistent with applicable codes and standards. The program requires that inspection and test records specify a description of the type of observation, identification of the inspector or data recorder, evidence of completion or verification of manufacturing, inspection or test operation, the date and results of the inspection or test, information related to nonconformances, and acceptability of the item inspected or tested.

The permanent plant filing system, developed during the design and construction phases and maintained during the operational phase is known as the Shoreham Records Retrieval System and is under the direction of the Nuclear Operations Support Department. It assures that quality assurance records are readily identifiable and retrievable. The program requires that the record storage facilities within the plant be constructed, located, and secured to prevent damage or loss of records due to fire, flooding, theft, or environmental conditions such as temperature or humidity or, alternatively, to maintain duplicate records stored in a separate remote location.

Suppliers performing safety-related activities are responsible for imposing the generation, collection, storage and maintenance requirements of quality assurance records on their internal operations and on those vendors and contractors performing work within the scope of their activities as specified in the procurement documents. They also assure through audit or surveillance the adequacy of program implementation. At the station, the Plant Staff is responsible for imposing their own records requirements as indicated above. The QA Department shall verify overall program adequacy and implementation of LILCO

internal organizations and suppliers through planned and periodic audits.

17.2.18 Audits

The LILCO QA Program establishes provisions for a comprehensive system of planned and periodic audits to verify implementation of program requirements. Section 18 of the QA Manual describes the QA Program requirements for audits.

The program requires that a comprehensive system of audits be established for both internal and external functions which affect safety-related structures, systems, and components to verify compliance with QA Program requirements as well as with approved quality assurance procedures, the station technical specifications, administrative controls and regulatory requirements. Audits shall include evaluations of quality related practices, effectiveness of implementation, conformance to policy, work areas, activities and processes, and reviews of documents and records.

Audits shall be conducted to predetermined schedules. These schedules shall be reviewed, published annually, and updated as required. Audit frequency shall be based on the status, safety, and importance of the audited activity and results of prior audits. Audits shall be scheduled to ensure that implementation of QA Program requirements and related supporting procedures receive a comprehensive audit at least every 2 years. Those applicable elements of the QA Program in which quality-related activities are more intensive and impacting upon daily operation shall be audited at least annually. Audits of nonroutine operations such as major modifications shall be scheduled as necessary.

Audits shall be conducted in accordance with written, approved procedures, plans and checklists by qualified personnel not directly responsible for the area being audited. Audits shall provide for objective evaluation of the status and adequacy of the area audited.

Audit results shall be documented. Deficient areas shall be reported to management having responsibility for the area being audited to assure corrective action. The QA Manager and the Plant Manager shall review and assess the results of audits performed within the station and assure implementation of required corrective action. Re-audits of deficient areas shall be performed, as required, to assure effective implementation of corrective and preventive action.

The QA Department is responsible for audit planning, preparation, scheduling, performance, reporting and, as required, verifying implementation of corrective and preventive action measures.

The QA Manager is responsible for assuring the development and implementation of the overall audit program. The QA Department is responsible for auditing the activities of the Shoreham Nuclear Plant Staff, LILCO nuclear support organizations, and suppliers of safety-related materials and services. Audit planning, scheduling, and programs developed by QA personnel shall be approved by the QA Manager.

LILCO and major suppliers also perform audits and/or surveys of their suppliers to evaluate QA Programs, procedures, and activities.

LILCO and major suppliers also perform surveillance and audits of their suppliers after source evaluation and award of contract. The degree of surveillance and audit of suppliers after source evaluation and award of contract shall be determined by the importance of the product to safety, the complexity of the product, the likelihood of the product to fail, the quality history of the supplier, and the feasibility of verification of quality requirements upon receipt of the product.

The QA Manager shall review audit results and assure implementation of required corrective action. These audit results shall also be used as source information for determining quality trends and QA Program status and adequacy which shall be reported to appropriate management levels on a periodic basis.

Suppliers of safety-related materials and services are responsible for imposing the requirements of this Section on their internal operations and on vendors or contractors preforming work within the scope of their activity as required by the procurement documents.

Responsibility and authority for establishing and implementing QA Program requirements relating to audits may be delegated, as deemed necessary by LILCO, to other organizations. LILCO, in delegating such responsibility shall retain ultimate responsibility for assuring compliance with QA Program requirements.

TABLE 17.2.5-1

LILCO QUALITY ASSURANCE PROGRAM MANUAL AND IMPLEMENTING PROCEDURES

Document Type/Subject	Purpose	Applicable 10CFR50/B Criteria
LILCO Quality Assurance Manual	To set forth the policy and QA requirements established by the Long Island Lighting Company to assure that nuclear power stations are designed, constructed, tested, and operated in accordance with 10CFR50 Appendix B.	All
Quality Assurance Procedures	To provide methods for the QA Department to implement the requirements set forth in the QA Manual. The following list describes only subjects and purposes of QA Procedures. It does not identify them by specific titles or numbers.	All
Organization	To describe the organization of the LILCO QA Department and assign responsibilities.	I
Stop Work Authority	To describe the stop work authority of QA Department personnel.	I
Quality Assurance Indoctrination and Training	To describe the QA indoctrination and training of personnel employed in nuclear operations and support functions.	II
Training and Qualification of QA Audit Personnel	To establish the requirements for training and qualification of LILCO QA Department Audit personnel.	II
Qualification and Certification of NDE personnel	To establish the methods to train, qualify and certify NDE personnel.	II

TABLE 17.2.5-1 (CONT'D)

Document Type/Subject	Purpose	Applicable 10CFR50/B Criteria
Qualification and Certification of Test, Inspection and Examination Personnel	To establish the methods to train, qualify and certify LILCO test, inspection, and examination personnel.	II
Quality Trends	To establish a method for identifying quality-related trends which may have significant adverse effects on the LILCO QA Program.	II
Reports to Management	To establish the system for reporting significant developments to concerned management personnel.	II
QA Program Status and Adequacy	To establish the system for QA management to evaluate the status and adequacy of the QA Program.	II
Management Assessment of the QA Program	To provide direction for the conduct of annual independent assessment of the QA Program.	II
QA Review of Design Documents	To describe the methods, and to provide the criteria, for the QA Department review of design documents such as specifications, design input/output documents and packages, design change reports, and modification and repair documents.	III
QA Review of Procurement Documents	To provide instructions for the QA Department review of procurement documents.	IV
Procurement by Quality Assurance	To provide the instructions for the procurement of services and equipment by the QA Department.	IV
QA Procedures, Instructions, Memoranda, and Change Notices	To provide instructions for the preparation, issuance, revision, periodic review, and updating of LILCO QA Department Procedures, Instructions, Memoranda, and Change Notices.	V

TABLE 17.2.5-1 (CONT'D)

Document Type/Subject	Purpose	Applicable 10CFR50/B Criteria
Quality Assurance Manual	To provide instructions for the preparation, issuance, revision, periodic review, and updating of the LILCO Quality Assurance Manual.	V
QA Review of Other Department Procedures	To provide instructions for the QA review of procedures prepared by other LILCO Departments.	V
Control of QA Department Documents	To provide the method for control of documents prepared by the QA Department.	VI
Control of QA Forms, Checklists and Surveillance Plans	To provide instructions for the control of generic forms, checklists and surveillance plans.	VI
Supplier Selection and Evaluation	To provide the methods to evaluate the capabilities of proposed suppliers.	VII
Procurement Surveys by LILCO	To establish instructions to review prospective suppliers' QA Manuals and to perform procurement surveys of the implementation of their quality systems.	VII
QA Surveillance of Supplier Activities	To provide the instructions for the surveillance of suppliers to assure that the items being procured conform with specified requirements.	VII
Qualified Suppliers List and Scheduling Visits to Suppliers	To provide the method for developing and maintaining the Qualified Suppliers List and scheduling visits to Supplier's facilities for audits, inspections and surveillance.	VII
Identification and Control of Material and Equipment	To define QA Department responsibilities toward the identification and control of materials, parts and components.	VIII
Review of Special Process Procedures	To provide the instructions for the QA Department review of special process procedures.	IX

TABLE 17.2.5-1 (CONT'D)

Document Type/Subject	Purpose	Applicable 10CFR50/B Criteria
ISI Surveillance	To provide the instructions for LILCO personnel to monitor the ISI operation to assure conformance to specified requirements.	IX
Review of ISI Program Plan and Examination Results	To provide for QA Department review of ISI Plan and of the examination records.	IX
Surveillance or Monitoring of Special Processes	To provide for QA Department surveillance or monitoring of special processes conducted in the station or supplier's facilities.	IX
QA Control of Inspections in the Station	To establish the controls for inspection of station structures, systems and components.	X
Receiving Inspection	To define requirements and responsibilities for station receiving inspection.	X
Inspection of Station Installations and Repairs	To provide for the QA inspection of installations and repairs within the station.	X
Surveillance of Station Activities	To establish the rules for planning, scheduling, conducting and documenting surveillance of station activities.	X
Test Control	To provide methods whereby the QA Department shall verify that control of testing is adequate.	XI
Testing of Materials	To provide instructions for performing tests such as mechanical testing and soils and concrete testing.	XI
Control of Station M&TE	To provide methods by which the QA Department verify adequate control of measuring and test equipment.	XII
Control of QA M&TE	To provide the methods used to control and calibrate M&TE used by the QA Department.	XII

TABLE 17.2.5-1 (CONT'D)

Document Type/Subject	Purpose	Applicable 10CFR50/B Criteria
Control of Handling, Storage and Shipping	To describe the QA methods for verifying the control of the handling, storage and shipping of station items.	XIII
Control of Inspection Test and Operating Status	To describe the QA criteria developed to verify that inspection, test, and operating status has been controlled.	XIV
Nonconformance Reports	To assign responsibilities and establish procedures for the QA Department review of nonconformance reports.	XV
Reportable Deficiencies Under 10CFR 50.55(e) or 10 CFR 21	To assign the responsibilities and establish detailed procedures for the reporting, by LILCO QA Department personnel, of significant deficiencies or defects and failure to comply.	XV
Control of Conditional Releases	To provide the method whereby the QA Department controls the conditional release of nonconforming items.	XV
Corrective Action	To provide detailed procedures for QA Department personnel to report deficiencies and nonconformances, and to document satisfactory corrective actions.	XVI
Quality Assurance Records	To assign responsibilities and provide instructions for the retention of quality assurance records.	XVII
QA Audit and Surveillance	To establish comprehensive audit and surveillance systems for verifying compliance with the elements of the LILCO QA Program.	XVIII

NOTES:

1. Each procedure will be uniquely numbered.

2. Procedures may be added to, revised, or deleted from this table without changing its intent. Therefore, this table should only be considered as representative.

TABLE 17.2.6-1

QUALITY RELATED DOCUMENT CONTROL RESPONSIBILITY

Document(1)	Prepared(2)	Reviewed(3)	Approved(3)	Issued(3)
QA Manual	QA Department	Vice President, Nuclear Operations; Appropriate LILCO Managers; Quality Division Managers; Plant Manager	Director - QA, Safety & Compliance; QA Manager	QA Manager
QA (Dept.) Procedures	QA Department	Responsible Quality Division Manager; Plant Manager	QA Manager	QA Manager
QA (Dept.) Instructions	Responsible Quality Division	Responsible Quality Divison Manager(s); if affected, Plant Manager	QA Manager	QA Manager
Other Offsite Procedures and Instructions	Responsible Offsite Staff	Manager, Responsible Offsite Organization; QA Manager	Responsible Manager	Appropriate Manager
Procurement Documents	Responsible Staff	Manager, Responsible Offsite Organiation; QA Manager	Responsible Manager	Appropriate Manager
	Plant Staff	Responsible Division Manager; QA Manager	Plant Manager	Responsible Section Head
Special Test Procedures	Plant Staff	Responsible Engineer; QA Manager; Review of Operations Committee	Plant Manager	Plant Administrative Coordinator
Station Procedures	Plant Staff	Responsible Engineer; QA Manager; Review of Operations Committee	Plant Manager	Plant Administrative Coordinator
Test & Calibration Procedures; Maintenance & Repair Procedures; Special Process Procedures	Plant Staff	Responsible Division Manager; Responsible Engineer; QA Manager	Plant Manager	Plant Administrative Coordinator

TABLE 17.2.6-1 (cont'd)

Document(1)	Prepared(2)	Reviewed(3)	Approved(3)	Issued(3)
Test & Cal. Procedures (cont)	Responsible Offsite Staff	Manager, Responsible Offsite Organization: QA Manager	Responsible Manager	Appropriate Manager
Inservice Inspection (ISI) Program	ISI Agent	Responsible Agent Managers; Responsible Nuclear Engineer; QA Manager	Agent Managers; LILCO Reviewer(s)	Nuclear Engineering Department
	Nuclear Engineering Department	Responsible Division Manager; QA Manager	Nuclear Engineering Department; Manager	Nuclear Engineering Department
	Plant Staff	Responsible Nuclear Engineer; QA Manager	Plant Manager	Plant Administrative Coordinator
Modification and Design Documents	Nuclear Engineering Department and/or Plant Staff	Responsible Nuclear Engineer and/or Responsible Plant Engineer; QA Manager; Nuclear Review Board; Review of Operations Committee	Nuclear Engineering Department Manager and/or Plant Manager	Nuclear Engineering Department or Records Management
Procedures Involving Unresolved Safety Questions	Nuclear Engineering Department and/or Plant Staff	Responsible Nuclear Engineer and/or Responsible Plant Engineer; QA Manager; Nuclear Review Board; Review of Operations Committee	Plant Manager	Plant Administrative Coordinator
Changes to FSAR	Originating Department	Assigned Engineers of Appropriate Disciplines; Licensing Engineer; QA Manager	Vice President, Nuclear Operations	Manager, NOSD

(1) Revisions and addenda are subject to the same review, approval, and distribution cycle.
(2) Or designated support organization such as consultant, architect-engineer, etc., or other internal LILCO organizations.
(3) Designated alternates may perform for individual named.

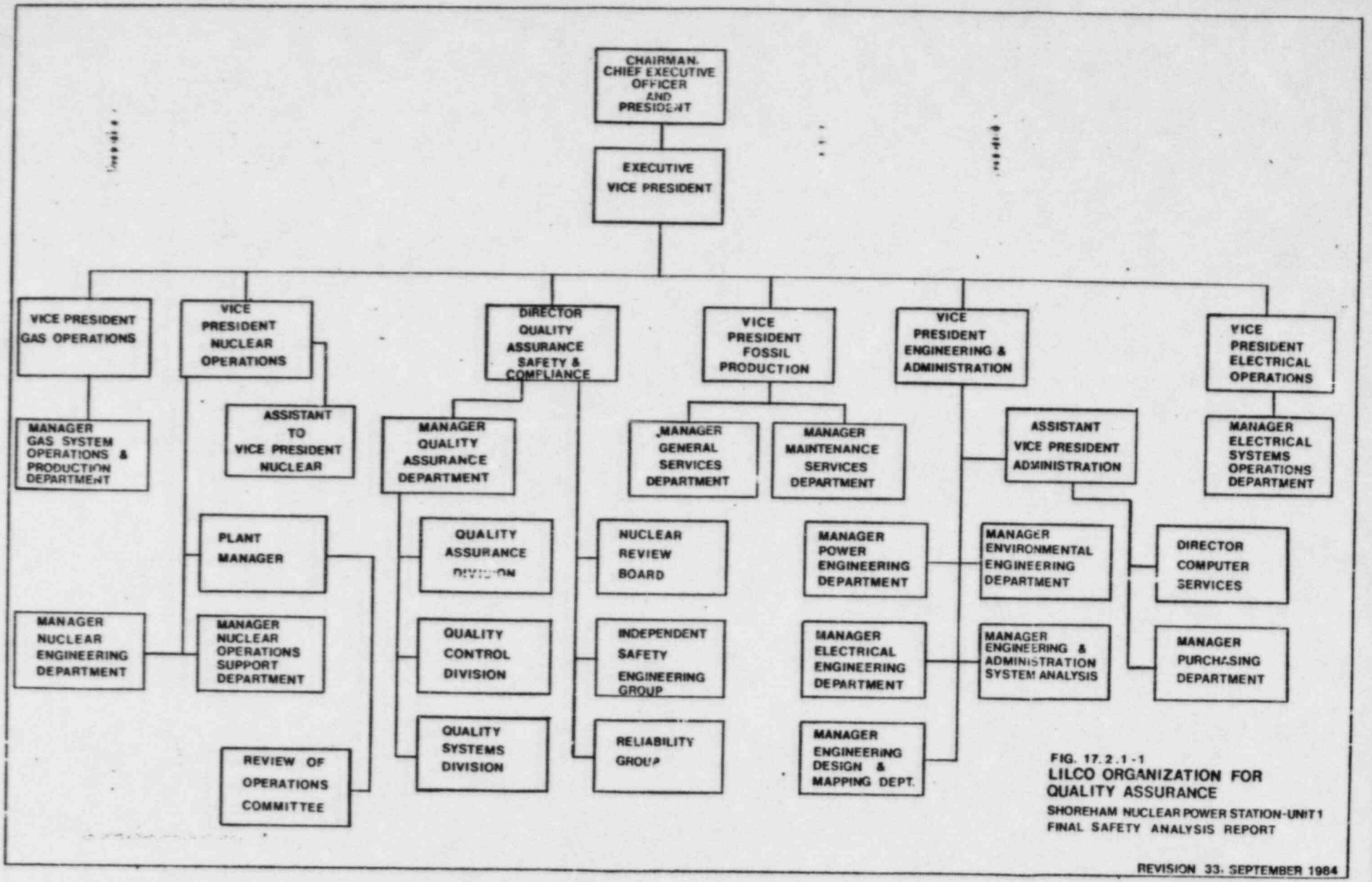

FIG. 17.2.1-1
LILCO ORGANIZATION FOR QUALITY ASSURANCE
SHOREHAM NUCLEAR POWER STATION-UNIT 1
FINAL SAFETY ANALYSIS REPORT