13.1 ORGANIZATIONAL STRUCTURE

Section 13.1 of the FSAR is organized as follows, based on guidance provided in NRC Regulatory Guide 1.70, Revision 2:

	Susquehanna Nuclear, LLC Management and Technical Support Organization (i.e., Off-Site Organization)	Susquehanna Nuclear, LLC Operating Organization (i.e., On-Site Organization)	Talen Energy Corporate Organization
Description of functions and responsibilities.	13.1.1	13.1.2	N/A
Position qualification requirements.	13.1.1.3	13.1.3	N/A
Résumés of incumbents.	Table 13.1-1	Table 13.1-2	N/A
Organizational chart.	Figure 13.1-2	Figure 13.1-3	Figure 13.1-1

13.1.1 MANAGEMENT AND TECHNICAL SUPPORT ORGANIZATION

This section describes the functions, responsibilities, and qualifications of personnel of the Susquehanna Nuclear, LLC off-site organization. The term “off-site organization” is used to describe those groups and personnel who do not ultimately report to the Plant Manager. Personnel belonging to the off-site organization may be physically located at the Talen Energy Corporation headquarters or at Susquehanna Steam Electric Station. The structure of the off-site organization is depicted in Figure 13.1-2.

13.1.1.1 Design and Operating Responsibilities

13.1.1.1.1 Design and Construction Activities (Project Phase) (HISTORICAL)

The principal site related engineering work, the design of the plant, site layout, development of the PSAR and FSAR, the procurement of material and equipment and construction of the plant was performed by Bechtel Power Corporation and other consultants. PPL (the original corporation responsible for the plant) formed a Nuclear Department to review and monitor design and construction activities.

13.1.1.1.2 Preoperational Activities (HISTORICAL)

In designing the Advanced Control Room for Susquehanna, PPL incorporated the results of an operability analysis performed to establish good interface between the operators and controls. NRC review of the Advanced Control Room identified no significant deficiencies.

In acquiring personnel for the plant staff, PPL selected experienced people from within PPL when possible and supplemented these personnel with nuclear-experienced personnel from outside the company. All personnel filling the plant staff positions listed in Section 13.1.3.1 met the

qualification requirements of ANSI N18.1-1971 in addition to the various selections and screening processes developed and used by the company. Once selected, appropriate training programs were administered as described in Section 13.2.

The initial test organization and plans are described in Section 14.2.

The operating and maintenance procedures are described in Section 13.5.

13.1.1.1.3 Technical Support for Operations: Responsibilities and Authorities of Personnel in the Off-Site Organization

a) Chief Nuclear Officer[1]

The Chief Nuclear Officer serves as the corporate officer responsible for the company's nuclear efforts, including design, maintenance, and operations. The Chief Nuclear Officer has corporate responsibility for overall plant nuclear safety and shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the plant to ensure nuclear safety. The Chief Nuclear Officer is responsible for establishing and maintaining the off-site and on-site nuclear organizations in accordance with applicable regulations, license requirements, and Technical Specification Requirements.

The Chief Nuclear Officer is responsible for performance of those oversight functions that verify compliance with OQA Program requirements and for management of the interfaces between Susquehanna Nuclear, LLC and the principle federal and state regulators. The Chief Nuclear Officer is also responsible for the development and implementation of the Susquehanna Nuclear, LLC employee concerns program. The subordinate managers and representatives responsible for these functions are assured direct access to the Talen Energy Corporation President & CEO to preclude any potential independence conflicts they may experience as a function of their reporting relationship to the Chief Nuclear Officer.

The following positions report directly to the Chief Nuclear Officer:

- Site Vice President
- Manager-Nuclear Oversight
- Employee Concerns Program Representative(s)

b) Site Vice President

The Site Vice President is responsible for providing managerial leadership and strategic direction for the operation of Susquehanna Nuclear, LLC and for developing and implementing the Susquehanna Nuclear, LLC nuclear training programs.

The following positions report directly to the Site Vice President:

- Plant Manager

[1] Plant-specific title for the "Corporate Officer" position described in Technical Specification 5.2.1.

- General Manager-Nuclear Engineering
- Manager-Nuclear Regulatory Affairs
- Manager-Nuclear Training

c) General Manager-Nuclear Engineering

The General Manager-Nuclear Engineering is responsible for providing leadership and strategic direction for engineering activities and their quality management. These activities include ensuring that the design basis, detailed design of the plant, and the design control program are adequate to meet Susquehanna Nuclear, LLC's commitment to safe, efficient, and reliable operation. The General Manager-Nuclear Engineering is also responsible for procuring Nuclear Fuel, engineering safety analysis and special projects.

The following positions report directly to the General Manager-Nuclear Engineering:

- Manager-Nuclear Design Engineering
- Manager-Nuclear Fuels and Analysis
- Manager-Station Engineering
- Manager-Special Projects
- Manager-Engineering Programs

In addition to the above responsibilities, the General Manger-Nuclear Engineering is specifically responsible for:

- On-going planning, development, maintenance, and upgrade of information services within Susquehanna Nuclear, LLC, including hardware and software.
- Providing procedural guidance on the implementation of the Non-Process Software Quality Assurance Program.
- Serving as the principal Susquehanna Nuclear, LLC contact with the Talen Energy information services support personnel relative to information services functions.
- Serving as the principal Susquehanna Nuclear, LLC contact with the Talen Energy supply chain support personnel relative to procurement engineering functions.

d) Manager-Nuclear Design Engineering

The Manager-Nuclear Design Engineering is responsible for the design and modification of the plant in accordance with applicable codes, standards, and regulations. Nuclear Design Engineering provides engineering support to identify technological solutions to address plant problems, and to establish and implement procedures that control material and component specifications, system designs, and modification activities. The Manager-Nuclear Design Engineering is also responsible for configuration management and oversight of the procurement engineering functions performed by the Talen Energy supply chain support personnel.

e) Manager-Nuclear Fuels and Analysis

The Manager-Nuclear Fuels and Analysis is responsible for managing the nuclear fuel cycle from acquisition of nuclear fuel to ultimate disposal of the fuel. This includes procuring, designing, disposing, and providing technical support with regard to nuclear fuel.

The Manager-Nuclear Fuels and Analysis is also responsible for fuel engineering safety analysis and risk assessment.

f) Manager-Nuclear Regulatory Affairs

The Manager-Nuclear Regulatory Affairs is responsible for managing the interfaces between Susquehanna Nuclear, LLC and the principal state and federal nuclear regulatory agencies, directing the licensing aspects of SSES including updating the FSAR, and coordinating the preparation and issuance of correspondence to the NRC.

g) Manager-Nuclear Oversight[2]

The Manager-Nuclear Oversight reports to the Chief Nuclear Officer and, if conditions warrant, has direct access to the Talen Energy Corporation President & CEO. The Manager-Nuclear Oversight is responsible for the following functions:

- Independent audit/assessment of Susquehanna Nuclear, LLC activities.
- Independent Technical Review functions in response to NUREG-0737.
- Administration of the Operational Quality Assurance (OQA) Program.
- Quality control activities, including definition of receipt inspection program controls and oversight of the Talen Energy supply chain support personnel in their implementation of these program controls.
- Vendor oversight activities.

The individuals who perform quality assurance functions shall have sufficient organizational freedom to ensure their independence from operating pressures.

h) Manager-Station Engineering

The Manager-Station Engineering is responsible for providing the engineering necessary to support operations and maintenance at SSES by optimizing plant system and equipment performance. This is accomplished by monitoring system and equipment performance, anticipating, defining, and preventing problems, identifying and implementing improvements, and resolving unexpected problems. The Manager-Station Engineering is also responsible for providing procedural guidance on the implementation of the Process Software Quality Assurance program. Sub-functions include:

- Computer Systems
- Electrical/I&C Systems
- Mechanical Systems (i.e., Balance of Plant and Nuclear Steam Supply Systems)

i) Manager-Special Projects

The Manager-Special Projects is responsible for providing managerial leadership for assigned special projects.

[2] Plant-specific title for the individual responsible for “performing quality assurance functions” as described in Technical Specification 5.2.1.

j) Manager-Engineering Programs

The Manager-Engineering Programs is responsible for managing these engineering programs in support of operations and maintenance at SSES:

- Equipment Reliability
- Fire Protection
- Programs and Testing

In addition, the Manager-Engineering Programs is responsible for maintaining the welding program, ASME Section III code repair, nondestructive examination (NDE) program and the functions of the corporate NDE-Level III.

13.1.1.2 Organizational Arrangement: Off-Site Organization

The structure of the off-site organization is depicted in Figure 13.1-2.

13.1.1.3 Qualification Requirements for Personnel in the Off-Site Organization

Personnel selected for the off-site positions listed on the matrix below shall meet the experience, education, and/or certification requirements presented in the referenced section of the applicable standard, as endorsed by the associated Regulatory Guide (where applicable).

Off-Site Organization Position Title	Applicable Standard (Assoc. Reg. Guide)	Standard Position Title (Section Reference)
General Manager-Nuclear Engineering	ANSI/ANS 3.1-1978	Engineer in Charge (4.6.1)
Manager-Nuclear Oversight	ANSI/ANS 3.1-1993 (Reg. Guide 1.8, Rev. 3	Quality Assurance (4.3.7)

The section below describes the minimum experience, education, and qualification requirements for personnel in Susquehanna Nuclear, LLC's off-site organization.

- *ANSI/Regulatory Guide requirements, if any, are presented in italics. Deviations from commitments to ANSI/Regulatory Guide requirements are not permitted without prior approval from the NRC.*

- Requirements imposed by Susquehanna Nuclear, LLC are presented in regular font, and are more restrictive than the ANSI requirements, if any, applicable to the position. Deviations from requirements imposed by Susquehanna Nuclear, LLC may be authorized by the senior management personnel at or above the General Manager level (as applicable to the subject subordinate personnel) when, in their judgment, the combined education, experience, and managerial competency of a particular individual are sufficient to ensure adequate performance of assigned responsibilities. Such exceptions will be documented in writing and will not be used as a means to degrade the overall qualifications of the nuclear staff.

Résumés of key personnel in the off-site organization are accessible per the instructions found in Table 13.1-1.

a) Chief Nuclear Officer

Education: Shall hold a recognized baccalaureate or higher degree in science or engineering in a field associated with power production.

Experience: Shall have ten years experience associated with power plant design and operation of which at least five years must be nuclear-related experience.

b) Site Vice President

Education: Shall hold a recognized baccalaureate or higher degree in science or engineering in a field associated with power production.

Experience: Shall have ten years experience associated with power plant design and operation of which at least five years must be nuclear-related experience.

c) General Manager-Nuclear Engineering

Education: Shall hold a baccalaureate or higher degree in engineering or the physical sciences.

Experience: Shall have ten *(three) years of professional-level experience in nuclear services, nuclear plant operation, or nuclear engineering, and the necessary overall nuclear background to determine when to call consultants and contractors for dealing with complex problems beyond the scope of owner-organization expertise.* The General Manager-Nuclear Engineering shall have five years of experience in responsible supervisory positions.

d) Manager-Nuclear Design Engineering

Education: Shall hold a recognized baccalaureate or higher degree in engineering or a related physical science.

Experience: Shall have ten years related experience including five years nuclear-related experience in responsible supervisory positions.

e) Manager-Nuclear Fuels and Analysis

Education: Shall hold a recognized baccalaureate or higher degree in engineering or a related physical science.

Experience: Shall have ten years experience in progressively more responsible roles, of which 5 years must be nuclear-related experience. He/she shall have knowledge of the nuclear fuel cycle, nuclear fuel analyses, safety and licensing requirements, and nuclear fuel procurement and contracting practices. Experience in core management is desirable.

f) Manager-Nuclear Regulatory Affairs

Education: Shall hold a recognized baccalaureate degree.

Experience: Shall have ten years related experience, including a minimum of 5 years nuclear-related experience in responsible supervisory positions.

g) Manager-Nuclear Oversight

Education: *Baccalaureate in engineering or related science.*

Experience: Related experience (4 years) which shall include Nuclear Power Plant (2 years) and Supervisory or Management (1 year).

Individuals who do not possess the formal educational and experience requirements specified above will not be eliminated automatically when other factors provide sufficient demonstration of their abilities. These other factors are to be evaluated on a case-by-case basis and approved and documented by the Chief Nuclear Officer. However, the individual assigned to this position is to meet the special requirements specified below.

Special Requirement: Management and supervisory skills (leadership, interpersonal communication, management responsibilities and limits, motivation of personnel, problem analysis and decision making and administrative policies and procedures).

Special Requirement: Shall have 1 year of experience performing quality verification activities. The term "quality verification" is defined as "The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements integral to the QA Program."

h) Manager-Station Engineering

Education: Shall hold a baccalaureate or higher degree in engineering or the physical sciences.

Experience*:* Shall have ten years of experience related to engineering or the physical sciences, including five years nuclear-related experience that includes participation in the activities of an operating nuclear power plant during the following: 1) 1 month above 20% power; 2) routine refueling outage; 3) startup testing. The Manager-Station Engineering shall hold an NRC SRO license or have held a license of a similar unit or have been certified at an appropriate simulator.

i) Manager-Special Projects

Education: Shall hold a recognized baccalaureate degree or higher degree in engineering or a related physical science.

Experience: Shall have ten years related experience including five years nuclear-related experience in responsible supervisory positions.

j) Manager-Engineering Programs

Education: Shall hold a recognized baccalaureate or higher degree in engineering or a related physical science.

Experience: Shall have ten years related experience including five years nuclear-related experience in responsible supervisory positions.

13.1.2 OPERATING ORGANIZATION

This section describes the functions and responsibilities of personnel of the Susquehanna Nuclear, LLC on-site organization. The term “on-site organization” is used to describe those groups and personnel who ultimately report to the Plant Manager. In general, personnel of the on-site organization are physically located at Susquehanna Steam Electric Station.
NOTE: Talen Energy provides on-site support at Susquehanna for various functions including financial/business services, health services, information services, supply chain (sourcing and logistic services), human resources, etc. Talen Energy also provides some maintenance/labor support.

NOTE: PPL Electric Utilities provides resources in support of switchyard and transmission activities via a Transition Services Agreement.

13.1.2.1 Plant (On-Site) Organization

The structure of the on-site organization is depicted in Figure 13.1-3.

13.1.2.2 Plant (On-Site) Personnel Responsibilities and Authorities

The chain of command/line of succession for nuclear operations as described in 13.1.2.2.c-(2) is as follows:

- Chief Nuclear Officer
- Site Vice President
- Plant Manager (or Duty Manager as assigned)
- General Manager-Operations
- Manager-Nuclear Operations
- Assistant Operations Manager-Shift Operations
- Shift Manager
- On-Shift Crew

Descriptions of the on-site organization follow.

a) Plant Manager[3]

The Plant Manager is responsible for overall safe operation of the plant and shall have control over those on-site activities necessary for safe operation and maintenance of the plant. The Plant Manager shall delegate in writing the succession to this responsibility during his/her absence. This responsibility is implemented in such a fashion as to ensure safe, efficient, and reliable operation of SSES. Responsibilities include:

- Ensuring protection of plant personnel and the public from radiation exposure and/or consequences of an accident at the plant.

- Operating and maintaining SSES in compliance with the applicable requirements of the Nuclear Regulatory Commission and other Regulatory agencies, and in full compliance with the facility Operating License, the Technical Specifications, the FSAR, and the OQA Program including its implementing documents.

- Approving, prior to implementation, each proposed test, experiment, or modification to systems or equipment that affect nuclear safety.

- Developing and implementing administrative procedures to limit the working hours of unit staff who perform safety-related functions (e.g., licensed Senior Reactor Operators, licensed Reactor Operators, health physicists, auxiliary operators, and key maintenance personnel), in accordance with Tech Spec 5.2.2.e.

- Managing the interface with the Institute of Nuclear Power Operations (INPO).

The following positions report directly to the Plant Manager:

- General Manager-Maintenance
- General Manager-Operations
- General Manager-Work Management
- General Manager-Programs

b) Manager-Nuclear Maintenance

The Manager-Nuclear Maintenance directs the plant mechanical, electrical, and instrument and controls maintenance activities and related support services. The Manager-Nuclear Maintenance is responsible for close liaison between other station organizations to assure safe equipment operation, shutdown, startup, and functional testing, and to assure that work is performed in accordance with station radiation protection procedures which maintain worker exposures as low as reasonably achievable. Sub-functions include:

- Electrical Maintenance
- I&C Maintenance

[3] Plant-specific title for the “Plant Manager” position described in Technical Specification 5.2.1.

- Mechanical Maintenance
- Maintenance Planning
- Modification Installation/Planning
- Fix-it-now (FIN) Team (includes predictive maintenance)
- Management of Refuel Floor Activities
- Project management of the Dry Fuel Storage Program
- Component Maintenance Optimization (includes predictive and component maintenance engineering functions)

The Superintendent of Maintenance Programs reports to the Manager-Nuclear Maintenance.

c) Manager-Nuclear Operations[4]

The Manager-Nuclear Operations is responsible for all plant operations including routine as well as abnormal or emergency operating situations. The Manager-Nuclear Operations is responsible to see that all operations are carried out in a safe, efficient manner, and that the plant is operated in conformance to the Operating License, Technical Specifications, and in accordance with approved written procedures. The Manager-Nuclear Operations is responsible for ensuring that a Reactivity Management Program is in place at SSES. The Manager-Nuclear Operations is responsible for a close liaison between other station groups to assure safe equipment operation, to assure that surveillance activities are carried out in accordance with written procedures and as specified in the Technical Specifications, to assure that other station activities do not place the plant in an unsafe condition, and to assure that all operating activities are performed with appropriate radiological safety considerations. The Manager-Nuclear Operations is also responsible for all on-site nuclear fuel management and fuel performance programs; control of special nuclear material; planning and coordination of all core refueling and core performance testing activities; and administration of the reactivity management program. During the absence of the Manager-Nuclear Operations, these responsibilities are delegated to the Assistant Operations Manager-Shift Operations, the on-duty Shift Manager, or other designated supervisor.

(1) Assistant Operations Manager-Shift Operations[5]

The Assistant Operations Manager-Shift Operations reports to the Manager-Nuclear Operations and is responsible for supervising day-to-day direction of Operations shift personnel. The Assistant Operations Manager-Shift Operations is the focal point for work groups with the authority to implement station priorities in accordance with regulatory requirements.

[4] Plant-specific title for the “Operations Manager” position described in Technical Specification 5.2.2.

[5] Plant-specific title for the “Assistant Operations Manager” position described in Technical Specification 5.2.2.

(2) Shift Managers[6]

The Shift Managers report to the Assistant Operations Manager-Shift Operations. They are responsible for the control room command function and are in charge of and responsible for the operations of the plant on their specific shift. The Shift Managers have the authority to shut down the plant if, in their opinion, plant conditions indicate that a nuclear safety hazard exists or approved procedures so direct. Shift Managers direct plant operations, supervise and check the performance of control room and other operators, inspect equipment when required, and respond to plant or equipment abnormalities in accordance with approved plant procedures. Additionally, Shift Managers inform station management in a timely manner of conditions which may affect public safety, plant personnel safety, plant capacity or reliability, or cause hazard to equipment. In addition, the Shift Manager, during off normal hours, assumes responsibility for all plant functions in the absence of senior plant management. The Shift Manager initially assumes the role of Emergency Director upon entry into an Emergency Plan condition. He/she is relieved of this duty when a qualified Emergency Director is prepared to assume control of the emergency.

During any absence of the Shift Manager from the control room while the unit is in Mode 1, 2, or 3, an individual with an active Senior Reactor Operator (SRO) license shall be designated to assume the control room command function.

During any absence of the Shift Manager from the control room while the unit is in Mode 4 or 5, an individual with an active SRO license or Reactor Operator license shall be designated to assume the control room command function.

(3) Unit Supervisors

Unit Supervisors assist the Shift Managers in their duties and assume their direct responsibilities in the event of the unavailability of the Shift Managers. Unit Supervisors direct the manipulation of unit controls. The Shift Managers and Unit Supervisors participate in operator training, retraining and requalification activities from the standpoint of providing guidance, direction, and instruction to shift personnel as well as pursuing academic work to keep their SRO licenses current. As assigned by the Manager-Nuclear Operations, the Shift Managers and Unit Supervisors review procedures as they apply to startup, shutdown, power operation, load changes, fuel handling, emergency situations, and surveillance activities from the standpoint of safety, accuracy, and experience gained as a result of operation.

(4) Licensed Operators

Licensed Operators perform operations directed by Unit Supervisors, manipulate the unit controls, monitor control room instrumentation, respond to plant or equipment abnormalities in accordance with approved plant procedures, direct the activities of non-licensed operators, and log plant operations, systems or

[6] Plant-specific title for the “Shift Supervisor” position described in Technical Specifications 5.1.2 and 5.2.2.

equipment abnormalities, and plant data. Plant shutdowns or scrams may be initiated by these operators when observation of plant conditions and equipment indicate a nuclear safety hazard exists, or approved procedures so direct. Licensed Operators manipulate process controls as necessary to match load demand and to respond to other process changes. Licensed Operators are responsible for taking immediate operator action necessary to maintain or bring the plant to a safe condition during abnormal and/or emergency conditions. Licensed Operators participate in the training of new Licensed Operators and maintain their operator licenses by participating in the License Requalification Program detailed in Section 13.2.

(5) Non-Licensed Operators

Non-licensed Operators perform duties outside the control room as assigned and necessary for continuous, safe plant operation and are available to shift supervision for additional work assignments that arise from time to time. They assist in plant startup, shutdown, surveillance, and emergency response as directed by shift supervision. For those tasks requiring the use of checklists or procedures, such as valving for plant startup, or data sheets used on routine equipment checks, they are responsible for performing these assigned evolutions and for making accurate entries according to the applicable procedure, data sheet, or checklist. The Non-Licensed Operators are responsible for improvement and upgrading of their own performance by participating in the applicable sections of the training program detailed in Section 13.2.

(6) Shift Personnel

Shift Personnel are instructed that should conditions exceed pre-established radiation levels or exposure limits, or if conditions occur that are deemed to be unsafe or hazardous, shift supervision will be informed. Two Radiation Protection Technicians or qualified alternates will be available to each shift and, if shift supervision feels that a radiological condition exists that warrants attention and investigation by Radiation Protection, the Radiation Protection Technicians will be directed to assist as necessary. A Chemistry Technician or qualified alternate will be available to each shift to provide assistance as required.

(7) Shift Technical Advisors

Shift Technical Advisors provide advisory technical support to the Shift Managers in the areas of thermal hydraulics, reactor engineering, and plant analysis with regard to safe operation of the unit. Shift Technical Advisors are assigned to each operating shift and provide diagnosis of plant conditions and advise control room personnel on the status of critical plant parameters during major tests, significant plant evolutions, transients, and accidents. Shift Technical Advisors advise shift supervision on the future course of actions to terminate or mitigate the consequences of major plant transients and accidents and perform other engineering support duties as assigned.

(8) Assistant Operations Manager-Work Control

The Assistant Operations Manager-Work Control reports directly to the Manager-Nuclear Operations. The Assistant Operations Manager-Work Control is responsible for coordinating and scheduling plant work, providing general administrative support and maintaining the various programs used by the Operations organization.

d) Manager-Radiation Protection[7]

The Manager-Radiation Protection is responsible for implementing the SSES Radiological Protection Program, including developing radiological protection standards, monitoring the implementation of these standards, and ensuring compliance with governing regulations. The Manager-Radiation Protection is also responsible for dosimetry, the storage of radioactive material, radwaste shipment (which includes processing and inspection), radwaste management, radiological operations, decontamination and ALARA functions.

A radiation protection technician shall be on site when fuel is in the reactor. The position may be vacant for not more than two hours, in order to provide for unexpected absence, provided immediate action is taken to fill the required position. As described in the Emergency Plan, radiation protection coverage is provided around the clock.

The individuals who perform Radiation Protection program activities shall have sufficient organizational freedom to ensure their independence from operating pressures.

e) General Manager-Work Management

The General Manager-Work Management is responsible for the coordination of the process by which physical work activities are scoped, planned, scheduled, coordinated, released, and completed. The General Manager-Work Management is responsible for the interface between SSES organizations to ensure coordination of all activities associated with work at the station including corrective and preventive maintenance, surveillances, modifications support, and testing. The General Manager-Work Management is also responsible for providing long-term outage strategy, direction, and leadership for Susquehanna Nuclear, LLC to ensure that activities can be planned, scheduled, and completed in a high quality and productive manner without compromising the safety of the public, plant personnel, or plant equipment. Subfunctions include:

- On-Line Work Management
- Outage Management
- Scheduling Management
- Field Project Management

[7] Plant-specific title for the individual responsible for “carrying out health physics” as described in Technical Specification 5.2.1 and for the “Supervisor-Health Physics” position described in Technical Specification 5.3.1.

The General Manager-Work Management is also responsible for the procurement of material and services in support of the safe, efficient, and reliable operation and maintenance of SSES. This responsibility includes serving as the principal Susquehanna Nuclear, LLC contact with Talen Energy – Supply Chain relative to the procurement and warehousing functions.

f) Manager-Plant Chemistry/Environmental

The Manager-Plant Chemistry/Environmental is responsible for maintaining an effective plant chemistry program that preserves and protects plant components and equipment, providing an accurate and thorough analytical laboratory, and complying with the governing radiological and non-radiological environmental regulations to minimize corrosion and ensure plant, personnel, and public safety.

As described in the SSES Emergency Plan, chemistry coverage is provided around the clock.

g) General Manager-Operations

The General Manager-Operations is responsible for providing oversight of the subordinate organizations. The following positions report directly to the General Manager-Operations:

- Manager-Nuclear Operations
- Manager-Radiation Protection
- Manager-Plant Chemistry/Environmental

h) General Manager-Programs

The General Manager-Programs is responsible for the security and emergency planning functions in support of the operating plant and for providing support services to the operating plant. These services include records management/document control and, administrative functions. The General Manager-Programs is responsible for developing and implementing the Susquehanna Nuclear, LLC corrective action, self-assessment and operating experience programs and for nuclear performance indicators. The following positions report directly to the General Manager-Programs:

- Manager-Nuclear Security
- Manager-Performance Improvement

i) Manager-Nuclear Training[8]

The Manager-Nuclear Training is responsible for the management and control of training and qualification for all personnel (except those in Nuclear Security) who support Susquehanna, and for making sure all programs are current and accredited. The Manager-Nuclear Training is responsible for providing training to support other

[8] Plant-specific title for the individual responsible for “training the operating staff” as described in Technical Specification 5.2.1.

Susquehanna Nuclear, LLC managers in the task of ensuring that subordinates are knowledgeable of the policies, programs, procedures, principles, skills, tools, equipment handling capabilities, and other information necessary to competently, safely, and efficiently accomplish their assigned tasks. The individuals who train the operating staff shall have sufficient organizational freedom to ensure their independence from operating pressures.

j) Manager-Performance Improvement

The Manager-Performance Improvement is responsible for the administration of the Susquehanna Nuclear, LLC corrective action, self-assessment and operating experience programs. This includes development and maintenance of trending, tracking, and reporting activities associated with the programs.

k) Manager-Nuclear Security

The Manager-Nuclear Security is responsible for providing physical security for SSES. This includes preventing radiological sabotage or other acts that would endanger public health or safety, and protecting against the commission of acts contrary to law and/or company policy.

Security coverage is provided around the clock; specific staffing is described in the SSES Security Plan.

l) General Manager-Maintenance

The General Manager-Maintenance is responsible for providing leadership and strategic direction for maintenance activities and their quality management. The Manager-Nuclear Maintenance reports directly to the General Manager-Maintenance.

13.1.2.3 Operating Shift Crews

SSES is staffed to address requirements specified by 10CFR50.54(m)(2)(i), Technical Specification 5.2.2.a, Technical Specification 5.2.2.g, and the Susquehanna Nuclear, LLC Emergency Plan. For normal operation of both units, the minimum shift composition consists of fifteen (15) qualified individuals as defined in the Emergency Plan Section 6.1.

A rotational schedule for six operating crews is typically maintained. For those operations that involve core alterations, direct supervision of fuel movements is provided by an individual holding an SRO License or SRO Limited to Fuel Handling. This person shall have no other concurrent responsibilities during this assignment.

Radiation Protection, Chemistry and Security coverage is provided around the clock and is discussed in Sections 13.1.2.2. e, 13.1.2.2. g and 13.1.1.1.3.j, respectively.

13.1.3 QUALIFICATION REQUIREMENTS FOR NUCLEAR PLANT (ON-SITE) PERSONNEL

13.1.3.1 Minimum Required Qualifications

Personnel selected for the on-site positions listed on the matrix below shall meet the experience, education, and/or certification requirements presented in the referenced section of the applicable standard, as endorsed by the associated Regulatory Guide (where applicable).

On-Site Organization Position Title	**Applicable Standard (Assoc. Reg. Guide)**	Standard Position Title (Section Reference)
Plant Manager	ANSI/ANS 3.1 – 1978	Plant Manager (4.2.1)
General Manager-Maintenance	ANSI/ANS 3.1 – 1978	Maintenance Manager (4.2.3)
Manager-Nuclear Maintenance	ANSI/ANS 3.1 – 1978	Maintenance Manager (4.2.3)
Manager-Nuclear Operations[1]	ANSI/ANS 3.1 – 1978	Operations Manager (4.2.2)
Manager-Radiation Protection[2]	ANSI N18.1 – 1971 (Reg. Guide 1.8, Rev. 1-R)	Radiation Protection (4.4.4)
General Manager-Work Management	ANSI/ANS 3.1 – 1978	Technical Manager (4.2.4)
Manager-Plant Chemistry/ Environmental	ANSI/ANS 3.1 – 1978	Chemistry and Radiochemistry (4.4.3)
Assistant Operations Manager-Shift Operations[1]	ANSI/ANS 3.1 – 1978	Operations Manager (4.2.2)
Assistant Operations Manager-Work Control	ANSI/ANS 3.1 – 1978	Technical Manager (4.2.4)
Shift Manager[2]	ANSI/ANS 3.1 – 1981 (Reg. Guide 1.8, Rev. 2)	Shift Supervisor (4.3.1.1)
Unit Supervisor[2]	ANSI/ANS 3.1 – 1981 (Reg. Guide 1.8, Rev. 2)	Senior Operator (4.3.1.2)
Licensed Operator[2]	ANSI/ANS 3.1 – 1981 (Reg. Guide 1.8, Rev. 2)	Licensed Operator (4.5.1.2)
Non-Licensed Operator	ANSI/ANS 3.1 – 1978	Operator (Non-Licensed) (4.5.1)
Shift Technical Advisor[2]	ANSI/ANS 3.1 – 1981 (Reg. Guide 1.8, Rev. 2)	Shift Technical Advisor (4.4.8)
Supervisor-I&C Crews	ANSI/ANS 3.1 – 1978	Instrumentation and Control (4.4.2)
Foreman and Assistant Foreman: Electrical Repairs, Radiation Protection, I&C, Mechanical Repairs	ANSI/ANS 3.1 – 1978	Supervisors not requiring NRC licenses (4.3.2)

On-Site Organization Position Title	**Applicable Standard (Assoc. Reg. Guide)**	Standard Position Title (Section Reference)
Technician: Radiation Protection, I&C	ANSI/ANS 3.1 – 1978	Technician (4.5.2)
Mechanic	ANSI/ANS 3.1 – 1978	Maintenance Personnel (4.5.3)
Supervisor-Reactor Engineering	ANSI/ANS 3.1 – 1978	Reactor Engineering (4.4.1)

Notes:

1. The Manager-Nuclear Operations (Tech Spec title "Operations Manager") or the Assistant Operations Manager-Shift Operations (Tech Spec title "Assistant Operations Manager") shall hold a Senior Reactor Operator license. (See Technical Specification 5.2.2.f)
2. See Technical Specification 5.3.1.

The section below describes the minimum experience, education, and qualification requirements for personnel in Susquehanna Nuclear, LLC's on-site organization.

- *ANSI/Regulatory Guide requirements are presented in italics. Deviations from commitments to ANSI/Regulatory Guide requirements are not permitted without prior approval from the NRC.*

- Requirements imposed by Susquehanna Nuclear, LLC, if any, are presented in regular font, and are more restrictive than the ANSI/Regulatory Guide requirements applicable to the position. Deviations from requirements imposed by Susquehanna Nuclear, LLC may be authorized by the senior management personnel at or above the General Manager level (as applicable to the subject subordinate personnel) when, in their judgment, the combined education, experience, and managerial competency of a particular individual are sufficient to ensure adequate performance of assigned responsibilities. Such exceptions will be documented in writing and will not be used as a means to degrade the overall qualifications of the nuclear staff.

Résumés of key personnel in the on-site organization are accessible per the instructions found in Table 13.1-2.

a) Plant Manager

Education: Should hold a recognized baccalaureate or higher degree in an engineering or scientific field generally associated with power plants.

Experience: Shall have ten years of responsible *power plant experience, of which three years shall be nuclear power plant experience. A maximum of four years of the remaining seven years of experience may be fulfilled by academic training on a one-for-one time basis. To be acceptable, this academic training shall be in an engineering or scientific field generally associated with power plants. Also, shall have acquired the experience and equivalent training normally required to be eligible for a Senior Reactor Operator's License, whether or not the examination is taken. If one or more persons are designated as principal alternates for the plant manager, and meet the experience and training requirements established for the plant manager, the requirements for the plant manager may be reduced such that only one of his/her ten years of experience need be*

nuclear power plant experience and that he/she need not be eligible for NRC examination.

b) General Manager-Maintenance

Education: Shall hold a recognized baccalaureate or higher degree in engineering or scientific field generally associated with power production.

Experience: Shall have ten *(seven) years of responsible power plant experience, a minimum of* three years *(one year) of which shall be nuclear power plant experience. A maximum of* four *(two) years of the remaining* seven *(six) years of experience may be fulfilled by academic or related technical training on a one-for-one time basis.* To be acceptable, this training shall be in an engineering or scientific field generally associated with power production. Also, shall have acquired the experience and equivalent training normally required to be eligible for a Senior Reactor Operator's License, whether or not the examination is taken. *He/she further should have nondestructive testing familiarity, craft knowledge, and an understanding of electrical, pressure vessel, and piping codes.*

c) Manager-Nuclear Operations

Education*:* Shall hold a high school diploma or equivalent.

Experience: Shall have eight years of responsible power plant experience of which a minimum of three years shall be nuclear power plant experience. A maximum of two years of the remaining five years of power plant experience may be fulfilled by satisfactory completion of academic or related technical training on a one-for-one time basis.

Certification: Shall meet one or more of the following: a) hold a SRO License or b) have been certified to have equivalent senior operator knowledge and the position qualification is in conjunction with the Assistant Operations Manager-Shift Operations who holds a SRO License (in accordance with SSES Technical Specification 5.2.2.f.).

d) Manager-Radiation Protection

Education: Shall *(should) hold a recognized baccalaureate degree or the equivalent in a science or engineering subject, including some formal training in radiation protection.*

Experience: Shall *(should) have five years of professional experience in applied radiation protection. (A master's degree may be considered equivalent to one year of professional experience, and a doctor's degree may be considered equivalent to two years of professional experience where course work related to radiation protection is involved.) At least three years of this professional experience* shall *(should) be in applied radiation protection work in a nuclear facility dealing with radiological problems similar to those encountered in nuclear power stations, preferably in an actual nuclear power station.*

e) General Manager-Work Management

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have eight years in responsible positions related to power generation, of which three years shall be nuclear power plant experience. A maximum of four years of the remaining five years of experience may be fulfilled by satisfactory completion of academic or related technical training.

f) Manager-Plant Chemistry/Environmental

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have five years experience in chemistry of which one year shall be in radiochemistry at an operating nuclear power plant. Two years of this five years experience shall be related technical training. A maximum of four years of this five years experience may be related technical or academic training.

g) Assistant Operations Manager-Shift Operations

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have eight years of responsible power plant experience of which a minimum of three years shall be nuclear power plant experience. A maximum of two years of the remaining five years of power plant experience may be fulfilled by satisfactory completion of academic or related technical training on a one-for-one time basis.

Certification: Shall meet one or more of the following: a) hold a SRO License or b) have been certified to have equivalent senior operator knowledge and the position qualification is in conjunction with the Manager-Nuclear Operations who holds a SRO License (in accordance with SSES Technical Specification 5.2.2.f.).

h) Assistant Operations Manager-Work Control

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have eight years in responsible positions related to power generation, of which three years shall be nuclear power plant experience. A maximum of four years of the remaining five years of experience may be fulfilled by satisfactory completion of academic or related technical training.

i) Shift Manager

Shall have the education, experience, training, and certification detailed in ANSI/ANS 3.1-1981, Section 4.3.1.1, "Supervisors Requiring NRC License: Shift Supervisor."

j) Unit Supervisor

Shall have the education, experience, training, and certification detailed in ANSI/ANS 3.1-1981, Section 4.3.1.2, "Supervisors Requiring NRC License: Senior Operator."

k) Licensed Operator

Shall have the education, experience, training, and certification detailed in ANSI/ANS 3.1-1981, Section 4.5.1.2, "Licensed Operators."

l) Non-Licensed Operator

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have two years of power plant experience and should possess a high degree of manual dexterity and mature judgment. One year shall be nuclear power plant experience. At least six months of the nuclear experience shall be at the plant for which he/she seeks a license unless his/her nuclear experience was acquired on a similar unit. Six months credit may be granted toward the experience requirement for individuals whose related technical training or relevant experience may warrant such credit.

m) Shift Technical Advisor

Shall have the education, experience, training, and certification detailed in ANSI/ANS 3.1-1981, Section 4.4.8, "Shift Technical Advisor." In addition, Shift Technical Advisors shall meet the qualifications specified by the Commission Policy Statement on Engineering Expertise on Shift.

n) Supervisor-I&C Crews

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have five years of experience in instrumentation and control, of which one year shall be in nuclear instrumentation and control at an operating nuclear power plant. Two years of this five years experience shall be related technical training. A maximum of four years of this five years experience may be fulfilled by related technical or academic training.

o) Foreman and Assistant Foreman: Electrical Repairs, Radiation Protection, I&C, Mechanical Repairs

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have four years of experience in the craft or discipline he/she supervises.

p) Technician: Radiation Protection, I&C

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have three years of working experience in their specialty of which one year should be related technical training. They should possess a high degree of manual dexterity and ability and should be capable of learning and applying basic skills.

q) Mechanic

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have three years of working experience in one or more crafts. Should possess a high degree of manual dexterity and ability and should be capable of learning and applying basic skills in maintenance operations.

r) General Manager-Operations

Education: Shall hold a recognized baccalaureate or higher degree in engineering or scientific field generally associated with power production.

Experience: Shall have ten years of responsible power plant experience, of which three years shall be nuclear power plant experience. A maximum of four years of the remaining seven years of experience may be fulfilled by academic training on a one-for-one time basis. To be acceptable, this training shall be in an engineering or scientific field generally associated with power production.

s) General Manager-Programs

Education: Shall hold a recognized baccalaureate degree.

Experience: Shall have ten years experience, including a minimum of 5 years nuclear-related experience in responsible supervisory positions.

t) Manager-Performance Improvement

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have eight years in responsible positions, of which three years shall be nuclear power plant experience. A maximum of four years of the remaining five years of experience may be fulfilled by satisfactory completion of academic training.

u) Manager-Nuclear Security

Education: Shall hold a high school diploma or equivalent.

Experience: Should have eight years experience in management or supervisory positions, two of those years should be in security related fields.

v) Manager-Nuclear Training

Education: Shall hold a recognized baccalaureate degree.

Experience: Shall have eight years in responsible positions, of which three years shall be nuclear power plant experience. A maximum of four years of the remaining five years of experience may be fulfilled by satisfactory completion of academic training.

w) Manager-Nuclear Maintenance

Education: Shall hold a high school diploma or equivalent.

Experience: Shall have seven years of responsible power plant experience, a minimum of one year of which shall be nuclear power plant experience. A maximum of two years of the remaining six years of experience may be fulfilled by academic or related technical training on a one-for-one time basis. He/she further should have nondestructive testing familiarity, craft knowledge, and an understanding of electrical, pressure vessel, and piping codes.

x) Supervisor-Reactor Engineering

Education: Shall hold a recognized baccalaureate or higher degree in engineering or a related physical science.

Experience: Shall have four years of experience or a graduate degree and three years of experience. Two of these years shall be nuclear power plant experience. The experience shall be in such areas as reactor physics, core measurements, core heat transfer, and core physics testing programs. Successful completion of a reactor engineering training program (such as the twelve-week concentrated programs offered by NSS vendors) may be equivalent to one year's nuclear power plant experience.

13.1.3.1.1 Qualifications of Personnel Who Cannot Be Directly Cross-Referenced to ANSI/ANS 3.1-1978

Personnel filling positions that cannot be directly cross-referenced to corresponding positions in ANSI/ANS 3.1-1978 have that combination of education, experience and skills commensurate with their functional level of responsibility which provides assurance that decisions and actions during normal and abnormal conditions will be such that the plant is operated in a safe and efficient manner.

13.1.3.2 Qualifications of Incumbent Plant Personnel

Résumés of key personnel in the on-site organization are accessible per the instructions found in Table 13.1-2.

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Table 13.1-1

Resumes of Key Personnel In Off-Site Organization

The résumés of the personnel who occupy the positions listed below are maintained as separate records. Refer to NDAP-QA-0001 to determine how to locate the desired résumé.

- Chief Nuclear Officer
- Site Vice President
- General Manager-Nuclear Engineering
- Manager-Nuclear Design Engineering
- Manager-Nuclear Fuels and Analysis
- Manager-Nuclear Regulatory Affairs
- Manager-Nuclear Oversight
- Manager-Station Engineering
- Supervisor-Reactor Engineering
- Manager-Special Projects
- Manager-Engineering Programs

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Table 13.1-2

Resumes of Key Plant Personnel In OnSite Organization

The résumés of the personnel who occupy the positions listed below are maintained as separate records. Refer to NDAP-QA-0001 to determine how to locate the desired résumé.

- Plant Manager
- General Manager-Maintenance
- Manager-Nuclear Operations
- Manager-Nuclear Procurement
- Manager-Radiation Protection
- General Manager-Work Management
- Manager-Plant Chemistry/Environmental
- Assistant Operations Manager-Shift Operations
- Assistant Operations Manager-Work Control
- Shift Managers
- General Manager-Operations
- General Manager-Programs
- Supervisor-Corrective Action and Assessment
- Manager-Nuclear Security
- Manager-Nuclear Training

Table 13.1-3

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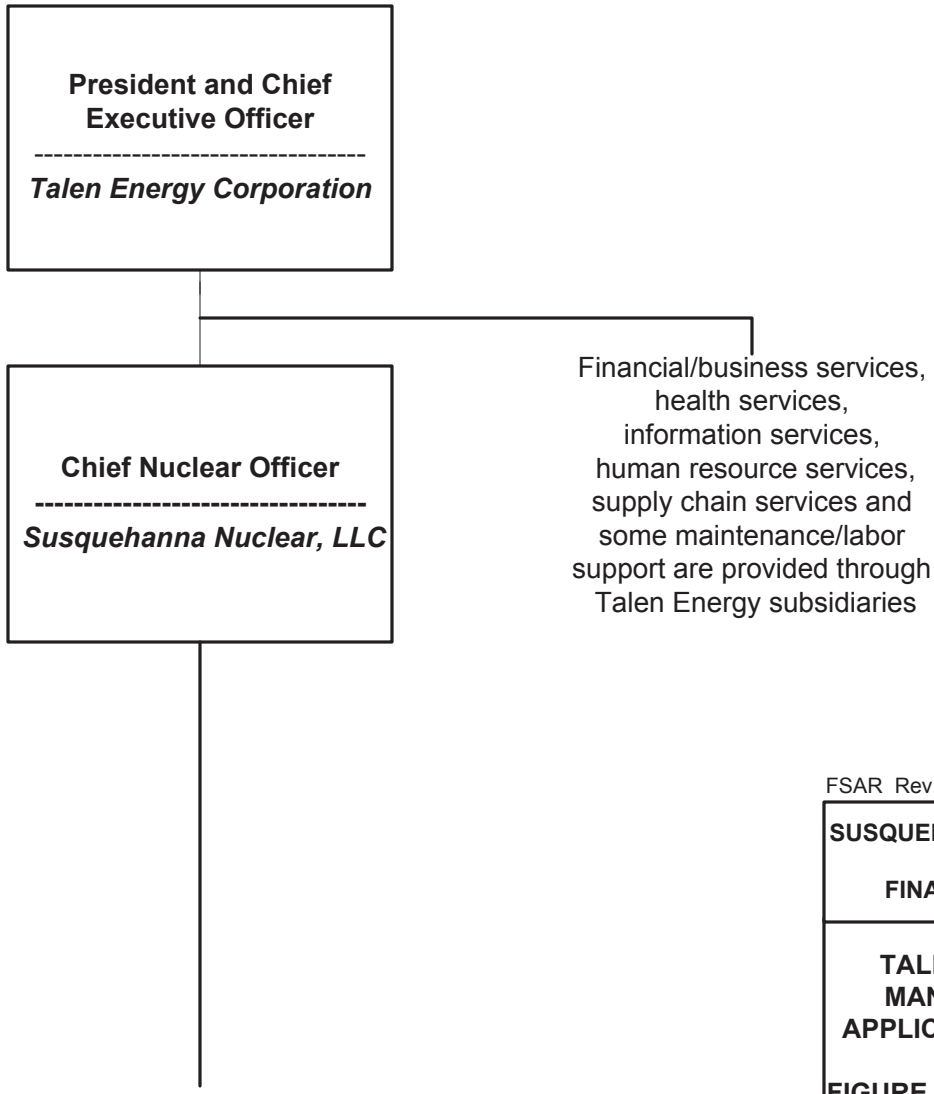


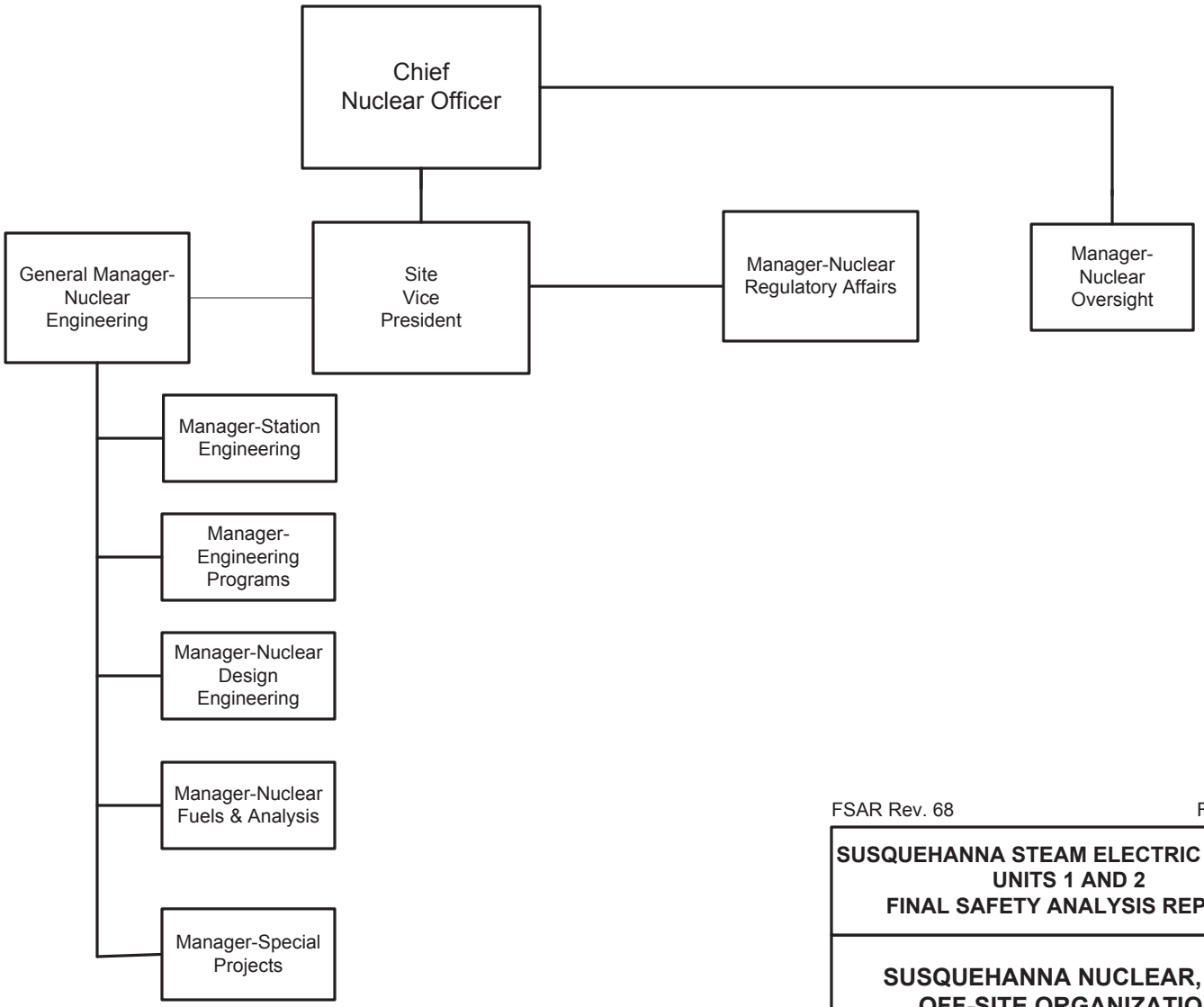
FSAR Rev. 68 Figure Rev. 64

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
FINAL SAFETY ANALYSIS REPORT

TALEN ENERGY CORPORATION
MANAGEMENT ORGANIZATION
APPLICABLE TO SUSQUEHANNA SES

FIGURE 13.1-1

PC F13-1-1.vsd



FSAR Rev. 68 Figure Rev. 70

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
FINAL SAFETY ANALYSIS REPORT

SUSQUEHANNA NUCLEAR, LLC
OFF-SITE ORGANIZATION

FIGURE 13.1-2

PC F13-1-2.vsd

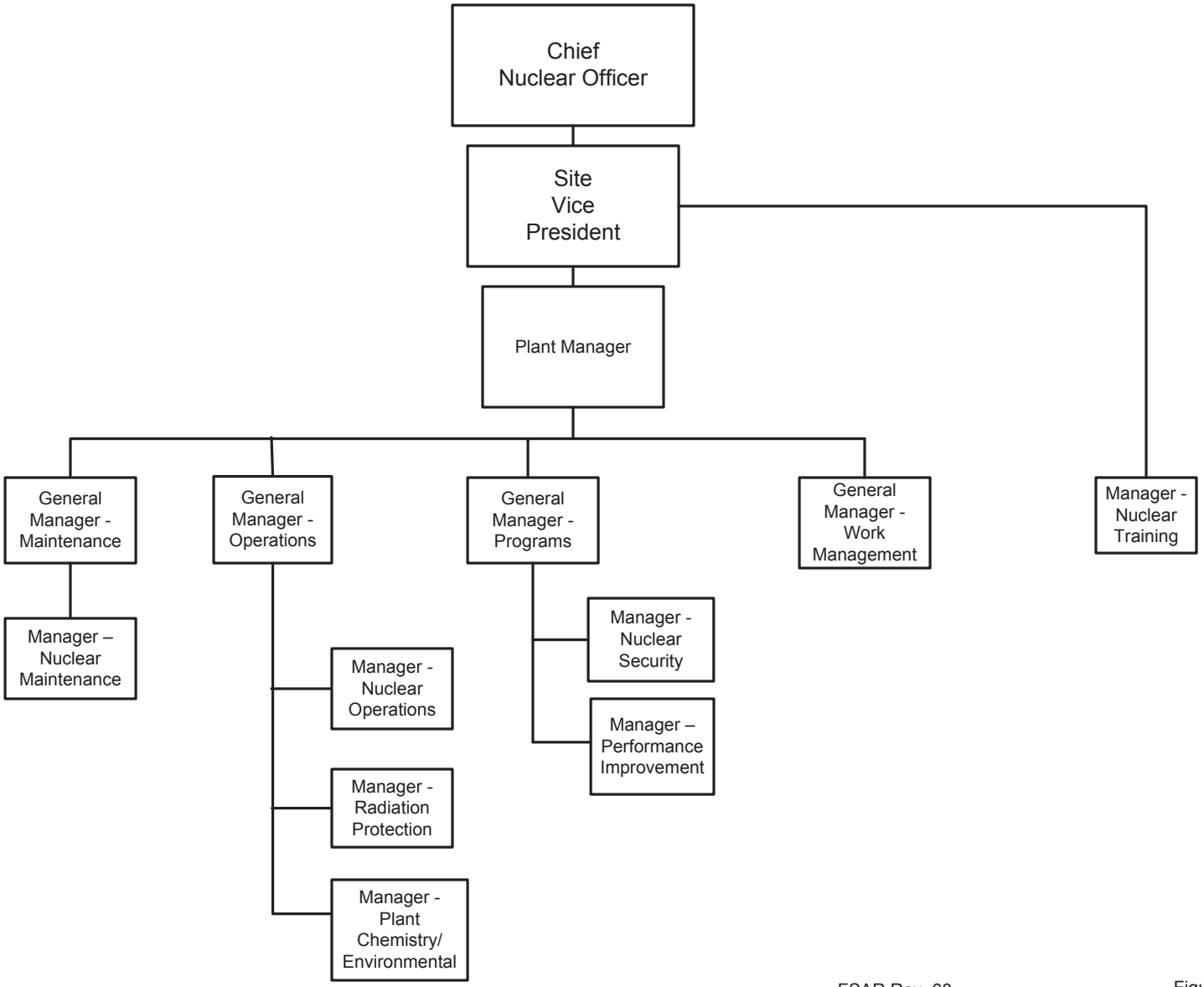


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Figure Rev. 69

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 AND 2
FINAL SAFETY ANALYSIS REPORT

SUSQUEHANNA NUCLEAR, LLC
ON-SITE ORGANIZATION

FIGURE 13.1-3

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SUSQUEHANNA STEAM ELECTRIC STATION
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FIGURE 13.1-4, Rev. 55

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SUSQUEHANNA STEAM ELECTRIC STATION
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FIGURE 13.1-5, Rev. 54

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FIGURE 13.1-1a, Rev. 54

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FIGURE 13.1-1b, Rev. 54

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FIGURE 13.1-2a, Rev. 54

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FIGURE 13.1-2b, Rev. 54

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FIGURE 13.1-2c, Rev. 54

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FIGURE 13.1-2d, Rev. 54

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SUSQUEHANNA STEAM ELECTRIC STATION
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FIGURE 13.1-2e, Rev. 54

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FIGURE 13.1-2f, Rev. 54

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FIGURE 13.1-2g, Rev. 54

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FIGURE 13.1-3a, Rev. 54

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FIGURE 13.1-3b, Rev. 54

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FIGURE 13.1-3c, Rev. 54

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FIGURE 13.1-3d, Rev. 54

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FIGURE 13.1-4a, Rev. 54

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FIGURE 13.1-4b, Rev. 54

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FIGURE 13.1-4c, Rev. 54

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FIGURE 13.1-4d, Rev. 54

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13.2 TRAINING PROGRAM

13.2.1 PLANT PERSONNEL TRAINING PROGRAM

The Training Program for the Susquehanna Steam Electric Station is formulated to develop and maintain an organization qualified to assume the responsibility for operation, maintenance, and technical considerations for the facility. In order to accomplish these objectives and to provide the necessary control of the overall plan, three separate training programs listed below are utilized:

a. Pre Licensing Training Program

b. Requalification/Continuing Training Program, and

c. Replacement Training

The Pre Licensing Training Program was designed to produce competent, trained personnel at all levels of the plant organization. The programs were designed to allow placement of personnel into specific levels based on employee experience and intended position.

The Requalification/Continuing Training Program provides continuing training for plant personnel commensurate with their area of responsibility.

The Replacement Training Program is designed to supply qualified personnel to fill vacancies that occur in the organization.

13.2.1.1 Pre Licensing Program Description

13.2.1.1.1 Initial Plant Staff Training

Initial plant staff were trained.

13.2.1.1.2 Operations Section Training Program

This program was designed for individuals who were to assume responsibility for the initial licensed and non licensed operator positions and fulfilled the general requirements and qualifications set forth in ANSI N18.1-1971. The program was structured to allow personnel of varying experience and education to enter the Cold Licensing Training Program at various levels and still fulfill the eligibility requirements for NRC cold licensing prior to fuel loading.

13.2.1.1.2.1 Initial Cold License Training

The program was designed for cold license candidates with no formal power plant experience or training. The program was divided into seven phases to ensure proper administration, documentation, and completeness of training.

- Phase I Conventional Power Plant Operator Experience Program.
- Phase II Academic Program for Nuclear Power Plant Personnel.
- Phase III Basic BWR Technology
- Phase IV BWR Simulator Training
- Phase V BWR Observation Training
- Phase VI Systems, Procedures and On-The-Job Training
- Phase VII BWR Refresher Training
- Phase VIII Dual Unit License Training

Those plant control operator license candidates with no power plant experience participated and qualified in all eight phases, while those with only a conventional power plant background participated and qualified in Phases II through VIII. Operators, and other staff members, who we've cold licensed with a nuclear background and/or related academic or technical training participated and qualified in selected portions of phases II through VI and all of Phase VII and Phase VIII. The extent of their participation in Phases II through VI was based on their background and documented in station training records.

- Phase I - Conventional Power Plant Experience Program

  The Conventional Power Plant Experience Phase of the Susquehanna SES Training Program was designed to provide power plant experience to those license candidates who lacked the minimum power plant experience requirements. This experience was to be provided prior to the start of the formal License Training Program (Phases II-VIII), so that by the time of the Nuclear Regulatory Commission Licensing Examination, the candidate had two years of power plant experience of which a minimum of one year had been nuclear power plant experience. This program was approximately one year in duration and included supervised on-the-job training in major operator positions (excluding fossil boiler related positions) at a PP&L conventional power plant. Also included in the one year experience program were approximately ten weeks of formal classroom training which included but was not limited to the following areas:

  Basic Power Plant Operation
  Steam Turbine Fundamentals
  Power Plant Mathematics
  Basic Thermodynamics and Fluid Mechanics
  Plant Cycle and Plant Performance
  Basic Electrical and Plant Instrumentation
  Basic Print Reading
  Basic Water Chemistry
  Introduction to Nuclear Power and Nuclear Plant Systems

- Phase II - Academic Program for Nuclear Power Plant Personnel

This course was conducted by the General Physics Corporation of Columbia, Maryland. It was designed to refresh basic courses received in high school and to acquaint those personnel, with little or no nuclear background, with nuclear phenomenon and the BWR concept as they apply to practical reactor technology. The course material and the approximate number of classroom hours allotted to each major topic were as follows:

Subject	Classroom Hours
First Segment – Mathematical and Classical Physics	200
Review of Introductory Mathematics	16
Exponents and Logarithms	36
Algebra	64
Geometry and Trigonometry	24
Mathematics of Dynamic Systems	20
Classical Physics	40
Second Segment – Physics	200
Atomic Physics	24
Nuclear Physics	60
Reactor Core Physics	68
Reactor Operations	48
Third Segment – Related Technologies	200
Introduction to Nuclear Power Plant Systems	28
Chemistry	28
Health Physics	56
Fundamentals of Electricity and Electronics	48
Nuclear Instrumentation	40
Fourth Segment – Nuclear Power Plant Technology	200
Theory and Application of Nuclear Power Plant Systems	88
Physics Review	56
Overall Nuclear Power Plant Operations	56
	800

Cold license applicants, with no previous nuclear experience, were assigned to a Research Reactor Training Course conducted by the Pennsylvania State University. This 2-week, course gave the student actual hands-on experience with an open pool nuclear reactor and allowed the cold license applicant to obtain at least the minimum of 10 reactor startups necessary to establish cold license eligibility requirements. The course included, but was not limited to, the following subject material:

- Reactor Operations
- Fuel Handling
- Flux Mapping
- Normal Reactor Operation
- Instrumentation Effects
- Control Rod Calibration
- Laboratory Demonstrations, and
- Control Transient Effects

- Phase III - Basic BWR Technology

  The Basic BWR Technology course was designed to impart the details of the BWR nuclear steam supply system to the operator trainees. The course consisted of approximately 5 weeks of classroom lecture on BWR nuclear steam supply system components, fuel description, thermal-hydraulics, radiation monitoring and nuclear instrumentation system operations. Important interfaces with the balance of plant systems were also taught.

  The lectures were presented by GE BWR Training personnel using conventional classroom techniques. Classes were scheduled for approximately 7 hours per day and suggested study assignments were normally made daily. Progress was measured by weekly written and final comprehensive examinations.

  The course material covered was typically as follows.

  Schedule changes and adjustments to course content were made as necessary to meet the particular needs of the students.

  Week 1

  Introduction to Course
  Plant Orientation
  Reactor Principles Review
  Reactor Vessel and Internals
  BWR Thermal Hydraulics Review
  Fuel Description
  Nuclear Boiler Instrumentation

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Week 2

Examination 1
Control Rod Drive Mechanism
Control Rod Drive Hydraulic System
Rod Control and Information System
Rod Pattern Control System

Recirculation System
Recirculation Flow Control System
Reactor Water Cleanup System
Source Range Monitoring System
Intermediate Range Monitoring System
Local Power Range Monitoring System
Average Power Range Monitoring System

Week 3

Examination 2
Traversing In-Core Probe System
Main Steam System
Reactor Pressure Control (Electro-Hydraulic Control)
Feedwater Control System
Reactor Protection
Containment and Related Systems
Introduction to Radwaste Systems(Off Gas,
Liquid and Solid Radwaste)

Week 4

Examination 3
Introduction to Electrical Distribution
Reactor Core Isolation System
Introduction to Emergency Core Cooling System
High Pressure Core Spray System
Auto Depressurization System
Low Pressure Core Spray
Residual Heat Removal System
Emergency Core Cooling Systems Integrated Response
Standby Liquid Control System
Process Radiation Monitoring
Area Radiation Monitoring

Week 5

Examination 4
Performance Monitoring System
BWR Materials
BWR Chemistry
Fuel Pool Cooling System

Reactor Refueling
Plant Operations
Transient Analysis
Review
Final Examination

- Phase IV - BWR Simulator Training

The BWR simulator course was taught at the General Electric BWR Training Center, Morris, Illinois, and was designed to provide the operator trainee with the skills necessary to safely operate a large Boiling Water Reactor power plant.

The course consisted of approximately 12 weeks of classroom lectures, simulator control room exercises, and in-plant oral seminars. This combination of instructional techniques afforded the optimum mixture for successful skill training. The final examination consisted of written, control room performance, and plant oral examinations.

Lectures and exercises were presented and guided by qualified, GE BWR Training Personnel. Classroom lectures were scheduled for approximately 8 teaching hours per day. Suggested reading and study assignments were made daily; written examinations were given weekly to monitor progress. In addition, at approximately the mid-point of the course, oral examinations were given to monitor the progress of each student's skill acquisition. The control room portion of the course was normally accomplished on night shifts of 8 hours. Four hours were spent in the simulator control room (total approximately 112 hours) with exercises and demonstrations guided by the licensed instructor. The other 4 hours were devoted to oral seminars. Each student rotated to appropriate control room operating positions, including shift supervisor, so that all personnel had equal opportunity to perform plant evolutions from each operating position.

The following is typical week-by-week schedule of the course. Schedule changes and adjustments to course content were made as necessary to meet the particular needs of the students.

Week 1

Introduction to the BWR Training Center
Reactor Vessel and Internals
Reactor Fuel
Nuclear Boiler Instrumentation
Control Rod Drive Mechanism
Control Rod Drive Hydraulics
Reactor Manual Control
Recirculation System
Recirculation Flow Control
Reactor Water Cleanup System
Shutdown Cooling and Head Spray
Source Range Monitoring (SRM)
Intermediate Range Monitoring (IRM)

Local Power Range Monitoring (LPRM)
Average Power Range Monitoring (APRM)
Rod Block Monitor

Week 2

Week 1 Examination
Traversing In-Core Probe (TIP)
Rod Worth Minimizer (RWM)
Main Steam
Turbine and Lube Oil System
Electro-Hydraulic Control System (EHC)
EHC Pressure Control and Logic
Condensate and Feedwater
Feedwater Control
Circulating Water
Generator and Auxiliaries
Generator Excitation
AC Electrical Distribution
Diesel Generators and DC Electrical Distribution
Reactor Protection System (RPS)
Primary and Secondary Containment

Week 3

Week 2 Examination
Fuel Pool Cooling and Cleanup
Off Gas System
Liquid Radwaste
Water Systems
Isolation Condenser
Introduction to Emergency Core Cooling System (ECCS)
High Pressure Coolant Injection (HPCI)
Automatic Depressurization System (ADS)
Low Pressure Coolant Injection (LPCI)
Core Spray
Emergency Core Cooling System Integrated Response
Standby Liquid Control
Process Radiation Monitoring
Area Radiation Monitoring
Reactor Physics Review

Week 4

Pre-Start and Functional Checks
Reactor Startups
Heatups
Manipulation of Auxiliary Systems
Power Changes in the Intermediate Range
Surveillance Testing

Transfer to Run Mode
Turbine Warmup and Roll

Week 5

Reactor Heatup and Transfer to Run Mode
Turbine Roll
Generator Synchronization and Loading
Surveillance Testing
Continued Loading to 100% Power
Operations at Full Power
Transient Analysis
Quiz 1
Maneuvering by Flow Control
Reactor Shutdown
Discussion on Decay Heat Operation and Removal
Plant Problems
Drills on Abnormal and Emergency Conditions

Week 6

Pre-Startup and Functional Checks
Reactor Startups and Heatups
Manipulation of Auxiliary Systems
Plant Problems
Drills on Abnormal and Emergency Conditions
Power Changes in the Intermediate Range
Surveillance Testing
Transfer to Run Mode
Turbine Warmup and Roll
Operator Synchronization and Loading
Quiz 2
Mid-Course Performance Examination

Week 7

Technical Specifications Bases Review
Review Certification Exam Format and Content
Physics Problem Solving
Mid-Course Control Room Checks
Solid Radwaste
Health Physics Review
BWR Chemistry
Thermal-Hydraulics
Process Computer
Circuit Breaker Control
Fuel Handling and Fuel Loading Physics

Week 8

Steady-State Operation at 50% Load
Surveillance Testing
Increase to Full Load
Drills on Abnormal and Emergency Conditions
Operations at Full Power
Maneuvering by Flow Control
Begin Reactor Shutdown
Reactor Shutdown and Cooldown
Flooding of Reactor Vessel
Plant Problems
Reactor Startups and Heatups
Scram and Scram Recoveries

Week 9

Operation at Full Load
Drills in Abnormal and Emergency Conditions
Shutdown to Hot Standby
Quiz 3
Plant Startup from Hot Standby to Full Power
Reactor Heatup
Generator Synchronization and Loading

Week 10

Operation at 50% Load
Scrams and Scram Recoveries
Surveillance Testing
Operation at Full Power
Drills
Individual Student Operations
Quiz 4
Transient Analysis Review

Week 11

Review and Study
Reactor Operator Certification Examination

Week 12

Control Room and Dresden Plant Oral Examination
Control Room Performance Demonstration
Senior Reactor Operator Certification Examination

- Phase V - BWR Observation Training

  BWR observation training was designed to acquaint the operator trainee with the day-to-day routine of an operating BWR. This involved exposure to plant operating and maintenance evolutions, station record keeping, and procedures. The course consisted of approximately 4 weeks of guided observation of an operating BWR. All observation was conducted under the guidance of experienced GE training personnel.

  The course was structured to provide experience in various aspects of plant operation. Flexibility was achieved by allowing the course director to adjust the group schedule to fit important plant evolutions. Daily work and observational assignments were made at the beginning of each work day.

  The following are weekly highlights of a typical BWR observation schedule:

  Week 1

  Plant Evacuation Procedures/Station Emergency Plan
  Health Physics Procedures
  Electrical Distribution
  Reactor Instrumentation
  Control Rods and Hydraulic Drive System
  Recirc MG set, support systems, and controls
  Main Steam System Controls and Instrumentation
  Residual Heat Removal System - All Modes

  Week 2

  Turbine, EHC System, and Turbine Support Systems
  Generator, Generator Excitation, and Generator Support Systems
  Turbine and Reactor Building Closed Cooling Water System
  Circulating and Service Water Systems
  Fire Protection Systems
  Core Spray System

  Week 3

  High Pressure Coolant Injection System
  Reactor Core Isolation Cooling System
  Reactor Protection MG sets
  Automatic Depressurization System
  Traversing In-core Probe System
  Neutron Monitoring and Associated Control Systems
  Radioactive Waste Handling Equipment and Procedures
  Performance of Routing Plant Equipment Checks

Week 4

Instrument and Service Air Systems
Process and Area Radiation Monitoring Systems
Fuel Pool Cooling System
Standby Liquid Control System
Plant Performance Logs
Observance of Routine Plant and/or Surveillance Procedures In Progress Review
Final Exam and Walk-Through

- Phase VI - SYSTEMS, PROCEDURES, AND ON-THE-JOB TRAINING

The systems, procedures, and on-the-job training phase was approximately 20 weeks in length of which a minimum of 8 weeks was to be class room instruction.

However, the weeks were not to be scheduled consecutively due to plant testing and work load considerations. This phase provided cold license candidates with an in-depth study of Susquehanna SES systems and equipment; nuclear characteristics; and Normal, Abnormal, Emergency and Administrative Procedures and Technical Specifications. Further operational training was accomplished as components, systems, or parts of systems were checked, tested, and placed in routine operation to provide necessary auxiliary support for other systems.

Instructors for the various Phase VI lectures were supplied by the Susquehanna staff, other PP&L organizations, vendors or consultants. Selections of the particular individual to conduct a specific training lecture was based upon individual availability and knowledge of the subject matter involved.

The course consisted of, but was not be limited to:

a. Theory and principles of operations
b. General and specific plant operating characteristics
c. Plant instrumentation and control systems
d. Plant protection, safety and emergency systems
e. Normal, abnormal and emergency operating procedures
f. Radiation control and safety
g. Technical Specifications
h. Applicable portions of Title 10, Chapter 1, Code of Federal Regulations
i. Reactor Theory
j. Handling, disposal and hazards of radioactive materials
k. Fuel handling and core parameters
l. Administrative procedures, conditions and limitations - A comprehensive examination will be given during this phase to determine student weak areas.

- Phase VII - BWR Pre-License Refresher Training

  Prior to the initial NRC Operator Licensing examination, a Pre-License Refresher Course was conducted. This course was to be presented by PP&L employees or by outside personnel, and was a summary and review of material presented in previous phases. When necessary an update of plant modifications and training to upgrade any identified weak areas was presented.

- Phase VIII - Dual Unit License Training

  Prior to issuance of the facility operating license for Unit 2 a training course covering the aspects of a dual unit operator/senior operator license was taught. This course included the design and procedural differences between Unit 1 and Unit 2, the common and cross-connected systems between units, and the philosophy of dual unit operation, particularly in unusual and emergency situations.

13.2.1.1.2.2 Non-Licensed Operator Training Program

The program was designed for non-licensed operators and was divided into three phases which provide a logical progression from the entry level to final job qualification.

- Phase I - Academic Training
- Phase II - Susquehanna SES System Lectures
- Phase III - Susquehanna SES System Qualification

This training was progressive and candidates for non-licensed positions had to successfully complete the training appropriate to their assigned job. Phase I may be exempted by passing a written exam.

- Phase I - The course consisted of basic training in Nuclear Power Plant Fundamentals. The program was about 160 hours long and consists of classroom training or equivalent self-study time. The areas covered included such subjects as math, chemistry, atomic and nuclear physics, health physics, nuclear instrumentation and reactor operations. Progress was measured by periodic quizzes and examinations.

- Phase II - This phase consisted of basic lectures on Susquehanna SES systems and covered, as applicable, the following areas of each system:

  General System Description
  Major Components and Flow Paths
  Instruments and Controls
  Alarms and Trips
  Power Feeds
  Operating and Emergency Procedures

Phase II was approximately 4 weeks in length and during each week, approximately 80% of the time was spent in class and the remaining 20% was spent in the plant tracing systems. There were weekly quizzes and a final exam at the end of the course.

- Phase III - This phase was completed by operators on the systems for which they were responsible. This phase took about 10 weeks to complete. However, the 10 weeks were not necessarily consecutive due to work-load considerations. Operators were checked out on each system to assure they could operate these systems under normal, abnormal, and emergency situations. The check out consisted of an oral and/or written test on each system.

13.2.1.1.3 Maintenance Section Training Program

The Supervisor of Maintenance received Level III Health Physics training, selected training in plant systems operation and specialized vendor training on specific plant equipment.

Foremen received additional experience on-the-job during the preoperational test program through the supervision of maintenance activities.

Station Mechanics and Leaders for the initial plant staff were generally selected from other PP&L facilities and had practical experience in one or more crafts, and through their previous experience and/or selection testing, demonstrated a high degree of manual dexterity and capability of learning and applying the basic skills in maintenance operations.

Maintenance personnel received on-the-job training during the preoperational test program by performing maintenance activities. Selected personnel received specialized vendor training on specific equipment or skills such as control rod drive repair and welding.

Maintenance personnel requiring access to Radiation Work Permit Areas received Level II Health Physics training.

13.2.1.1.4 Technical Section Training Program

The objective of the initial training program of the Technical Section was to provide competent personnel to support in the safe, efficient operation of the Susquehanna SES.

Selected supervisory and professional/technical personnel attended GE's Design Orientation courses (or other formal instruction with a similar intent) to familiarize them with the design principles of a BWR. The major topics covered included BWR components, core design, thermal-hydraulics, process and nuclear instrumentation design and operation and auxiliary systems.

13.2.1.1.4.1 Chemistry Personnel

In addition to those courses described in Subsection 13.2.1.1.4, selected chemistry supervisory personnel received specialized training through a course such as "BWR Chemistry" offered by

GE. The course enabled students to complete both radiological and chemical analyses for process control, waste disposal, effluent monitoring, process and laboratory instrument calibration and evaluation. The course also covered compliance with and interpretation of chemical and radiochemical aspects of the technical specifications, licenses and plant warranties.

The Chemistry Leaders and Chemistry Analysts received in-house training as developed by supervisory chemistry or other appropriate personnel, covering topics similar to those in the "BWR Chemistry" course. As appropriate, they also attended vendor-sponsored training sessions to assure understanding and proper operation of laboratory instruments. Progress was measured through oral and/or written examinations.

13.2.1.1.4.2 Instrumentation & Control Personnel

In addition to those courses described in Subsection 13.2.1.1.4, appropriate I&C supervisory personnel and selected I&C technicians attended the GE "Nuclear Instrumentation" and "Process Instrumentation and Controls" courses or other formal instruction with similar intent.

The "Nuclear Instrumentation" course was broken into classroom and laboratory phases. The classroom phase covered the theory of operation and equipment demonstrations for the GE BWR nuclear, process and area radiation monitoring, control rod position information, reactor protection and traversing incore probe systems. The laboratory phase taught detailed circuitry study, setup, calibration, testing, maintenance and repair for the various components of these systems and where possible for the overall system.

The "Process Instrumentation and Control" course taught the theory of operation, setup, calibration, testing, maintenance and repair techniques for the basic instrumentation and control loop components for the GE BWR. Components covered included level, temperature, electrical properties, movement, chemical properties, sensing devices, transmitters, power supplies, signal conditioning modules and controllers. Primary instrument control loops were also studied. I&C technicians also received training covering topics such as AC/DC circuit fundamentals, transistor circuits, solid state devices and operational amplifiers and including "hands-on" experience with electrical and electronic circuits and components. As necessary, I&C personnel attended courses offered by equipment vendors on various plant components.

Progress was measured through oral and/or written examinations.

13.2.1.1.4.3 Reactor Engineering Personnel

In addition to the courses described in Subsection 13.2.1.1.4, selected Reactor Engineering personnel received training through a course such as GE's "Station Nuclear Engineering." The course covered topics like reactor behavior, control rods, shutdown margins, technical specifications and Fuel Warranty Operation Provisions, core flow and thermal limit calculations, fuel failure and PCIOMR and water chemistry among others.

Progress was to be measured through oral and/or written examinations.

Text Rev. 54

13.2.1.1.5 Health Physics Training Program

Selected Health Physics supervisory personnel received specialized professional training in a course such as "Radiological Engineering" offered by GE or equivalent. Health Physics Technician Training Program is described in Subsection 12.5.3.7.

13.2.1.1.6 General Employee Training

All permanent plant personnel granted unescorted vital area access at the station were trained in the following areas:

1. Appropriate plans and procedures, including applicable plant security and emergency procedures.

2. Radiological Health and Safety in accordance with Subsection 12.5.3.7.

3. Industrial Safety.

4. Fire Protection Program.

5. Quality Assurance Program.

This training is the responsibility of the Nuclear Training Group. Personnel will be examined in the above areas to determine the effectiveness of general employee training.

Temporary Maintenance and Service personnel were trained in the areas listed to the extent necessary to assure safe execution of their duties.

13.2.1.1.7 Fire Safety Training

FPRR Section 1.4 addresses the Fire Protection Staff and Training, Fire Safety Training, and Fire Brigade Training.

13.2.2 REQUALIFICATION/CONTINUING AND REPLACEMENT TRAINING

13.2.2.1 Licensed Operator Requalification Program

The purposes of the licensed operator requalification program are:

- Help maintain Susquehanna SES plant operational safety and reliability.

- Assure that Susquehanna SES licensed personnel maintain the high level of skill and knowledge required to accomplish routine and emergency duties.

- Establish a system for evaluating and documenting licensed operator proficiency and competency.

Text Rev. 54

The Susquehanna SES licensed operator requalification training program shall be conducted on a two (2) year cycle. Upon completion of each two year requalification training program another two year requalification training program shall commence. The Susquehanna SES licensed operator requalification training program is divided into three (3) major segments: a preplanned lecture series, operational training, and evaluation.

13.2.2.1.1 Curriculum

The Susquehanna SES Licensed Operator Requalification Training Program is based on a Systematic Approach To Training (S.A.T.) model.

13.2.2.1.2 Evaluations

Evaluation of skills and knowledge of licensed individuals shall be performed periodically. Comprehensive requalification written examinations and an annual operating test shall be administered under the supervision of the Nuclear Training Group. Written requalification examinations shall cover the knowledge required of a reactor operator or senior reactor operator. Emphasis should be placed on evaluating the topics covered in the training program. An overall grade of 80% is required for satisfactory performance. Annual operating examinations shall be conducted for each shift. These examinations shall be conducted in accordance with nuclear training instructions covering such examinations.

13.2.2.1.3 Accelerated Retraining

Accelerated retraining for failures on the annual examinations shall be conducted as appropriate. Special retraining programs shall be developed to correct deficiencies detected in individuals who do not satisfactorily complete the written or operating examinations. Failure of the requalification examination shall require removal from the shift duties until such time as retraining and re-examination in the categories that were failed is completed satisfactorily.

13.2.2.1.4 Absence from Licensed Duties

To maintain an Active License, the licensee shall actively perform the function of an Operator or Senior Operator a minimum of seven eight-hour or five twelve-hour shifts per calendar quarter and have satisfactorily completed the previous year's Requalification Training Program.

To maintain an Inactive License, a licensed individual must complete the requirements of the Licensed Requalification Training Program.

Return to Active License status is accomplished in accordance with 10CFR55.53.

13.2.2.1.5 Disability of Licensed Individuals

If any licensed or senior licensed individual suffers a sickness, injury, or decline in general health and physical condition, which might cause impaired judgement or motor coordination,

the Personnel and Administrative Supervisor shall inform the Nuclear Regulatory Commission Region I Administrator within thirty (30) days.

13.2.2.2 Continuing Training for Non-licensed Personnel

As a minimum, non-licensed personnel shall receive Continuing Training described below.

13.2.2.2.1 Continuing Training for Non-licensed Operators

Non-licensed operators assigned on shift will participate in a continuing training program, for which the content and evaluation criteria will be determined by a Systematic Approach to Training.

13.2.2.2.2 Continuing Training for Technical Personnel

A Continuing Training program is provided for technical personnel to ensure that they remain proficient in their particular job. Training in specific areas is provided to the extent necessary for personnel to safely and efficiently carry out their assigned responsibilities in accordance with established policies and procedures.

Such training may consist of vendor presentations, technical training sessions, on-the-job work experience or programmed instruction.

13.2.2.2.3 Continuing Training for Engineering Support Personnel

Continuing Training will be provided to maintain an individual's level of expertise equal to or exceeding that required by his or her job responsibilities.

13.2.2.3 Replacement Training

Replacement training is designed to supply qualified personnel for all levels of the plant organization. Replacement individuals will receive training appropriate to the new position. Technical replacement personnel are trained in accordance with a systematic approach to training.

13.2.2.3.1 NRC Licensed Operator Replacement

Personnel selected for assignments as licensed operators are provided training that prepares them for eventual NRC licensed operator positions through a systematic approach to training.

Text Rev. 54

13.2.2.3.2 Non-licensed Operator Replacement Training

Replacement training program for non-licensed operators follows the systematic approach to training.

13.2.2.3.3 Technical Personnel Replacement Training

Replacement training is designed to supply qualified personnel for all levels of the organization.

The replacement training program for Technical personnel follows the systematic approach to training and includes:

Electrical Maintenance Personnel
Mechanical Maintenance Personnel
Health Physics Technicians
Chemistry Technicians
Instrument and Control Technicians

13.2.2.3.4 Engineering Support Personnel Replacement Training

Replacement training is designed to assure fully qualified personnel for all levels of the Engineering organization.

13.2.2.4 Records

Training records are established for each permanent plant employee. These records include, attendance records, and other records as may be required to adequately document all training received by station personnel.

Training records will be periodically reviewed to assess the effectiveness of the training program.

13.2.2.5 Responsible Individual

The Manager Nuclear Training is responsible for the administration and conduct of the Susquehanna SES training program.

13.3 EMERGENCY PLANNING

The emergency plan for the Susquehanna SES has been submitted as a separate document.

13.4 REVIEW AND AUDIT

Note: Implementation of the Improved Technical Specifications has placed the information contained in Section 13.4 into the scope of the Operational Quality Assurance Program. Therefore, any changes to Section 13.4 require evaluation under 10CFR50.54(a).

13.4.1 PLANT OPERATIONS REVIEW COMMITTEE

The Plant Operations Review Committee (PORC) shall be functional throughout the life of the plant to advise the Plant Manager on matters related to nuclear and environmental safety as described in Subsection 13.4.1.3.

13.4.1.1 Organization

The PORC shall be composed of a Chair and five to ten members of the Susquehanna Nuclear, LLC management staff at the manager level or above. This includes individuals filling one of the manager positions described in subsections 13.1.1.1.3 or 13.1.2.2, individuals who meet or exceed the minimum experience, education and qualification requirement for one of the positions described in ANSI/ANS 3.1-1978 (paragraphs 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.3, 4.4.5 or 4.6.1) or for the position described in NRC Reg. Guide 1.8, Rev. 1-R, 9/75, Section C). The Plant Manager will designate these positions in station administrative procedure(s). As minimum, representatives from the operations, maintenance, health physics, chemistry and engineering organizations shall be appointed to PORC.

Substitute Chairs

Should the Chair be unable to attend a meeting, the Plant Manager or other individual designated in writing by the Plant Manager shall serve as Substitute Chair. A Substitute Chair has all responsibility and authority of the PORC Chair.

Alternate Members

The Plant Manager shall appoint, in writing, alternate members who shall serve on a temporary basis; however, alternate members, including any Substitute Chair, who are voting participants in PORC shall hold a minority vote in all PORC activities.

Quorum

A quorum of the PORC necessary for the performance of the PORC responsibility and authority provisions of FSAR Subsections 13.4.1.3 and 13.4.1.4 shall consist of the PORC Chair or designated Substitute Chair and a majority of the PORC-appointed members, including designated alternate members. However, the number of permanent appointed members (including the designated Chair, if present) who are participating as voting members shall hold a majority vote in all PORC activities.

13.4.1.2 Meetings

Meetings shall be held at least once per calendar month and as convened by the PORC Chair or designated Substitute Chair. The PORC shall maintain written minutes of each PORC meeting that, as a minimum, document the results of all PORC activities performed under the responsibility and authority provisions of Subsections 13.4.1.3 and 13.4.1.4. Copies of minutes from PORC meetings shall be sent to the Plant Manager, the Chief Nuclear Officer, and the Nuclear Safety Review Board (NSRB).

13.4.1.3 Responsibility

The PORC is responsible for the duties listed below:

1. Review of procedures, programs and changes thereto requiring approval by the Plant Manager as specified in Section 13.4.5 of the FSAR.

2. Review of all administrative procedures as described in Appendix A to Regulatory Guide 1.33, Rev. 2 (February 1978) and changes thereto, other than editorial or typographical changes.

3. Review of all proposed tests and experiments conducted under the provisions of 10 CFR 50.59 or 10CFR72.48.

4. Review of all proposed changes to the SSES Technical Specifications, i.e., Appendix A of the Unit 1 or Unit 2 Operating Licenses, and requests for enforcement discretion.

5. Review of evaluations for all proposed changes or modifications to facility systems or equipment completed under the provisions of 10CFR50.59 or 10CFR72.48. This review shall include a full description of the change or modification and its purpose, identification of all components directly or indirectly affected, safety functions of affected systems/components, and effects on safety functions.

6. Review of 10CFR50.59 or 10CFR72.48 evaluations for procedures, tests, or experiments, and changes thereto.

7. Review of investigation results for violations of the Unit 1 or Unit 2 Technical Specifications that require notification to the NRC under 10CFR50.73, including cause evaluation and recommendations to prevent recurrence.

8. Review of events requiring notification to the NRC under 10CFR50.72 or 10CFR50.73.

9. Review of facility operations to detect potential nuclear safety hazards.

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

11. Review of the Security Plan and changes thereto.

12. Review of the Emergency Plan and changes thereto.

13. Review of investigation results for every unplanned on-site release of radioactive material to the environs, including cause evaluation and recommendations to prevent recurrence.

14. Review of changes to the Process Control Program (PCP), Off-site Dose Calculation Manual (ODCM), and radwaste treatment systems.

15. Review of changes to the Technical Requirements Manual.

16. Review of Safety Limit Violation Reports prepared in accordance with TRM Section 4.3.1.2.

13.4.1.4 Authority

The PORC shall:

- Recommend in writing to Plant Manager the approval or disapproval of Items 1 through 6, 11, 12, 14 and 15 considered under Subsection 13.4.1.3.

- Render determinations in writing with regard to whether or not each item considered under Subsection 13.4.1.3, Items 1, 2, 3, 5, 6, and 15, requires prior NRC approval pursuant to 10CFR50.59.

- Render determinations in writing with regard to whether or not each item considered under Subsection 13.4.1.3, Item 4, involves a “no significant hazards” consideration as defined in 10CFR50.92.

- Provide written notification within 24 hours to the Plant Manager, Chief Nuclear Officer and the Nuclear Safety Review Board of any disagreement between the PORC and the Plant Manager; however, the Plant Manager shall have responsibility for resolution of such disagreements.

13.4.2 NUCLEAR SAFETY REVIEW BOARD

The Nuclear Safety Review Board (NSRB) was established and functional prior to initial fuel loading of Unit 1. This Committee shall verify that the operation of Susquehanna SES is performed in a safe manner consistent with Susquehanna Nuclear, LLC policy and rules, approved operating procedures, and license provisions.

The NSRB shall be chartered and shall review such areas as changes in the Technical Specifications, changes that may require prior NRC approval as determined through a 10CFR50.59 evaluation, and events that have been reported to the Nuclear Regulatory Commission (NRC) under 10CFR50.73. The NSRB shall be watchful for trends that are not obvious to the day-to-day observer.

13.4.2.1 Charter

The NSRB shall be controlled by a Charter which describes the membership, responsibilities, reporting requirements and areas to be reviewed. The Charter and any revisions shall be approved by the Chief Nuclear Officer.

13.4.2.2 Membership

The Nuclear Safety Review Board shall be comprised of at least eight, but not more than twelve, individuals.

The Chair, Vice Chair, and all members shall be appointed in writing by the Chief Nuclear Officer. Alternate members shall be appointed in advance in writing by the NSRB Chair, Vice Chair, or Chief Nuclear Officer. The alternates shall be involved only during legitimate absences of the principal members. No more than two alternates may participate as voting members at any one time.

The membership shall collectively possess experience and competence to review the following areas: plant operations, nuclear engineering, chemistry and radiochemistry, metallurgy, nondestructive testing, instrumentation and control, radiological safety, mechanical and electrical engineering, administrative controls, quality assurance and training, plus any other unique areas of Susquehanna SES that involve nuclear safety.

The NSRB Chair shall meet or exceed the qualification requirements of ANSI 3.1-1981, Section 4.7.1. Individual NSRB members providing independent review of the areas listed above shall meet or exceed the qualification requirements of ANSI 3.1-1981, Section 4.7.2. Per ANSI 3.1-1981, Section 4.1, exceptions to the educational requirements are permissible.

The NSRB membership shall have access to all aspects of Susquehanna SES operation, including files and personnel, to ensure its ability to independently review operational aspects of the plant. The NSRB membership shall be kept current on the happenings within areas of its responsibility, either through activities of its members or by reviewing reports submitted to the Chair.

13.4.2.3 Sub-Committees

Sub-committees may be used by the NSRB when required, to assist in review of technical or detailed matters. Establishment, duties, and membership of subcommittees shall be described in the NSRB Charter. Individuals functioning as subcommittee chairs shall meet or exceed the requirements of ANSI/ANS 3.1-1981, Section 4.7. Per ANSI 3.1-1981, Section 4.1, exceptions to the educational requirements are permissible.

13.4.2.4 Consultants

Consultants shall be used as determined by the NSRB Chair, Vice Chair, or Chief Nuclear Officer to provide expert advice to the NSRB.

13.4.2.5 Meeting Frequency

The NSRB shall meet at least once per calendar quarter during the initial year of each Unit operation following fuel loading and not less than twice a year thereafter.

13.4.2.6 Quorum

The quorum of the NSRB necessary for the performance of the NSRB review and audit functions pursuant to Subsection 13.4.2.8 and Subsection 13.4.2.9 shall consist of not less than a majority of all members, or designated alternates, and shall be subject to the following constraints: the Chair or designated alternate shall be present for all formal meetings and no more than a minority of the quorum shall have line responsibility for operation of the units.

13.4.2.7 Records

Records of NSRB activities shall be provided, approved and distributed as indicated below:

a. Minutes of each NSRB meeting shall be prepared, approved and forwarded promptly to the Chief Nuclear Officer following each meeting.

b. Reports of reviews encompassed by Subsection 13.4.2.8, below, shall be prepared, approved and forwarded promptly to the Chief Nuclear Officer and appropriate members of management having responsibility in the reviewed area following completion of the review.

c. Audit reports encompassed by Subsection 13.4.2.9, below, shall be forwarded to the Chief Nuclear Officer and to the management positions responsible for the areas audited within 30 days after completion of the audit by the auditing organization.

13.4.2.8 Responsibility

The NSRB shall be responsible for the review of:

a. 10CFR50.59 evaluations that were performed to determine whether prior NRC approval is required for 1) proposed changes to procedures, equipment, or systems and 2) proposed tests or experiments.

b. Proposed changes to procedures, equipment or systems that require prior NRC approval, as determined through a 10CFR50.59 evaluation.

c. Proposed tests or experiments that require prior NRC approval, as determined through a 10CFR50.59 evaluation.

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

e. Violations of 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 facility equipment that affect nuclear safety.

g. Events requiring notification to the Commission under 10CFR50.73.

h. All 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 PORC.

j. The health of accredited training programs.

13.4.2.9 NSRB Audit Program

All Susquehanna Nuclear, LLC Audit Program audits shall be performed under the cognizance of the NSRB, and at a frequency as described below or in FSAR Subsection 17.2.18. These audits shall at a minimum encompass:

a. The conformance of unit operation to provisions contained within the Technical Specifications and applicable license conditions.

b. The performance, training and qualifications of the entire facility staff.

c. The results of actions taken to correct deficiencies occurring in facility equipment, structures, systems or method of operation that affect nuclear safety.

d. The performance of activities required by the Operational Quality Assurance Program to meet the criteria of 10CFR50, Appendix B.

e. Any other area of unit operation considered appropriate by the NSRB or the Chief Nuclear Officer.

f. The Fire Protection Program and implementing procedures every 24 months.

g. An independent fire protection and loss prevention inspection and audit shall be performed every 24 months utilizing either qualified off-site licensee personnel or an outside fire protection firm.

h. An inspection and audit of the Fire Protection and Loss Prevention Program shall be performed by an outside qualified fire protection consultant at intervals no greater than 36 months.

i. The Radiological Environmental Monitoring program and the results thereof.

j. The Offsite Dose Calculation Manual (ODCM) and implementing procedures.

k. The Process Control Program (PCP) and implementing procedures for solidification of radioactive wastes.

l. The performance of activities required by the Quality Assurance Program to meet the criteria of Regulatory Guide 4.15, Revision 1, February 1979.

m. The Emergency Plan and implementing procedures

n. The Fitness-for-Duty Program

o. The Security Plan and implementing procedures

p. The Access Authorization Program

q. The Dry Fuel Storage Program

r. The Chemistry Program

s. The Radiological Protection Program (Health Physics)

t. The Environmental Protection Program

13.4.2.10 Authority

The NSRB reports to and advises the Chief Nuclear Officer on those areas of responsibility specified in FSAR Subsections 13.4.2.8 and 13.4.2.9.

13.4.3 AUDIT PROGRAM

The Susquehanna Nuclear, LLC Audit Program for the operational phase of Susquehanna SES is described in FSAR Subsection 17.2.18.

13.4.4 PROCESS CONTROL PROGRAM (PCP)

The PCP shall be approved by the Commission prior to implementation.

Licensee initiated changes to the PCP:

1. Shall be submitted to the Commission in the Annual Radiological Effluent Release Report for the period in which the change(s) was made. This submittal shall contain:

    a. Sufficiently detailed information to totally support rationale for the change without benefit of additional or supplemental information;

    b. A determination that the change did not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes; and

    c. Documentation of the fact that the change has been reviewed and recommended for approval by the PORC.

2. Shall become effective upon review and approval by the Plant Manager.

13.4.5 TECHNICAL REVIEW AND CONTROL

The following procedures and programs, and changes thereto (other than editorial or typographical changes) shall be reviewed as described in paragraphs 'a' through 'f' below:

- Procedures and programs used to implement the requirements presented in the SSES Technical Requirements Manual.
- Procedures and programs listed in SSES Technical Specification Section 5.4.1.
- Procedures and programs listed in SSES Technical Requirements Manual Section 4.4.1.
- Other procedures that affect plant nuclear safety, as determined by the Plant Manager.

a. Each such procedure, program or procedure change shall be independently reviewed by an individual knowledgeable in the area affected. The reviewer shall be someone other than the individual who prepared the procedure, program, or procedure change.

b. Individuals responsible for reviews performed in accordance with Subsection 13.4.5.a, above, shall be previously designated by a process approved by the Plant Manager. This process shall also include a determination of whether or not additional, cross-disciplinary, review is necessary. If deemed necessary, such a review shall be performed by the review personnel of the appropriate discipline.

   Individuals responsible for reviews performed in accordance with Subsection 13.4.5.a, above, shall meet or exceed the qualifications stated in Section 4.4 of ANSI N18.1 – 1971 for the appropriate discipline.

c. When an initial screening reveals that a specific change needs a 10CFR50.59 evaluation to determine whether the change requires prior NRC approval, this evaluation shall be included in the procedure review. For those changes that require prior NRC approval, NRC approval shall be obtained prior to approval of the procedure.

d. Written records of reviews performed in accordance with Subsection 13.4.5.a, above, including recommendations for approval, shall be prepared and maintained.

e. Each such procedure, program, or procedure change shall be approved prior to implementation. Approval authority is as follows:

   1) Technical Specification and Technical Requirement Manual programs/procedures that specify approval by the plant manager shall be approved by the Plant Manager.

   2) Upper tier procedures, and changes thereto, shall be approved by the Plant Manager.

   3) Lower tier procedures, and changes thereto, that require a 10CFR50.59 evaluation shall be approved by the Plant Manager.

   4) Lower tier procedures, and changes thereto, that do not require a 10CFR50.59 evaluation shall be approved by the appropriate Susquehanna Nuclear, LLC manager or supervisor identified in Section 17.2.1.

5) Each procedure, and changes thereto, that is established to implement those portions of the radiological effluent and environmental monitoring programs and those portions of the ODCM that are the responsibility of Plant Chemistry shall be approved by the Manager-Plant Chemistry/Environmental.

f. Each procedure shall be reviewed periodically as set forth in administrative procedures.

13.5 PLANT PROCEDURES

13.5.1 ADMINISTRATIVE PROCEDURES

All safety-related operations at Susquehanna Steam Electric Station Units 1 and 2 are conducted in accordance with written and approved procedures. Plant personnel receive training in the use of appropriate procedures and the procedures are made available to them at strategic locations.

13.5.1.1 Procedure Conformance

Procedure topics follow the guidance specified by applicable portions of Regulatory Guide 1.33, Revision 2 and procedures are prepared following the guidance provided by ANSI N18.7-1976.

13.5.1.2 Preparation of Procedures

Procedures are prepared by the plant staff and support organizations under the direction of department management. Reviews of safety-related procedures use and changes thereto, are performed and approved as described in Section 13.4.

Applicable procedures are periodically reviewed to determine if changes are necessary or desirable. Applicable procedures are reviewed after significant system or equipment modification, and following an unusual incident, such as a hazardous condition, an unexpected transient, a significant operator error, or equipment malfunction where the procedures contributed to the cause of the incident, or where inadequate in mitigating the effects of the incident.

13.5.1.3 Procedures

Administrative Procedures establish rules and instructions pertaining to activities such as procedure preparation; plant personnel responsibilities and authorities; plant modification; corrective maintenance and preventive maintenance; safety tagging; temporary changes to approved procedures; review of plant documents; surveillance testing and in-service inspection; equipment control; fire protection; security and visitor control, access to containment; communication system; and temporary procedures of an administrative nature. Administrative Procedures governing shift operations include the reactor operator's authority and responsibility, the senior reactor operator's authority and responsibilities, the logbook usage and control, issuance and updating of special orders and the plans for meeting the requirements of 10CFR50.54(i), (j), (k), (l) and (m) (Fig. 13.5-2). The general format of Administrative Procedures includes: Title, purpose, references, and procedure sections.

13.5.2 OPERATING AND MAINTENANCE PROCEDURES

The general format of the Operating and Maintenance Procedures complies with ANSI N18.7-1976.

13.5.2.1 Control Room Operating Procedures

The following procedure categories delineate those procedures primarily performed by licensed operators in the control room. Procedural steps which specify immediate operator actions to prevent or mitigate the consequences of a serious condition are committed to memory by licensed operators.

13.5.2.1.1 Operating Procedures

The operating procedures include instructions for startup, normal, manual, and automatic modes of operation of each system or subsystem related to the safety of the plant. Detailed check off lists are included where appropriate with each procedure. These lists delineate the proper valve lineup, circuit breaker position, or switch position that is a prerequisite for the addressed mode of operation.

13.5.2.1.2 General Plant Procedures

General Plant Procedures provide the necessary instructions for the integrated operations of the plant. Check off lists are used for confirming completion of major steps in the proper sequence.

13.5.2.1.3 Off-Normal Procedures

Off-Normal Procedures specify operator actions for restoring an operating variable to its normal controlled value when it departs from its range, or to restore normal operating conditions following a perturbation. Such actions are invoked following an operator observation of an off-normal condition which, if not corrected, could degenerate into a condition requiring action under an Emergency Procedure.

13.5.2.1.4 Emergency Procedures

Emergency Procedures identify potential emergency conditions and provide guidance for operations during potential emergencies while allowing sufficient flexibility to accommodate variations. These procedures specify actions, including manipulation of controls, to: (1) avoid further degradation of abnormal conditions which in themselves do not constitute an accident but could lead to an accident or (2) reduce the consequences of an accident or hazardous condition that has occurred and that may require implementation of the Emergency Plan.

13.5.2.1.5 Alarm Response Procedures

Alarm Response Procedures are provided to guide operators in their response to control room alarm conditions. These procedures are classified in a manner permitting quick retrieval in response to an alarm condition.

13.5.2.1.6 Temporary Procedures

Temporary Procedures may be issued to direct operations during such activity as testing, refueling, maintenance and modifications; and to provide guidance in unusual situations not within the scope of existing procedures. Temporary procedures are only in effect for the duration of the applicable situation, and require the same review and approval process as other plant procedures as prescribed in Section 13.4.

13.5.2.2 Additional Operating and Maintenance Procedures

The following procedure categories delineate those procedures that are primarily performed outside the limits of the control room.

13.5.2.2.1 Chemistry Procedures

Chemistry Procedures are implemented to maintain coolant quality and concentrations of harmful agents within prescribed limits. These procedures include chemical and radiochemical analysis, sample collection and equipment instruction.

13.5.2.2.2 Emergency Plan Procedures

The Emergency Plan establishes the concepts, evaluation criteria, and actions that are necessary to limit and mitigate the consequences of radiological incidents and unusual events including natural hazards and civil occurrences. The Emergency Plan Procedures are implementing procedures which provide the response which is required to ensure public health and safety.

13.5.2.2.3 Environmental Surveillance Procedures

The Environmental Monitoring Procedures provide the measurement and documentation of environmental information of a radiological or nonradiological nature to evaluate the effect on the environment, if any, resulting from the operation of the plant. These procedures will be performed, by the appropriate Group, in accordance with specifications that define the scope of testing and the test frequency.

13.5.2.2.4 Health Physics Procedures

Health Physics Procedures are written to govern the implementation of the Health Physics Program described in Section 12.5. These procedures detail various aspects of the Health Physics Program including equipment operating instructions, control of access and stay time, as low as reasonably achievable program, radiation surveys, contamination surveys, airborne radioactive material surveys, personnel monitoring, and training.

13.5.2.2.5 Instrument and Control Procedures

Instrument and Control Procedures provide for the required periodic calibration and testing of safety related plant instrumentation, calibration of measuring and test equipment and instrument maintenance. These procedures have provisions for taking the instrument out of service, assuring accuracies adequate to keep safety parameters within operational and safety limits, recording the date, as-found condition, corrective actions, as-left condition, identification of personnel performing the test, and restoration of the instrument to normal operating status.

13.5.2.2.6 Maintenance Procedures

Maintenance Procedures are written to maintain mechanical and electrical safety-related equipment at the quality required for it to perform its intended function. This category also includes procedures for implementation of the preventive maintenance program for mechanical and electrical safety-related equipment. Included are procedures that provide for the calibration and testing of protective relays. These procedures have provisions for recording the date, as-found condition, corrective action, as-left condition, and identification of personnel performing the test.

13.5.2.2.7 Procurement and Material Control Procedures

Procurement and Material Control Procedures provide for the proper procurement, documentation, and control of those materials and components associated with safety-related structures or systems. These procedures are sufficiently detailed to ensure that materials and components are purchased and handled in a controlled manner in accordance with applicable standards.

13.5.2.2.8 Radwaste Management Procedures

Effluents management Section has Radwaste Operating Procedures for solid radwaste systems to provide administrative controls for the shipment of solid radwaste. This includes the Process Control Program Procedures that ensure regulatory requirements are met for processing and packaging solid radioactive waste, and Transportation Procedures to ensure compliance with 10 CFR Part 71 and all DOT requirements as defined in 49 CFR Parts 100-177.

Effluents management also has Procedures for the release of batch quantities of liquids, from sumps or berm areas via tankers, with controls to ensure approval from chemistry prior to release.

Operations/Chemistry Section has Radwaste Operating Procedures for the liquid radwaste processing equipment, for controlling liquid releases from process equipment and/or for controlling gaseous releases. This includes provisions which provide administrative controls to allow liquid radwaste releases, when required data, analyses and approvals are completed.

13.5.2.2.9 Reactor Engineering Procedures

Reactor Engineering Procedures in conjunction with Operating Procedures provide for the monitoring and evaluation of core thermal and hydraulic parameters. In addition, these procedures

provide methods for evaluating fuel exposure, isotopic composition, core flux levels, and nuclear instrumentation setpoints as they relate to core power and flow.

13.5.2.2.10 Records Procedures

Records Procedures provide for the preparation and retention of plant records. Records to be retained are identified in ANSI N45.2.9-1974. These procedures will also address storage requirements and retention periods.

13.5.2.2.11 Security Procedures

Security Procedures are written to describe and implement the security requirements for the plant. These procedures include, but are not necessarily limited to, the subjects listed in Section 4.2.1 of ANSI N18.17-1973.

13.5.2.2.12 Surveillance Procedures

Surveillance procedures are written to provide for operability verification of safety-related structures and components in accordance with Technical Specifications and Technical Requirements Manual (FSAR Chapter 16). Surveillance performance is scheduled for conformance to frequencies established in Technical Specifications and Technical Requirements Manual.

13.5.2.2.13 Fire Protection Procedures

FPRR Table 5.0-1 Section B addresses the Fire Protection Administrative Procedures, Controls, and Fire Brigade.

THIS FIGURE HAS BEEN
DELETED

FSAR REV. 65

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT

Figure Deleted

FIGURE 13.5-1, Rev. 55

AutoCAD Figure 13_5_1.doc

Security-Related Information
Figure Withheld Under 10 CFR 2.390

FSAR REV.65

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT

MAIN CONTROL ROOM

FIGURE 13.5-2, Rev 55

AutoCAD: Figure Fsar 13.5-2.dwg

13.6 INDUSTRIAL SECURITY

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