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## IFSAR Formatting Legend

Color	Description
	Original Westinghouse AP1000 DCD Revision 19 content (part of plant-specific DCD)
	Departures from AP1000 DCD Revision 19 content (part of plant-specific DCD)
	Standard FSAR content
	Site-specific FSAR content
	Linked cross-references (chapters, appendices, sections, subsections, tables, figures, and references)

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## Chapter 13 Conduct of Operation

This chapter provides information relating to the preparations and plans for operation of the AP1000. Its purpose is to provide reasonable assurance that the plant will establish and maintain a staff of sufficient size and technical competence and that operating plans provide reasonable assurance of adequate protection of the public health and safety.

### 13.1 Organizational Structure

The organizational structure must be consistent with the human system interface design assumptions. See [Section 1.8](#) and [Chapter 18](#) for interface requirements pertaining to organizational structure.

This section describes organizational positions of a nuclear power unit and owner corporations and associated functions and responsibilities.

[Table 13.1-201](#), Generic Position/Site Specific Position Cross Reference, provides a cross-reference to identify the corresponding generic position titles.

#### 13.1.1 Management and Technical Support Organization

FPL has more than 35 years of experience in the design, construction, and operation of nuclear generating units in Florida. FPL is a subsidiary of NextEra Energy and is part of NextEra Energy's Nuclear Fleet Organization. In addition to FPL, NextEra Energy's Nuclear Fleet Organization includes three holding companies and a Florida-based fleet support office. The NextEra Energy Nuclear Fleet Organization operates 10 nuclear units at five sites: Duane Arnold, Seabrook, Turkey Point Units 3 & 4 and 6 & 7, Saint Lucie Units 1 & 2, and Point Beach Units 1 & 2. The Nuclear Fleet Organization includes, but is not limited to, nuclear extended power uprate, nuclear operations, fleet support, engineering support, fleet organizational support, and nuclear assurance.

##### 13.1.1.1 Design, Construction, and Operating Responsibilities

The NextEra Energy president and chief executive officer (CEO) promulgates corporate policy and provides corporate direction to the executive vice president and chief nuclear officer, and to other members of the senior management staff. Line responsibilities for implementing policies and direction are assigned to the executive vice president—engineering, construction and corporate services, and to the executive vice president and chief nuclear officer. The executive vice president—engineering, construction and corporate services directs the vice president—new nuclear projects in the design and construction of new nuclear plant generation. The executive vice president and chief nuclear officer directs the site vice presidents, the vice president-nuclear fleet technical support, the vice president—nuclear power uprate, the director of quality and process improvement, and director-nuclear assurance in support of the operation of the current plants. The first priority and responsibility of each member of the nuclear staff throughout the life of the plant is nuclear safety. Decisions regarding unit activities are made conservatively, with expectations of this core value of nuclear safety regularly communicated to appropriate personnel by management interface, training, and unit directives.

Lines of authority, decision making, and communication are clearly and unambiguously established to enable various project members, including contractors, to understand that utility management is in charge and directs the project. Key executive and corporate management positions, functions, and responsibilities are described in [Subsection 13.1.1.3.1](#). The corporate organization is shown in [Figure 13.1-203](#). The management and technical support organization for design, construction, and preoperational activities is addressed in [Appendix 13AA](#).

### 13.1.1.2 Provisions for Technical Support Functions

Before beginning preoperational testing, the vice president–new nuclear projects, the Turkey Point site vice president, the plant general manager for Units 6 & 7, and the chief nuclear officer (CNO) establish the organization of directors, managers, functional managers, supervisors, and staff sufficient to perform required functions for support of safe plant operation. These functions include the following:

- Nuclear, mechanical, structural, electrical, thermal-hydraulic, metallurgical and material, and instrumentation and controls engineering
- Safety review
- Quality assurance, audit, and surveillance
- Plant chemistry
- Radiation protection and environmental support
- Fueling and refueling operations support
- Training
- Maintenance support
- Operations support
- Fire protection
- Emergency planning organization
- Outside contractual assistance

If unit personnel are not qualified to address a specific problem, the services of qualified individuals from other functions in the company or an outside consultant are engaged. For example, major contractors, such as the reactor technology vendor or turbine generator manufacturer, provide technical support when equipment modifications or special maintenance problems are considered. Special studies, such as environmental monitoring, may be contracted to qualified consultants. **Figure 13.1-201** illustrates the management and technical support organizations for plant operation. See **Subsection 13.1.1.3.2** for descriptions of responsibilities and authorities of management positions for organizations providing technical support. **Table 13.1-201** shows the estimated number of positions required for each function.

Multiple layers of protection are provided to preserve unit integrity, including organization. Organizationally, operators and other shift members are typically assigned to a specific unit. Physical separation of units helps to minimize wrong unit activities. In addition, unit procedures and programs provide operating staff with methods to minimize human error, including tagging programs, procedure adherence requirements, and training.

#### 13.1.1.2.1 Engineering Support

The engineering support department consists of system engineering, design engineering, engineering performance improvement, and program engineering. The engineering program group

includes reactor engineering. These groups are responsible for performing the classical design activities, as well as providing engineering expertise in other areas of new plant sites.

Each engineering group has a functional manager who reports through a nuclear engineering site director to the site vice president. The engineering site director interfaces with the general manager fleet engineering for governance and oversight. See [Figure 13.1-201](#).

The engineering support department is responsible for:

- Supporting plant operations in the engineering areas of mechanical, structural, electrical, thermal-hydraulic, metallurgy and materials, electronic, instrument and control, and fire protection. Priorities for support activities are established based on input from site management with emphasis on issues affecting safe operation of the plant
- Engineering programs
- Supporting procurement, chemical and environmental analysis, and maintenance activities in the plant as requested by the site management
- Performing design engineering of plant modifications
- Maintaining the design basis by updating the record copy of design documents, as necessary, to reflect the actual as-built configuration of the plant
- Accident and transient analyses
- Human factors engineering design process
- Reactor engineering

The site reactor engineering team is supported by the director nuclear fuels. The director nuclear fuels provides technical assistance in the areas of core design, core operations, core thermal limits, and core thermal hydraulics. The director nuclear fuels reports to the general manager fleet engineering.

Engineering work may be contracted to and performed by outside companies in accordance with the Quality Assurance Program Description (QAPD).

Engineering resources are shared between Units 6 & 7. A single management organization oversees the engineering work associated with Units 6 & 7.

#### **13.1.1.2.2 Assessment and Safety Review**

Programs are established for reviews and assessments to verify that activities covered by this quality assurance program are performed in compliance with the requirements established, review significant proposed plant changes or tests, verify that reportable events are promptly investigated and corrected, and detect trends which may not be apparent to the day-to-day observer. These programs are, themselves, reviewed for effectiveness as part of the overall assessment process, as described herein.

Self-assessment (performed by or for the group responsible for the activity being assessed) and independent assessment (performed by the nuclear oversight organization) are used to monitor overall performance, identify anomalous performance and precursors of potential problems, and verify satisfactory resolution of problems. Persons responsible for carrying out these assessments



are cognizant of day-to-day activities such that they can act in a management advisory function with respect to the scope of the assessment. Both self-assessments and independent assessments are accomplished using instructions or procedures that provide detail commensurate with the assessed activity's complexity and importance to safety.

The plant maintains an onsite review group to review overall plant performance and advise site management on matters related to nuclear safety. Independent reviews are periodically performed of matters involving the safe operation of the fleet of nuclear power plants, with a minimum of one such review being conducted for each generating site each year. The review is supplemented by outside consultants or organizations as necessary to ensure the team has the requisite expertise and competence. Results are documented and reported to responsible management.

#### **13.1.1.2.3 Nuclear Assurance**

Safety-related activities associated with the operation of the plant are governed by QA direction described in **Chapter 17** and the QAPD. The requirements and commitments contained in the QAPD apply to activities associated with structures, systems, and components that are safety-related and are mandatory and should be implemented, enforced, and adhered to by individuals and organizations. QA requirements are implemented through the use of approved procedures, policies, directives, instructions, or other documents that provide written guidance for the control of quality-related activities and provide for the development of documentation to provide objective evidence of compliance. The QA function includes:

- Maintaining the QAPD
- Coordinating the development of audit schedules
- Audit, surveillance, and evaluation of nuclear division suppliers
- Supporting general QA indoctrination and training for the nuclear unit personnel

The site QA organization is independent of the unit operating line organization. Quality control (QC) inspection/testing activities to support plant operation, maintenance, and outages are independent of the unit operating line organization. QA and QC personnel report to the site quality manager.

Personnel resources of the QA organization are shared among units. A single management organization oversees the QA group for the units.

#### **13.1.1.2.4 Chemistry**

A chemistry program is established to monitor and control the chemistry of various plant systems so that corrosion of components and piping is minimized and radiation from corrosion by-products is kept to levels that allow operations and maintenance with radiation doses as low as reasonably achievable.

The chemistry manager is responsible to the plant general manager for maintaining chemistry programs and for monitoring and maintaining the water chemistry of plant systems. The staff of the chemistry department consists of laboratory technicians, support personnel, and supervisors who report to the chemistry manager.

Personnel resources of the chemistry organization are shared between Units 6 & 7. A single management organization oversees the chemistry group for Units 6 & 7.

#### **13.1.1.2.5 Radiation Protection**

A radiation protection program is established to protect the health and safety of the surrounding public and the personnel working at the plant. The radiation protection program is described in **Chapter 12**. The program includes:

- Respiratory protection
- Personnel dosimetry
- Bioassay
- Survey instrument calibration and maintenance
- Radioactive source control
- Effluents and environmental monitoring and assessment
- Radioactive waste shipping
- Radiation work permits
- Job coverage
- Radiation monitoring and surveys

The radiation protection department is staffed by radiation protection technicians, support personnel, and supervisors who report to the radiation protection manager. To provide sufficient organizational freedom from operating pressures, the radiation protection manager reports directly to the plant general manager.

Personnel resources of the radiation protection organization are shared between Units 6 & 7. A single management organization oversees the radiation protection group for Units 6 & 7.

#### **13.1.1.2.6 Fueling and Refueling Support**

The function of fueling and refueling is performed by a combination of personnel from various departments, including operations, maintenance, radiation protection, engineering, and reactor technology vendor, or other contractor staff.

Initial fueling and refueling operations are a function of the outage organization.

The work controls manager is responsible for planning and scheduling outages and for refueling support. The manager of refueling support services reports to the work controls manager and is responsible for implementing the refueling outage plan. The work controls manager reports to the plant general manager. The work controls manager interfaces with the work controls corporate functional area manager (CFAM) for governance and oversight.

Personnel resources of the outage and scheduling organization are shared between Units 6 & 7. A single management organization oversees the outage and scheduling group for Units 6 & 7.

### **13.1.1.2.7 Training and Development**

The site training department establishes, maintains, and implements training programs in accordance with applicable plant administrative directives, regulatory requirements, and company operating policies so that unit personnel can meet the performance requirements of their jobs in operations, maintenance, technical support, and emergency response.

The objective of training programs is to provide qualified personnel to safely and efficiently operate and maintain the plant and to provide compliance with the license, Technical Specifications, and applicable regulations. The training department's responsibilities encompass operator initial license training, requalification training, and plant staff training, as well as the plant access training (general employee training) and radiation worker training. The training manager is independent of the operating line organization to provide independence from operating pressures. Nuclear plant training programs are described in [Section 13.2](#).

Personnel resources of the training department are shared between the units. A single management organization oversees the training group for the four nuclear units. The training manager reports functionally to the site vice president. The training manager receives programmatic direction from the director nuclear fleet training.

### **13.1.1.2.8 Maintenance Support**

In support of maintenance activities, planners, schedulers, and parts specialists prepare work packages, acquire proper parts, and develop procedures that provide for the successful completion of maintenance tasks. Maintenance tasks are integrated into the unit schedule for evaluating the operating or safe shutdown risk elements and providing for safe and efficient performance. The maintenance support department head reports to the maintenance manager who reports to the plant general manager.

Personnel of the maintenance support organization are shared between Units 6 & 7. A single management organization oversees the maintenance group for Units 6 & 7.

### **13.1.1.2.9 Operations Support**

The operations support group provides the additional assistance required for the effective achievement of administrative and technical objectives relevant to the operations department. The operations support supervisor function is provided under the direction of the operations manager. Operations support includes the following programs:

- Operations procedures
- Operations surveillances
- Equipment tagging
- Fire protection testing and surveillance

### **13.1.1.2.10 Fire Protection**

FPL is committed to maintaining a fire protection program as described in [Section 9.5](#). The site vice president is responsible for the fire protection program. Assigning the responsibilities at that level provides the authority to obtain the resources and assistance necessary to meet fire protection program objectives, resolve conflicts, and delegate appropriate responsibility to the fire protection staff. The relationship of the site vice president to other staff personnel with fire protection

responsibilities is shown on **Figure 13.1-201**. Fire protection for the facility is organized and administered by the fire protection supervisor. The site vice president is responsible for the development and implementation of the fire protection program, including development of fire protection procedures, site personnel and fire brigade training, and inspections of fire protection systems and functions. Functional descriptions of position responsibilities are included in appropriate procedures. Unit personnel are responsible for adhering to the fire protection/prevention requirements detailed in **Section 9.5**.

The Units 6 & 7 project director–new nuclear projects has the lead responsibility for the overall site fire protection during construction for new units prior to implementation of the operational fire protection program. Once the operational fire protection program is implemented the lead responsibility for Units 6 & 7 fire protection program transitions to the site vice president and the Units 6 & 7 operating organization.

Personnel resources of the fire protection organization are shared between Units 6 & 7. A single management organization oversees the fire protection group for Units 6 & 7.

#### **13.1.1.2.11 Emergency Response Organization**

The emergency response organization is composed of personnel who have the experience, training, knowledge, and ability necessary to implement actions to protect the public in the case of emergencies. Managers and unit personnel assigned to positions in the emergency response organization support the emergency preparedness organization and emergency plan, as required. Staff members of the emergency preparedness organization administer and orchestrate drills and training to maintain qualification of site staff members and develop procedures to guide and direct the emergency response organization during an emergency. The emergency preparedness manager reports to the site vice president. The site emergency response organization is described in the Emergency Plan.

Resources of the emergency preparedness group are shared between all units at the site. A single management organization oversees the emergency preparedness group for the four nuclear units.

#### **13.1.1.2.12 Outside Contractual Assistance**

Contract assistance with vendors and suppliers of services not available from organizations established as part of the utility staff is provided by the sourcing manager. Personnel in the sourcing department perform the necessary functions to contract vendors of special services to perform tasks for which utility staff does not have the experience or equipment required. The sourcing manager reports to the vice president–new nuclear projects.

Resources of the materials, purchasing, and contracts organization are shared between Units 6 & 7. A single management organization oversees the materials, purchasing, and contracts group for Units 6 & 7.

#### **13.1.1.3 Organizational Arrangement**

##### **13.1.1.3.1 Executive Management Organization**

Executive management is ultimately responsible for execution of activities and functions for the nuclear generating plants. Executive management establishes expectations so that a high level of quality, safety, and efficiency is achieved in aspects of plant operations and support activities through an effective management control system and an organization selected and trained to meet the above objectives. A high-level chart of the corporate headquarters and nuclear fleet organization is provided in **Figure 13.1-203**.

Executives and management with direct line of authority for activities associated with plant operation are shown in **Figure 13.1-203**. Responsibilities of those executives and managers are specified below.

#### **13.1.1.3.1.1 NextEra Energy President and CEO**

This position has the ultimate responsibility for the safe and reliable operation of each nuclear unit owned and/or operated by the utility. This position is responsible for the overall direction and management of the corporation and execution of the company policies, activities, and affairs. This position is responsible for directing NextEra Energy's core operational business, including NextEra Energy, Florida Power & Light Company (FPL), and NextEra Energy Resources. This position is assisted in the direction of nuclear operations by the executive vice president nuclear division and chief nuclear officer (CNO) and other executive staff in the nuclear division of the corporation. The CEO is responsible for developing, implementing, and verifying execution of the Quality Assurance Program. Responsibility for implementing the Quality Assurance Program is delegated to the CNO and authority for developing and verifying execution of the program is delegated to the director nuclear assurance.

#### **13.1.1.3.1.2 Executive Vice President Nuclear Division and Chief Nuclear Officer**

The executive vice president nuclear division and CNO reports to the CEO through the chief operating officer. This position is responsible for the overall plant nuclear safety and takes the measures needed to provide acceptable performance of the staff in operating, maintaining, and providing technical support to the plant. This position is responsible for oversight of operations at each of the operating nuclear units in the system. This position delegates authority for the nuclear assurance of new nuclear generation through the director–nuclear assurance.

This position is responsible for nuclear operations, nuclear plant support, training, and performance improvement. The CNO implements these responsibilities through the following direct report positions: vice president nuclear fleet technical support and the site vice presidents. It is the responsibility of the CNO to provide guidance and direction so that safety-related activities, including engineering, operations, operations support, maintenance, and planning are performed following the guidelines of the QA program. The CNO has no ancillary responsibilities that might detract attention from nuclear safety matters. The CNO is designated as the company officer responsible for assuring that defects and noncompliances are reported to the NRC as required by 10 CFR Part 21.

#### **13.1.1.3.1.3 Vice President–Nuclear Fleet Technical Support**

The vice president–nuclear fleet technical support reports to the CNO and the vice president CFAM and outage support, the vice president organizational effectiveness and general managers, as assigned in select functional areas, report to this position. This position is responsible for CFAMs, outage support, organizational effectiveness, fleet engineering, issue management, and fleet projects. This position is also the functional interface with nuclear information technology. The organizations that implement some of these responsibilities are assigned to the site vice president(s).

#### **13.1.1.3.1.4 Director Nuclear Assurance**

The position reports to the CNO and is responsible for activities that include establishing, maintaining, and interpreting quality assurance practices and policies (including the Quality Assurance Topical Report); managing independent assessment and establishing quality control practices and policies for quality verification activities. The director nuclear assurance has direct access to the CNO for resolution of any areas in question. Additional responsibilities include facilitating actions deemed necessary to prevent unsafe plant conditions or a significant violation of the QA Program; periodically apprising the CNO of the status of the quality assurance program at

NextEra Energy facilities and immediately apprising senior management of significant problems affecting quality; and verifying implementation of solutions for significant conditions adverse to quality identified by Nuclear Oversight. Also responsible for establishing the requirements for assessor and inspector certification; and providing for supplier evaluation; the conduct of supplier assessments or surveys; and verification that supplier quality assurance programs comply with NextEra Energy requirements. This position has Stop Work authority at the sites and corporate offices.

#### **13.1.1.3.1.5 Vice President CFAM and Outage Support**

The vice president CFAM and outage support reports to the vice president nuclear fleet technical support and is responsible for CFAM activities, including maintenance, operations, work management, safety, and chemistry/radiation protection. In addition, responsibilities include outage planning and execution. Some responsibilities may be implemented through a general manager reporting to this position.

#### **13.1.1.3.1.6 Vice President Organizational Effectiveness**

The vice president organizational effectiveness reports to the vice president nuclear fleet technical support and is responsible for fleet training, licensing, security, emergency preparedness, and performance improvement/standardization, which includes operating experience, document control, and records management. Some responsibilities may be implemented through a general manager reporting to this position.

#### **13.1.1.3.1.7 General Managers**

General managers are assigned to the areas of operations (including operations and emergency preparedness), fleet engineering (including design engineering, probabilistic safety analysis, and nuclear fuel), issue management (including engineering programs and the engineering chief's organization), and fleet projects (including capital projects, project engineering, project control, project implementation, and ISFSI), and general managers report to the vice president nuclear fleet technical support directly, or through another responsible vice president.

#### **13.1.1.3.1.8 Corporate Functional Area Managers**

The CFAMs are responsible to institutionalize the governance and oversight principles implemented by the CFAM program. The CFAM is the highest level of authority within a functional area and is implemented for all functional areas identified in the Nuclear Excellence Model. CFAMs employ functional area processes as a means of achieving fleet-wide alignment, teamwork, efficiency, promote achieving, and maintaining the FPL nuclear operational excellence. CFAMs are established in the following functional areas: maintenance, radiation protection, work management, safety & human performance, and operations/emergency planning/chemistry.

#### **13.1.1.3.1.9 Executive Vice President—Engineering, Construction & Corporate Services**

The executive vice president—engineering, construction & corporate services reports to the NextEra Energy president and CEO and is responsible for new nuclear design and construction, construction scheduling and cost control, testing activities, and turnover to operations for new nuclear generation facilities. This position is responsible for the development and implementation of a construction QA organization and program consistent with company organization and policy.

#### **13.1.1.3.1.10 Vice President—New Nuclear Projects**

The vice president—new nuclear projects reports to the executive vice president—engineering, construction and corporate services, and is responsible for the overall safe and efficient licensing,



engineering, construction, and preoperational test of new nuclear projects, and for the implementation of quality assurance requirements in the applicable areas specified by the QAPD.

#### **13.1.1.3.1.11 Vice President–Integrated Supply Chain**

The vice president integrated supply chain reports to the CEO through the executive vice president–engineering, construction and corporate services is responsible for procurement engineering, coordinating contract activities, negotiating, generating, and issuing procurement documents for required items and services supporting the operation, licensing, maintenance, modification, and inspection of NextEra Energy nuclear plants, and for materials and equipment to support the nuclear division staff. Responsibilities also include the review of procurement documents to assure that technical and quality requirements are incorporated into the procurement documents that it authorizes, performance of receipt inspection to verify that purchased items comply with procurement document requirements, and controlling materials received at each NextEra Energy nuclear plant site in accordance with company policy and procedures.

#### **13.1.1.3.1.12 Vice President and Chief Information Officer**

The chief information officer (CIO) reports to the CEO through the vice chairman and chief financial officer. The CIO is responsible for nuclear information management such as computer-related hardware and software acquisition, deployment, maintenance, control and replacement, telecommunications, information/cyber security, and applicable training.

#### **13.1.1.3.1.13 Director of IT Business Solutions IM Nuclear Systems**

This position reports to the vice president and CIO with direct interface with the vice president nuclear fleet technical support. The position has functional areas of responsibility that include management of information technology, nuclear cyber security, and computer related hardware/software acquisition. The functions are supported via staff at both corporate and site levels.

### **13.1.1.3.2 Site Support Organization**

#### **13.1.1.3.2.1 Engineering Site Director**

The engineering site director is the onsite lead position for engineering and reports functionally to the site vice president and interfaces with the general manager fleet engineering for governance and oversight. The engineering site director is responsible for engineering activities related to the operation or maintenance of the plants and design change implementation support activities, and other functions described in **Subsection 13.1.1.2.1**. The engineering site director directs functional managers responsible for design engineering, program engineering, system and component engineering, and engineering performance improvement. Program engineering staff includes reactor engineering as described in **Subsection 13.1.1.2.1**.

Separate management organizations oversee the engineering support for Units 3 & 4 and Units 6 & 7.

#### **13.1.1.3.2.2 Director Nuclear Fleet Security**

The director nuclear fleet security is responsible for providing guidance and direction to the nuclear plant security manager at each site on the nuclear security, access authorization, and fitness for duty programs. The director nuclear fleet security reports to the vice president–organizational effectiveness.

### **13.1.1.3.2.3 Director Plant Support**

The director plant support provides staff functions to the entire site for financial services, document services, management of the operating experience, and corrective action. The director plant support is assisted by managers, supervisors, and staff in the following units:

- Integrated supply chain
- Document control services
- Financial services
- Information technology
- Site security services
- Performance improvement

### **13.1.1.3.2.4 Emergency Preparedness Manager**

The emergency preparedness manager is responsible for:

- Coordinating and implementing the plant emergency response plan with state and local emergency plans
- Developing, planning, and executing emergency drills and exercises
- Emergency action level development
- NRC reporting associated with 10 CFR 50.54 (q)

The functional manager in charge of emergency preparedness reports to the site vice president and is responsible for the combined emergency preparedness program for Turkey Point Units 3, 4, 6, and 7.

### **13.1.1.3.2.5 Training Manager**

The training manager is responsible for training programs required for the safe and proper operation and maintenance of the plant, including:

- Operations training programs
- Plant staff training programs
- Plant access training
- Emergency plan training
- Radiation worker training

The training manager may seek assistance from other departments in the company or outside specialists such as educators and manufacturers. The training manager supervises a staff of training supervisors who coordinate the development, preparation, and presentation of training programs for nuclear plant personnel.



The training manager reports to the site vice president and is responsible for the combined training programs for Turkey Point Units 3, 4, 6, and 7.

#### **13.1.1.3.2.6 Director Nuclear Fuels**

The director nuclear fuels has overall responsibility for implementation of the special nuclear material (SNM) control and accounting function, develops the methodology and analysis procedures to calculate changes in SNM while burning in the core, and prepares the SNM balance and inventory change reports for annual governmental reports.

#### **13.1.1.4 Qualifications of Technical Support Personnel**

The qualifications of managers and supervisors of the technical support organization meet the qualification requirements in education and experience for those described in ANSI/ANS-3.1-1993 (Reference 201) as endorsed and amended by RG 1.8. The qualification and experience requirements of headquarters staff are established in accordance with current corporate nuclear policy and procedure manuals.

### **13.1.2 Operating Organization**

#### **13.1.2.1 Plant Organization**

The plant management, technical support, and plant operating organizations are shown in Figure 13.1-201. The on-shift operating organization is presented in Figure 13.1-202, which shows those positions requiring NRC licenses. Additional personnel are required to augment normal staff during outages.

Nuclear plant employees are responsible for reporting problems with plant equipment and facilities. They are required to identify and document equipment problems in accordance with the QA program. QA program requirements as they apply to the operating organization are described in Chapter 17 and the QAPD. Administrative procedures or standing orders include:

- Establishing a QA program for the operational phase
- Preparing procedures necessary to carry out an effective QA program. See Section 13.5 for a description of the unit procedure program
- Establishing a program for review and audit of activities affecting plant safety. See Section 17.5 and the QAPD for a description of unit review and audit programs
- Preparing programs and procedures for rules of practice as described in Section 5.2 of N18.7-1976/ANS-3.2 (Reference 203)

Managers and supervisors in the plant operating organization are responsible for establishing goals and expectations for their organization and for reinforcing behaviors that promote radiation protection. Specifically, managers and supervisors are responsible for the following, as applicable to their position in the plant organization:

- Interface directly with radiation protection staff to integrate radiation protection measures into plant procedures and design documents and into the planning, scheduling, conduct, and assessment of operations and work

- Notify radiation protection personnel promptly when radiation protection problems occur or are identified, take corrective actions, and resolve deficiencies associated with operations, procedures, systems, equipment, and work practices
- Ensure that department personnel receive training and periodic retraining on radiation protection, in accordance with 10 CFR Part 19, so that they are properly instructed and briefed for entry into restricted areas
- Periodically observe and correct, as necessary, radiation worker practices
- Support radiation protection management in implementing the radiation protection program
- Maintain exposures to site personnel ALARA

#### **13.1.2.1.1 Site Vice President**

The site vice president directs the efforts of the plant general manager for Units 3 & 4, the plant general manager for Units 6 & 7, the director–plant support for the site, the nuclear engineering site director for Units 3 & 4, the nuclear engineering site director for Units 6 & 7, and the licensing manager for the site and receives input from the site quality manager. The site vice president reports to the CNO.

#### **13.1.2.1.2 Plant General Managers**

The plant general managers and the plant general manager’s staff are assigned to Units 6 & 7 or Units 3 & 4 and are responsible for overall safe operation of the assigned units. They have control over those onsite activities necessary for safe operation and maintenance of the assigned units, including the following:

- Operations
- Maintenance and modification
- Chemistry and radiochemistry
- Outage management

Additionally, the plant general manager has overall responsibility for occupational and public radiation safety for their assigned units. Radiation protection responsibilities of the plant general manager are consistent with the guidance in RG 8.8 and RG 8.10, including the following:

- Provide management radiation protection policy throughout the plant organization
- Provide an overall commitment to radiation protection by the plant organization
- Interact with and support the radiation protection manager on implementation of the radiation protection program
- Support identification and implementation of cost-effective modifications to plant equipment, facilities, procedures, and processes to improve radiation protection controls and reduce exposures
- Establish plant goals and objectives for radiation protection

- Maintain exposures to site personnel ALARA
- Support timely identification, analysis, and resolution of radiation protection problems (e.g., through the plant corrective action program)
- Provide training to site personnel on radiation protection in accordance with 10 CFR Part 19
- Establish an ALARA committee with delegated authority from the plant general manager that includes, at a minimum, the managers in charge of operations, maintenance, engineering, and radiation protection to help provide for effective implementation of line organization responsibilities for maintaining worker doses ALARA

In the absence of the plant general manager, the onsite individual designated by the plant general manager will be in charge for the duration of the absence. This will normally be the scheduled duty manager. The succession of authority includes the authority to issue standing or special orders, as required.

As described in **Subsection 13.1.2.1.3.4**, the operations manager is the plant general manager's direct representative for the conduct of operations.

#### **13.1.2.1.2.1 Maintenance Manager**

Plant maintenance is performed by the maintenance department mechanical, electrical, and instrumentation and controls (I&C) disciplines. Planning, scheduling, and work package preparation are performed by maintenance support. The functions of this department are to perform preventive and corrective maintenance, equipment testing, and implement modifications as necessary.

The maintenance manager is responsible for the performance of preventive and corrective maintenance and modification activities required to support operations, including compliance with applicable standards, codes, specifications, and procedures. The maintenance manager reports to the plant general manager and provides direction and guidance to the maintenance discipline functional managers and maintenance support staff.

#### **13.1.2.1.2.2 Maintenance Superintendents**

The superintendent of each maintenance discipline (mechanical, electrical, I&C, and support) is responsible for maintenance activities in that discipline, including plant modifications. The superintendents provide guidance in maintenance planning and craft supervision. They establish the necessary manpower levels and equipment requirements to perform both routine and emergency maintenance activities, seeking the services of others in performing work beyond the capabilities of the plant maintenance group. Each discipline superintendent is responsible for liaison with other plant staff organizations to facilitate safe operation of the unit. These superintendents report to the maintenance manager.

#### **13.1.2.1.2.3 Maintenance Supervisors**

The maintenance supervisors (mechanical, electrical, and I&C) supervise maintenance activities, assist in planning future maintenance efforts, and guide the efforts of the craft workers in their discipline. The maintenance discipline supervisors report to the appropriate maintenance discipline superintendent.

#### **13.1.2.1.2.4 Maintenance Mechanics, Electricians, and I&C Technicians**

The discipline craft workers perform electrical and mechanical maintenance, I&C, and support tasks as they are assigned by the discipline supervisors. The craft workers trouble-shoot, inspect, repair, maintain, and modify plant equipment and perform technical specification surveillances on equipment for which they have cognizance. They perform these tasks in accordance with approved procedures and work packages.

#### **13.1.2.1.2.5 Work Control Manager**

The work control manager is responsible for:

- Planning and scheduling refueling, maintenance, and forced outages
- Providing direction and guidance to staff members in establishing outage activities
- Minimizing shutdown risk during outages with proper planning and preparation
- Directing activities during outages to provide safe, efficient, and effective outages
- Planning and scheduling online work activities, monitoring the online work process, and risk management

The work control manager is assisted by the outage supervisor and the online supervisor. The work control manager reports to the plant general manager. See **Subsection 13.1.1.2.6**.

#### **13.1.2.1.2.6 Radiation Protection Manager**

The radiation protection manager has the direct responsibility for providing adequate protection of the health and safety of personnel working at the assigned units and members of the public during activities covered in the scope and extent of the license. Radiation protection responsibilities of the radiation protection manager are consistent with the guidance in RG 8.8 and RG 8.10. They include:

- Managing the radiation protection organization
- Establishing, implementing, and enforcing the radiation protection program
- Providing radiation protection input to facility design and work planning
- Tracking and analyzing trends in radiation work performance and taking the necessary actions to correct adverse trends
- Supporting the plant emergency preparedness program and assigning emergency duties and responsibilities in the radiation protection organization
- Delegating authority to appropriate radiation protection staff to stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety
- Developing, implementing, directing, and coordinating the radioactive waste and materials management program for the assigned units

The radiation protection manager reports to the plant general manager and is assisted by the radiation protection supervisors.

#### **13.1.2.1.2.7 Radiation Protection Supervisors**

The radiation protection supervisors are responsible for carrying out the day-to-day operations and programs of the radiation protection department as listed in [Subsection 13.1.1.2.5](#).

Radiation protection supervisors report to the radiation protection manager.

#### **13.1.2.1.2.8 Radiation Protection Technicians**

Radiation protection technicians directly carry out responsibilities defined in the radiation protection program and procedures. In accordance with Technical Specifications, a radiation protection technician is on site whenever there is fuel in the vessel. See [Table 13.1-202](#).

The following are some of the duties and responsibilities of the radiation protection technicians:

- As delegated authority by the radiation protection manager, stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety
- Provide coverage and monitor radiation conditions for jobs potentially involving significant radiation exposure
- Conduct surveys, assess radiation conditions, and establish radiation protection requirements for access to and work in restricted, radiation, high radiation, very high radiation, and airborne radioactivity areas and in areas containing radioactive materials
- Provide control over the receipt, storage, movement, use, and shipment of licensed radioactive materials
- Review work packages, proposed design modifications, and operations and maintenance procedures to facilitate integration of adequate radiation protection controls and dose reduction measures
- Review and oversee implementation of plans for the use of process or other engineering controls to limit the concentrations of radioactive materials in the air
- Provide personnel monitoring and bioassay services
- Maintain, prescribe, and oversee the use of respiratory protection equipment
- Perform assigned emergency response duties

#### **13.1.2.1.2.9 Chemistry Manager**

The chemistry manager is responsible for developing, implementing, directing and coordinating the chemistry, radiochemistry, and the nonradiological environmental monitoring programs for the assigned units. This area includes overall operation of the hot lab, cold lab, emergency offsite facility lab, and nonradiological environmental monitoring. This also includes developing, implementing, directing, and coordinating the radioactive liquid effluent injection and radioactive gaseous effluent release control programs, offsite dose calculation manual, and the radiological environmental monitoring program for the assigned units. The chemistry manager is responsible for developing, administering, and implementing procedures and programs that provide for effective compliance with environmental regulations. The chemistry manager reports to the plant general manager and directly supervises the chemistry supervisors and chemistry technicians.

### 13.1.2.1.3 Operations Department

Operations activities are conducted with the safety of the public, personnel, and equipment as the overriding priority. The operations department is responsible for:

- Operating unit equipment
- Monitoring and watching safety and nonsafety-related equipment
- Fuel loading
- Providing the nucleus of emergency and firefighting teams

The operations department maintains sufficient licensed and senior licensed operators to staff the control room continuously using a crew rotation system. The operations department is under the authority of the operations manager, who, through the operations supervisor, directs the day-to-day operation of the assigned units.

Specific duties, functions, and responsibilities of key shift members are described in **Subsections 13.1.2.1.2.4 through 13.1.2.1.2.8** and in plant administrative procedures and the Technical Specifications. The minimum shift manning requirements are shown in **Table 13.1-202**.

Some resources of the operations organization are shared between Units 6 & 7.

Administrative and support personnel perform their duties on either unit. To operate or supervise the operation of more than one unit, an operator (senior reactor operator or reactor operator) must hold an appropriate, current license for each unit. A single management organization oversees the operations group for Units 6 & 7. See **Table 13.1-201** for estimated number of staff in the operations department for single or multiple-unit sites.

The operations support section is staffed with sufficient personnel to provide support activities for the operating shifts and overall operations department. The following is an overview of the operations organization.

#### 13.1.2.1.3.1 Operations Manager

The operations manager has overall responsibility for the day-to-day operation of the assigned units. The operations manager reports to the plant general manager and is assisted by the shift technical advisors and the operations supervisor. The operations manager or the operations supervisor is licensed as a senior reactor operator.

#### 13.1.2.1.3.2 Operations Supervisor

The operations supervisor, under the direction of the operations manager, is responsible for:

- Conducting shift plant operations in accordance with the operating license, Technical Specifications, and written procedures
- Providing supervision of operating shift personnel for operational shift activities, including those of emergency and firefighting teams
- Coordinating with the operations support superintendent and other plant staff sections

- Verifying that nuclear plant operating records and logs are properly prepared, reviewed, evaluated, and turned over to the operations support superintendent

The operations supervisor is assisted in these areas by the shift manager, who directs the operating shift personnel. The operations supervisor reports to the operations manager.

#### **13.1.2.1.3.3 Operations Support Superintendent**

The operations support superintendent, under the direction of the operations manager, is responsible for:

- Directing and guiding plant operations support activities in accordance with the operating license, Technical Specifications, and written procedures
- Supervising operating support personnel, overseeing operations support activities, and coordinating support activities
- Providing for nuclear plant operating records and logs to be turned over to the nuclear records group for maintenance as QA records
- Coordinating operations related to fire protection program activities with the supervisor–fire protection

The operations support superintendent is assisted by the work management, operations procedures, and other support personnel.

#### **13.1.2.1.3.4 Shift Manager**

The shift manager is a licensed senior reactor operator responsible for the control room command function, and is the plant general manager’s direct management representative for the conduct of operations. As such, the shift manager has the responsibility and authority to direct the activities and personnel at Units 6 & 7 as required to:

- Protect the health and safety of the public, the environment, and personnel on the plant site
- Protect the physical security of the plant
- Prevent damage to site equipment and structures
- Comply with the operating license

The shift manager retains this responsibility and authority until formally relieved of operating responsibilities. Additional responsibilities of the shift manager include:

- Directing nuclear plant employees to report to the plant for response to potential and real emergencies
- Seeking the advice and guidance of the shift technical advisor and others in executing the duties of the shift manager whenever in doubt as to the proper course of action
- Promptly informing responsible supervisors of significant actions affecting their responsibilities



- Participating in operator training, retraining, and requalification activities from the standpoint of providing guidance, direction, and instruction to shift personnel

The shift manager is the senior management on shift and is responsible for Units 6 & 7. The shift manager is assisted in carrying out the above duties by the unit supervisors in charge on shift and the operating shift personnel. The shift manager reports to the operations supervisor.

#### **13.1.2.1.3.5 Unit Supervisors**

The unit supervisors are licensed senior reactor operators. The primary function of the unit supervisors is to administratively support the shift manager so that the command function is not overburdened with administrative duties and to supervise the licensed and non-licensed operators in carrying out the activities directed by the shift manager. Other duties include:

- Being aware of maintenance and testing performed during the shift
- Shutting down the reactor if conditions warrant this action
- Informing the shift manager and other unit management in a timely manner of conditions that may affect public safety, plant personnel safety, or plant capacity or reliability, or cause a hazard to equipment
- Initiating immediate corrective action as directed by the shift manager in any upset situation until assistance, if required, arrives
- Participating in operator training, retraining, and requalification activities from the standpoint of providing guidance, direction, and instruction to shift personnel

The unit supervisors report directly to the shift manager.

#### **13.1.2.1.3.6 Reactor Control Operators**

The reactor control operators are licensed reactor operators and report to the unit supervisor. They are responsible for routine plant operations and performance of major evolutions at the direction of the unit supervisor.

Reactor control operator duties include:

- Monitoring control room instrumentation
- Responding to plant or equipment abnormalities in accordance with approved plant procedures
- Directing the activities of non-licensed operators
- Documenting operational activities, plant events, and plant data in shift logs
- Initiating plant shutdowns, scrams, or other compensatory actions when observation of plant conditions indicates that a nuclear safety hazard exists or when approved procedures so direct

Whenever there is fuel in the reactor vessel, at least one reactor control operator is in the control room monitoring the status of the unit at the main control panel. The reactor control operator assigned to the main control panel is designated the operator at the controls and conducts monitoring



and operating activities in accordance with the guidance set forth in RG 1.114, which is further described in [Subsection 13.1.2.1.4](#).

#### **13.1.2.1.3.7 Non-Licensed Operators**

The non-licensed operators perform routine duties outside the control room as necessary for continuous, safe plant operation, including:

- Assisting in plant startup, shutdown, surveillance, and emergency response by manually or remotely changing equipment operating conditions, placing equipment in service, or securing equipment from service at the direction of the reactor control operator
- Performing assigned tasks in procedures and checklists, such as valve manipulations for plant startup, or in data sheets on routine equipment checks, and making accurate entries according to the applicable procedure, checklist, or data sheet
- Assisting in training new employees and in improving and upgrading their own performance by participating in the applicable sections of the training program

Non-licensed operators include auxiliary operators as shown in [Figure 13.1-202](#).

#### **13.1.2.1.3.8 Shift Technical Advisor**

FPL is committed to meeting NUREG-0737 TMI Action Plan item I.A.1.1 for shift technical advisors. The shift technical advisor reports directly to the shift manager and provides advanced technical assistance to the operating shift complement during normal and abnormal operating conditions. The shift technical advisor's responsibilities are detailed in plant administrative procedures as required by TMI Action Plan I.A.1.1 and NUREG-0737 Appendix C. These responsibilities include:

- Activities to monitor core power distribution and critical parameters
- Activities to assist the operating shift with technical expertise during normal and emergency conditions
- The evaluation of Technical Specifications, special reports, and procedural issues

The shift technical advisor primarily contributes to maximizing the safety of operations by independently observing plant status and advising shift supervision of conditions that could compromise plant safety. During transients or accident situations, the shift technical advisor independently assesses plant conditions and provides technical assistance and advice to mitigate the incident and minimize the effect on personnel, the environment, and plant equipment.

A senior reactor operator on shift who meets the qualifications for the combined senior reactor operator/shift technical advisor position specified for Option 1 of Generic Letter 86-04 ([Reference 202](#)) may also serve as the shift technical advisor. If this option is used for a shift, then the separate shift technical advisor position may be eliminated for that shift.

#### **13.1.2.1.3.9 Fire Protection Supervisor and Fire Protection Engineer**

In the engineering and support unit, the fire protection supervisor is in charge of fire protection and the fire protection staff. The fire protection supervisor is responsible for:

- Fire protection program requirements, including consideration of potential hazards associated with postulated fires, knowledge of building layout, and system design

- Postfire shutdown capability
- Design, maintenance, surveillance, and QA of fire protection features (e.g., detection systems, suppression systems, barriers, dampers, doors, penetration seals, and fire brigade equipment)
- Fire prevention activities (administrative controls and training)
- Fire brigade organization and training
- Prefire planning, including review and updating of prefire plans at least every 2 years

The fire protection supervisor reports through the program engineering manager to the site vice president, who has ultimate responsibility for the fire protection program. Additionally, the fire protection supervisor works with the operations support superintendent to coordinate activities and program requirements with the operations department. The fire protection supervisor is qualified in accordance with ANSI/ANS-3.1-1993, Section 4.4 ([Reference 201](#)).

Fire protection program implementation and maintenance are the responsibilities of the fire protection engineer. The fire protection engineer is qualified in accordance with RG 1.189 Revision 1, Regulatory Position 1.6.1.a.

Both the fire protection supervisor and the fire protection engineer are trained and experienced in fire protection and nuclear plant safety or have available personnel who are trained and experienced in fire protection and nuclear plant safety.

#### **13.1.2.1.3.10 Radwaste Operations Lead**

This position is responsible for developing, implementing, directing, and coordinating the radwaste activities. This position reports to the operations supervisor.

This position supervises radwaste operators assigned to the radwaste area.

#### **13.1.2.1.4 Conduct of Operations**

Unit operations are controlled and/or coordinated through the control room. Maintenance activities, surveillances, and removal from/return to service of structures, systems, and components affecting the operation of the plant may not commence without the approval of senior control room personnel. The rules of practice for control room activities, as described by administrative procedures, which are based on RG 1.114, address the following:

- Position/placement of operator at the controls workstation and the expected area of the control room where most of the unit supervisor's time should be spent
- Definition and outline of "surveillance area" and requirement for continuous surveillance by the operator at the controls
- Relief requirements for operator at the controls and the unit supervisor

In accordance with 10 CFR 50.54:

- Reactivity controls may be manipulated only by licensed operators and senior operators except as allowed for training under 10 CFR Part 55

- Apparatus and mechanisms other than controls that may affect reactivity or power level of the reactor will be operated only with the consent of the operator at the controls or the unit supervisor
- During operation of the facility in modes other than cold shutdown or refueling, a senior operator will be in the control room and a licensed operator or senior operator will be present at the controls

#### **13.1.2.1.5 Operating Shift Crews**

Plant administrative procedures are used to implement the required shift staffing. These procedures establish crews with sufficient qualified plant personnel to staff the operational shifts and be readily available in the event of an abnormal or emergency situation. The objective is to operate the plant with the required staff and to develop work schedules that minimize overtime for plant staff members who perform safety-related functions. Work hour limitations are provided in unit procedures. When overtime is necessary, the provisions in the Technical Specifications and the plant administrative procedures apply. Shift crew staffing plans may be modified during refueling outages to accommodate safe and efficient completion of outage work in accordance with the work hour limitations.

The minimum composition of the operating shift crew is contingent on the unit operating status. Position titles, license requirements, and minimum shift manning for various modes of operation are contained in Technical Specifications, administrative procedures, and [Table 13.1-202](#). Routine shift operations staffing is illustrated in [Figure 13.1-202](#).

#### **13.1.2.1.6 Fire Brigade**

The plant is designed and the fire brigade is organized to be self-sufficient with respect to firefighting activities. The fire brigade is organized to address fires and related emergencies that could occur. It consists of a fire brigade leader and a sufficient number of team members to be consistent with the equipment that must be put in service during a fire emergency. A sufficient number of trained and physically qualified fire brigade members are available onsite during each shift. The fire brigade consists of at least five members on each shift. Members of the fire brigade are knowledgeable of building layout and system design. The assigned fire brigade members for any shift do not include the shift manager nor any other members of the minimum shift operating crew necessary for safe shutdown of the unit. It does not include any other personnel required for other essential functions during a fire emergency. Fire brigade members for a shift are designated in accordance with established procedures at the beginning of the shift.

#### **13.1.2.1.7 Reclaimed Water Treatment Facility Manager**

This position reports to the site vice president and is responsible for the safe operation and maintenance of the FPL reclaimed water treatment facility.

### **13.1.3 Qualification Requirements of Nuclear Plant Personnel**

#### **13.1.3.1 Minimum Qualification Requirements**

Qualifications of managers, supervisors, operators, and technicians of the operating organization meet the qualification requirements in education and experience for those described in ANSI/ANS-3.1-1993 ([Reference 201](#)), as endorsed and amended by RG 1.8.

### 13.1.3.2 Qualification Documentation

Résumés and/or other documentation of qualification and experience of initial appointees to appropriate management and supervisory positions are available for NRC review after position vacancies are filled

### 13.1.4 Combined License Information Item

The organizational structure is addressed in **Subsections 13.1.1 through 13.1.3.**

### 13.1.5 References

201. American Nuclear Society, *American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plant*, ANSI/ANS -3.1-1993.
202. U.S. Nuclear Regulatory Commission, *Generic Letter 86-04, Policy Letter, Engineering Expertise on Shift.*
203. American Nuclear Society, *American National Standard for Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants*, N18.7-1976/ANS-3.2.

**Table 13.1-201 (Sheet 1 of 3)**  
**Generic Position/Site-Specific Position Cross Reference**

<b>Nuclear Function</b>	<b>Function Position – ANSI/ANS-3.1-1993 Section Reference</b>		<b>Nuclear Plant Position (Site-Specific)</b>	<b>Expected Positions Single Unit</b>	<b>Expected Additional Positions Second Unit</b>
Executive Management	Chief Executive Officer		Chief Executive Officer (CEO)	1	—
	Chief Nuclear Officer		Chief Nuclear Officer (CNO)	1	—
	Executive, Nuclear Operations		Executive Vice President and CNO	1	—
	Executive, Nuclear Generation and Development		Executive Vice President—Engineering, Construction, & Corporate Services	1	—
Nuclear Support	Executive, Operations Support		Vice President—Nuclear Fleet Technical Support	1	—
Plant Management	Executive Plant Manager	4.2.1	Site Vice President	1	—
			Plant General Manager-Units 6 & 7	1	—
Engineering	Executive Manager	4.2.4	General Manager Fleet Engineering	1	—
			Engineering Site Director-Units 6 & 7	1	—
System Engineering	Functional Manager System Engineer	4.3.9	System Engineering Manager	1	—
			System Engineers	24	12
Design Engineering	Functional Manager Design Engineer	4.3.9	Design Engineering Manager	1	—
			Design Engineers	12	6
Engineering Programs	Functional Manager Programs Engineer	4.3.9	Operations Support Engineering Manager	2	—
			Operations Support Engineers		6
Reactor Engineering	Functional Manager Reactor Engineer	4.3.9	Reactor Engineering Supervisor	1	—
			Reactor Engineers	3	1
Maintenance	Manager	4.2.3	Maintenance Manager	1	—
Instrumentation and Control	Functional Manager	4.3.4	I&C Maintenance Superintendent	1	—
	Supervisor	4.4.7	I&C Maintenance Supervisor	3	1
	Technician	4.5.3.3	I&C Technicians	22	12
Mechanical	Functional Manager	4.3.6	Mechanical Maintenance Superintendent	2	—
	Supervisor	4.4.9	Mechanical Maintenance Supervisors	2	1
	Technician	4.5.7.2	Mechanics	22	8
Electrical	Functional Manager	4.3.5	Electrical Maintenance Superintendent	1	—
	Supervisor	4.4.8	Electrical Maintenance Supervisor	2	1
	Technician	4.5.7.1	Electricians	14	6

**Table 13.1-201 (Sheet 2 of 3)**  
**Generic Position/Site-Specific Position Cross Reference**

<b>Nuclear Function</b>	<b>Function Position – ANSI/ANS-3.1-1993 Section Reference</b>		<b>Nuclear Plant Position (Site-Specific)</b>	<b>Expected Positions Single Unit</b>	<b>Expected Additional Positions Second Unit</b>
Support	Functional Manager	4.3	Maintenance Support Superintendent	1	—
Operations	Manager	4.2.2	Operations Manager	1	—
Operations, Plant	Functional Manager	4.3.8	Operations Supervisor	1	1
Operations, Admin	Functional Manager	4.3.8	Operations Support Supervisor	1	—
Operations (On-shift)	Functional Manager	4.4.1	Shift Manager	6	—
	Supervisor	4.4.2	Unit Supervisor	6	6
			Nuclear Watch Engineer	6	6
	Licensed Operator	4.5.1	Reactor Control Operator	12	12
	Non-Licensed Operator	4.5.2	Non-Licensed Operator	36	18
	Shift Technical Supervisor	4.6.2	Shift Technical Advisor	6	—
Operations – Radwaste	Supervisor	4.4	Radwaste Operations Lead	1	—
Fire Protection	Supervisor	4.4	Fire Protection Supervisor	1	—
Radiation Protection	Functional Manager	4.5.3.2	Radiation Protection Manager	1	—
	Supervisor		Radiation Protection Supervisors	3	3
	Technician		Radiation Protection Technicians	18	9
	ALARA specialist		ALARA Supervisors	3	1
	Decon Technician		Utility Workers	6	2
Chemistry	Functional Manager	4.3.2	Chemistry Manager	1	—
	Supervisor	4.4.5	Chemistry Supervisors	4	1
	Technician	4.5.3.1	Chemistry Technicians	18	9
Nuclear Safety Assurance	Manager	4.2	Site Quality Manager	1	—
Licensing	Functional Manager	4.3	Licensing Manager	1	—
	Supervisor		Licensing Supervisor	1	—
	Licensing Engineer		Licensing Engineer	2	1
Corrective Action	Functional Manager	4.3	Performance Improvement Manager	1	—
	Corrective Action Specialist		Analysts	2	2
Emergency Preparedness	Functional Manager	4.3	Site Emergency Preparedness Manager	1	—
	EP Planner		EP Planner	2	1

**Table 13.1-201 (Sheet 3 of 3)**  
**Generic Position/Site-Specific Position Cross Reference**

Nuclear Function	Function Position – ANSI/ANS-3.1-1993 Section Reference		Nuclear Plant Position (Site-Specific)	Expected Positions Single Unit	Expected Additional Positions Second Unit
Training	Functional Manager Supervisor Ops Trng Ops Training Instructor Supervisor Tech. Staff/ Maint TrngTech Staff/Maint. Instructors	4.3.1 4.4.4	Site Training Manager Operations Training Supervisors Operations Training Instructors Maintenance & Technical Training Supervisors Tech/Maint Instructors	1 3 2 9 2 8	— — — 4 — 4
Purchasing and Contracts Security Planning and Scheduling	Functional Manager Functional Manager Functional Manager Supervisor	4.3 4.3 4.3 4.4	Nuclear Materials Manager Security Manager Work Control Manager Outage Supervisor Online Supervisor Work Week Managers	1 1 1 1 1 6	— — — 1 1 6
Quality Assurance	Functional Manager Supervisor QA Auditor Supervisor QC Inspector	4.3.7 4.4.13  4.4.13 4.4.11	Site Quality Manager Quality Assurance Supervisors QA Auditors QC Supervisor QC Inspectors	1 2 3 1 4	— — 3 — 2
Startup testing	Supervisor  Startup Test Engineer Supervisor  Preop. Test Engineer	4.4.12   4.4.12	Startup Manager  Startup Test Supervisor  Startup Engineers	2  5  25	—  —  —

**Table 13.1-202**  
**Minimum On-Duty Operations Shift Organization for Two-Unit Plant**

Units Operating	Two Units Two Control Rooms
All Units Shutdown	1 SM (SRO) 2 RO 3 NLO
One Unit Operating <sup>(a)</sup>	1 SM (SRO) 2 SRO 3 RO 4 NLO
Two Units Operating <sup>(a)</sup>	1 SM (SRO) 2 SRO 3 RO 4 NLO
SM – Shift Manager SRO – Licensed Senior Reactor Operator	RO – Licensed Reactor Operator NLO – Non-Licensed Operator

(a) Operating modes other than cold shutdown or refueling.

**Notes:**

1. In addition, one Shift Technical Advisor (STA) is assigned per shift during plant operation. A shift manager or another SRO on shift, who meets the qualifications for the combined Senior Reactor Operator/Shift Technical Advisor position, as specified for option 1 of Generic Letter 86-04, (Reference 202) the commission's policy statement on engineering expertise on shift, may also serve as the STA. If this option is used for a shift, then the separate STA position may be eliminated for that shift.
2. In addition to the minimum shift organization above, during refueling a licensed senior reactor operator or senior reactor operator limited (fuel handling only) is required to directly supervise any core alteration activity.
3. A shift manager/supervisor (SRO licensed for each unit that is fueled), shall be on site at all times when at least one unit is loaded with fuel.
4. A radiation protection technician shall be on site at all times when there is fuel in a reactor.
5. A chemistry technician shall be on site during plant operation in modes other than cold shutdown or refueling.
6. To operate, or supervise the operation of more than one unit, an operator (SRO or RO) must hold an appropriate, current license for each unit.



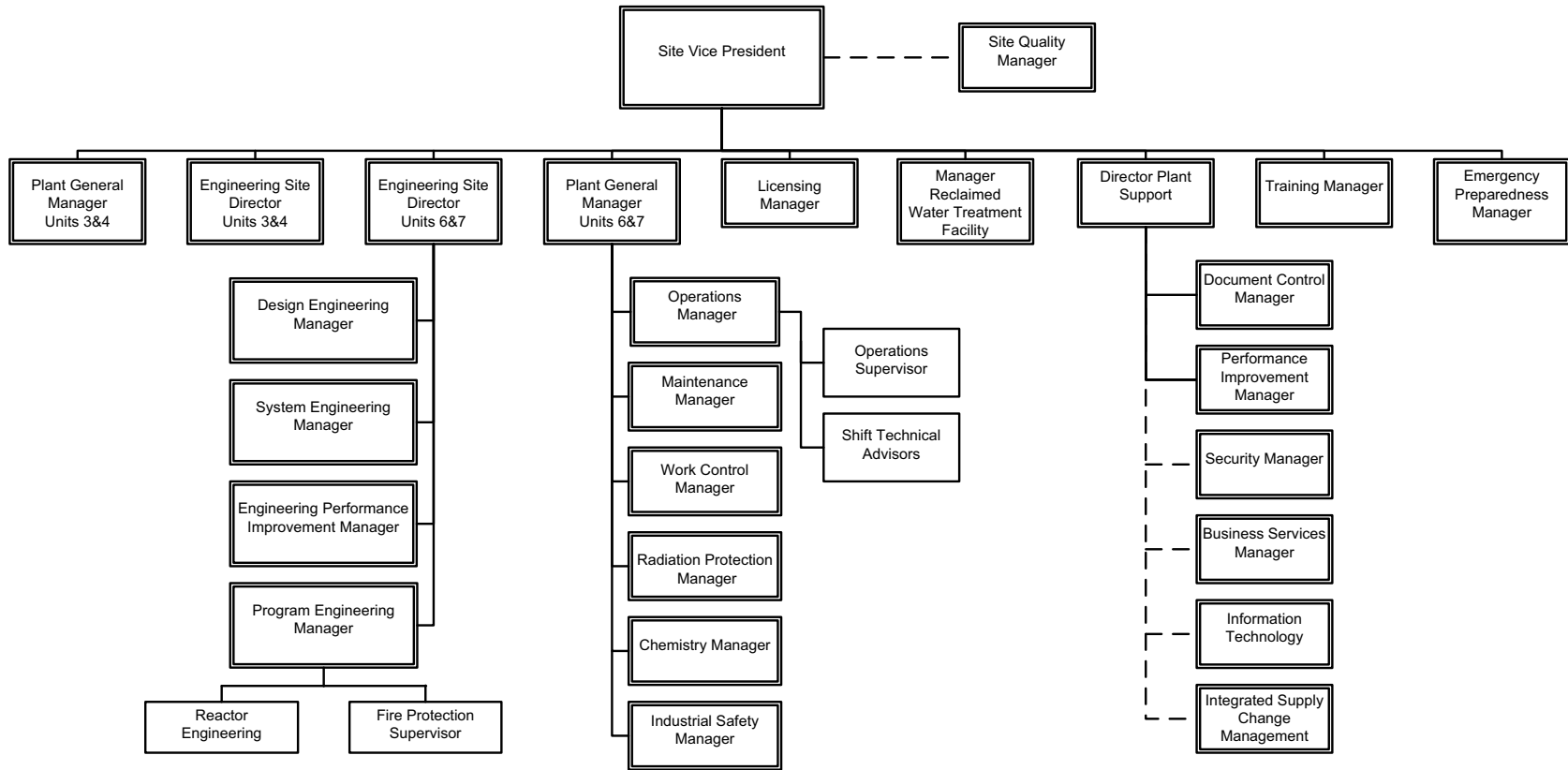
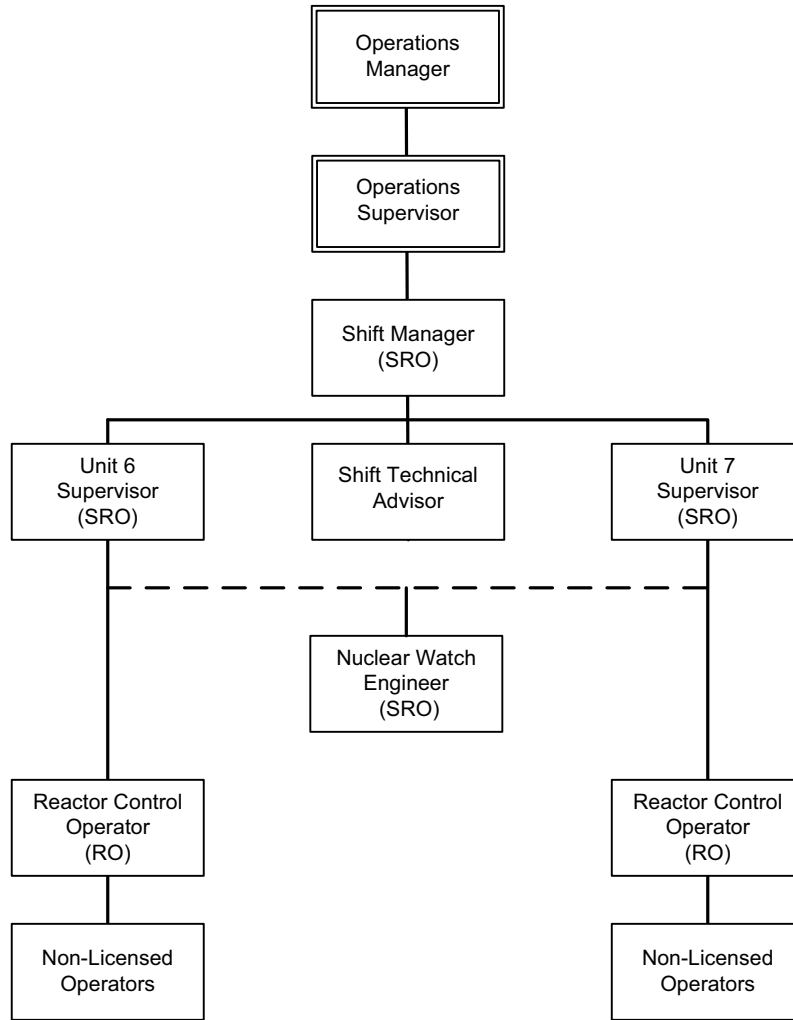


Figure 13.1-201 Plant Management Organization



**Figure 13.1-202 Shift Operations Organization**

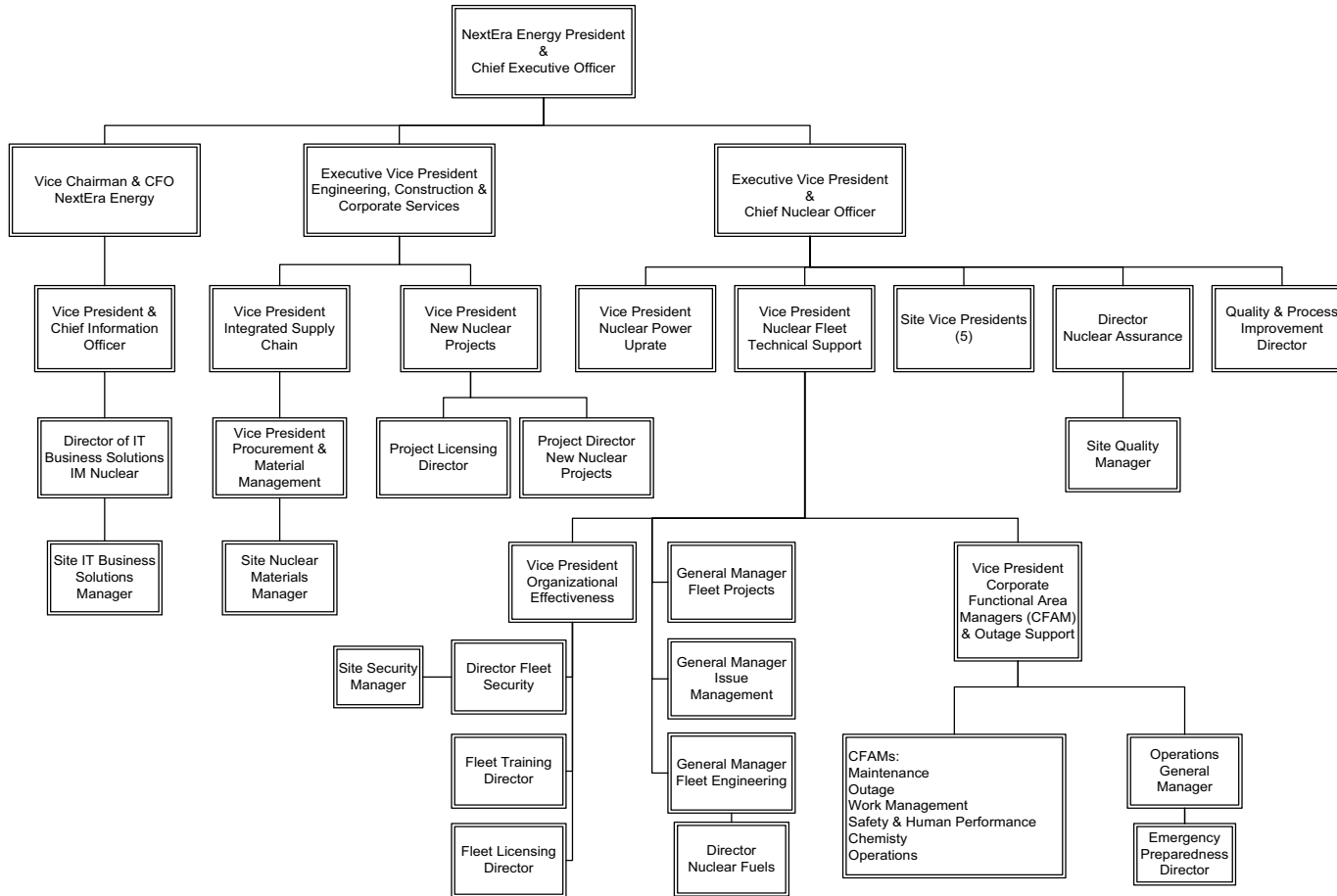


Figure 13.1-203 Corporate and Engineering Organization

## 13.2 Training

This section incorporates by reference NEI 06-13A, Template for an Industry Training Program Description. See [Table 1.6-201](#).

Training programs incorporate instructional requirements to qualify personnel to operate and maintain the facility in a safe manner in all modes of operation ([Reference 202](#)). The programs are developed and maintained in compliance with the facility license and applicable regulations. The training programs are periodically evaluated and revised to reflect industry experience and to incorporate changes to the facility, procedures, regulations, and quality assurance requirements, and are periodically reviewed by management for effectiveness. These training programs are described in site and/or corporate procedures, as appropriate. Sufficient records are maintained and kept available for NRC inspection to verify adequacy of the programs.

The Training Department provides the required training based on individual employee experience, the intended position, and previous training and education. Training Department personnel may be supplemented by other personnel such as subject matter experts, contract staff, and vendor representatives. Formal instruction may be presented through a combination of classroom lectures, e-learning, assigned reading, simulator training and evaluations, and other delivery techniques.

For reactor operators, senior reactor operators, fuel handlers, fire protection personnel, and positions specified in 10 CFR 50.120 ([Reference 13.2-4](#)), programs are developed, established, implemented and maintained using a systems (or systematic) approach to training (SAT) as defined by 10 CFR 55.4 ([Reference 13.2-8](#)) and ANSI/ANS-3.1-1993 ([Reference 13.2-14](#)), as endorsed by Regulatory Guide 1.8 ([Reference 13.2-16](#)).

Initial and continuing training programs accredited by the National Academy for Nuclear Training (NANT) provide personnel with the skills and knowledge to perform assigned tasks. Accredited training programs include the following:

- Non-licensed operator
- Reactor operator
- Senior reactor operator
- Shift manager
- Shift technical advisor
- Continuing training for licensed personnel
- Instrument and control technician and supervisor
- Electrical maintenance personnel and supervisor
- Mechanical maintenance personnel and supervisor
- Chemistry technician
- Radiological protection technician
- Engineering personnel

The results of reviews of operating experience are incorporated into training and retraining programs in accordance with the provisions of TMI Action Item I.C.5, Appendix 1A. Training programs encompass all phases of plant operation including preoperational testing and low-power operation in accordance with the provisions of TMI Action Item I.G.1 ([Reference 13.2-19](#)). Before initial fuel loading, sufficient plant staff will be trained to provide for safe plant operations. [Table 13.4-201](#) provides milestones for training implementation.

Operators involved in the Human Factors Engineering Verification and Validation (V&V) Program receive additional training specific to the task of performing V&V. A systematic approach to training is incorporated in developing this training program along with input from WCAP-14655, Designer's

Input to the Training of the Human Factors Engineering Verification and Validation Personnel (Reference 201).

Chapter 18, Section 18.10 references WCAP 14655. This document describes input from the designer on the training of the operations personnel who participate as subjects in the human factors engineering (HFE) verification and validation. The WCAP also describes how training insights are passed from the designer.

### **13.2.1 Licensed Operator Training**

The Reactor Operator (RO) and Senior Reactor Operator (SRO) training programs, including initial and requalification training, provide the means to train individuals in the knowledge, skills, and abilities needed to perform licensed operator duties. The licensed operator training program includes the requalification program as required by 10 CFR 55.59 (Reference 13.2-13). Collectively, ROs and SROs are referred to as Licensed Operators. Before initial fuel loading, the number of persons trained in preparation for RO and SRO licensing examinations will be sufficient to meet regulatory requirements, with allowances for examination contingencies and without the need for planned overtime.

The site employs a simulator in accordance with 10 CFR 55.46. This simulator is used for training licensed personnel, and for the administration of the operating test.

#### **13.2.1.1 Licensed Operator Initial Training Program**

The Licensed Operator Initial Training Program prepares RO and SRO candidates for the NRC license exam. This program is implemented in accordance with administrative procedures.

##### **13.2.1.1.1 Reactor Operator**

Reactor Operator candidates receive training in the topics listed in 10 CFR 55.41 (Reference 13.2-9). RO candidates receive plant simulator training to demonstrate understanding and the ability to perform the actions listed in 10 CFR 55.45 (Reference 13.2-11).

##### **13.2.1.1.2 Senior Reactor Operator**

In addition to the Reactor Operator topics listed in 10 CFR 55.41 (Reference 13.2-9), candidates for the Senior Reactor Operator license receive training in the topics listed in 10 CFR 55.43 (Reference 13.2-10). SRO candidates receive plant simulator training to demonstrate understanding and the ability to perform the actions listed in 10 CFR 55.45 (Reference 13.2-11).

#### **13.2.1.2 Continuing Training for Licensed Personnel**

Continuing training for licensed personnel consists of regularly scheduled formal instruction, evaluation, and on-the-job training. Training material is developed using the SAT process, and includes Operational Experience (OE). Licensed operators participate in continuing training.

Program content, course schedules and examination schedules comply with 10 CFR 55.59 (Reference 13.2-13). Continuing training for licensed personnel is conducted in accordance with administrative procedures.

## 13.2.2 Training for Positions Listed in 10 CFR 50.120<sup>1</sup>

This section addresses training programs for the positions listed in 10 CFR 50.120 (Reference 13.2-4). The systematic approach to training (SAT) process is used to establish and maintain training programs. Course duration and content are determined by the SAT process and by administrative procedure. This program will commence no later than eighteen months prior to initial fuel loading.

### 13.2.2.1 Non-Licensed Operator (NLO) Initial Training

Personnel employed as NLOs receive instruction on operation of plant equipment and components under normal and emergency conditions. This program is a combination of formal instruction and on-the-job training. Training is given in:

- Fundamentals of mechanical and electrical components
- Operation of equipment and systems
- Operating procedures
- Surveillance requirements
- Operation of systems important to plant safety

In-plant training includes system walk downs, which emphasize the use of procedures, the proper operation of equipment, and safe operating practices.

### 13.2.2.2 Shift Manager Initial Training

Shift managers have been trained as Senior Reactor Operators and receive additional training that addresses higher-level management skills and behaviors, and provides a broader perspective of plant operations. Initial training includes such topics as:

- Application of Operating Experience
- Problem-solving skills
- Planning and managing evolutions
- Maintaining a broad view of plant operations
- Application of observation skills
- Operating philosophy
- Shift team management
- Application of design bases to plant operations
- Emergency Plan
- Transient and Accident Analysis
- Systematic Approach to Training
- Work controls

### 13.2.2.3 Shift Technical Advisor Initial Training Program

Shift technical advisors provide engineering expertise on-shift. Training provides them with the skill and knowledge to monitor equipment and system operation, and assess plant conditions during abnormal and emergency events. Initial training for individuals who fill the position of shift technical advisor includes instruction in the following areas:

- Responses to accidents and analyses of plant transients
- Application of engineering principles to protection of the core
- Mitigation of plant accidents

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1. 10 CFR 52.78 (Reference 13.2-6) requires that Combined License applicants demonstrate compliance with 10 CFR 50.120.

- Basis of plant and systems design
- Reactor theory, thermodynamics, heat transfer, and fluid flow
- General Operating Procedures, Technical Specifications, and Administrative Controls
- Operational transient and accident analysis
- Simulator training, including exercises in the following situations:
  - Plant or reactor startups to include a range such that reactivity feedback from nuclear heat addition is noticeable and heatup rate is established
  - Plant shutdown
  - Manual control of feedwater during startup or shutdown.
  - Significant (10 percent) power changes due to manual changes in control rod position.
- Accident response training

#### **13.2.2.4 Instrumentation and Control (I&C) Technician Initial Training**

Initial training for I&C technicians includes instruction in the following areas:

- Fundamentals of instrumentation and control
- Pneumatic systems and equipment
- Electronics
- Fundamental systems training
- I&C and other job related procedures
- Surveillance requirements
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage
- On-the-job training

On-the-job training allows I&C technicians to practice the skills learned in the classroom under the guidance of experienced and qualified I&C personnel.

#### **13.2.2.5 Electrical Maintenance Initial Training Program**

Initial training for electrical maintenance technicians includes instruction in the following areas:

- Print reading
- Use of electrical tools and test equipment
- Fundamental systems training
- Electrical components and equipment
- Electrical maintenance practices
- Maintenance procedures
- On-the-job training

On-the-job training allows Electricians to practice the skills learned in the classroom under the guidance of experienced and qualified electrical maintenance personnel.

#### **13.2.2.6 Mechanical Maintenance Initial Training Program**

Initial training for mechanical maintenance technicians includes instruction in the following areas:

- Print reading
- Use of hand tools, power tools, and measurement devices
- Fundamental systems training
- Mechanical components and equipment
- Mechanical maintenance practices
- Maintenance procedures

- On-the-job training

On-the-job training allows Mechanics to practice the skills learned in the classroom under the guidance of experienced and qualified mechanical maintenance personnel.

#### **13.2.2.7 Radiological Protection Technician Initial Training**

Initial training for radiological protection technicians includes instruction in the following areas:

- Principles of radiation
- Radiation protection and safety
- Use of survey instruments
- Use of analytical equipment
- Radiation Protection procedures
- Emergency Plan procedures
- ALARA practices and procedures
- Fundamental systems training
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage

On-the-job training provides the trainee opportunities to practice actual operation of radiation protection equipment and use of procedures under the guidance of experienced technicians. Further information on training for radiological protection technicians can be found in [Section 12.5](#).

#### **13.2.2.8 Chemistry Technician Initial Training**

Initial training for chemistry technicians includes instruction in the following areas:

- Chemistry procedures
- Laboratory practices
- Conduct of analytical tests
- Operation of laboratory equipment
- Fundamental systems training
- On-the-job training to include actual operation of analytical equipment and the use of procedures
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage
- Power plant chemistry

On-the-job training provides the trainee opportunities to practice actual operation of analytical equipment and use of procedures under the guidance of experienced technicians.

#### **13.2.2.9 Engineering Personnel Initial Training**

Engineering personnel complete orientation training on topics such as those listed below. The topics are chosen to familiarize engineering support personnel with various aspects of nuclear technology in an operating plant environment. Training topics include:

- Records management and document control
- Applicable industrial and nuclear regulations, codes, and standards
- Procedures and drawings
- Applicable programs such as corrective action, configuration management, work control, and the QA program
- Technical Specifications



- Fundamentals such as reactor theory, heat transfer, fluid flow, properties of materials, and chemistry
- Plant systems, instrumentation, and components
- Plant operations
- Introductory review of accidents
- Design processes

### **13.2.2.10 Continuing Training for Personnel Listed in 10 CFR 50.120**

Non-licensed plant personnel specified in **Subsection 13.2.2** [i.e., personnel listed in 10 CFR 50.120 (**Reference 13.2-4**)] receive continuing training to maintain qualifications and enhance proficiency. Continuing training reinforces initial training by reiterating selected portions of the material. Continuing training also addresses new and modified procedures and plant design changes.

Operating Experience (OE) is included in continuing training, providing personnel with actual examples of good practices and lessons learned. OE topics are selected from Licensee Event Reports, corrective action databases, industry groups, and other sources.

Continuing training material is developed in accordance with the systematic approach to training and is conducted in accordance with administrative procedures.

STA qualifications are maintained by participation in continuing training for licensed personnel.

### **13.2.3 General Employee Training (GET) Program**

#### **13.2.3.1 Plant Access Training**

As part of the GET program, members of the station staff, contractor workers, and unescorted visitors participate in Plant Access Training, which consists of the following topics, prior to being granted unescorted access to the plant:

- Station organization
- Station facilities and layout
- Station administration
- Nuclear plant overview
- Industrial safety
- Fire protection
- Quality assurance and quality control
- Plant security
- Emergency planning
- Radiological orientation
- Appropriate portions of 10 CFR 26 (**Reference 13.2-2**)
- Appropriate portions of 10 CFR 19 (**Reference 13.2-1**)

#### **13.2.3.2 Radiation Worker Training Program**

Personnel whose job duties require them to have unescorted access to radiologically controlled areas of the plant receive instruction in the applicable aspects of radiation protection. Topics include the following:

- Sources of radiation
- Types and measurement of radiation
- Biological effects
- Limits and guidelines, including Reg. Guide 8.13 (**Reference 13.2-18**)

- Concept of As Low As Reasonably Achievable (ALARA)
- Radiation dosimetry
- Contamination
- Internal exposure
- Radiation work permits
- Radiological postings
- Radiological alarms
- Radioactive waste
- Rights and responsibilities
- Protective clothing

### **13.2.3.3 General Employee Requalification Training**

Personnel with unescorted access to the plant participate in annual requalification training. Requalification training includes those topics in [13.2.3.1](#) and [13.2.3.2](#), as applicable to access requirements. Emphasis is placed on significant changes to the plant, plant procedures, government regulations regarding the operation of the plant, and quality assurance requirements. As applicable, training is conducted on industry operating experiences, Licensee Event Reports, and personnel errors.

### **13.2.4 Selected Other Training Programs**

This subsection addresses training for positions not specified by 10 CFR 55 ([Reference 13.2-7](#)) or 10 CFR 50.120 ([Reference 13.2-4](#)).

#### **13.2.4.1 Fire Protection Training**

Initial fire protection training is completed prior to receipt of fuel at the site. Personnel assigned as fire brigade members receive formal training prior to assuming brigade duties, and regularly scheduled retraining. Fire brigade training complies with NFPA Standard 600 ([Reference 13.2-15](#)).

Training appropriate to the assigned work is also provided for the fire protection staff, fire watch personnel, and the general employee. [Subsection 9.5.1](#) includes additional information regarding fire protection training.

#### **13.2.4.2 Emergency Plan Training Program**

Emergency Plan training meets the requirements of 10 CFR 50 Appendix E Section IV.F ([Reference 13.2-5](#)) and the standards of 10 CFR 50.47(b)(15) ([Reference 13.2-3](#)). Further details of the Emergency Plan training program can be found in the Emergency Plan, which is a separate document.

#### **13.2.4.3 Physical Security Training Program**

Training of security personnel is discussed in [Section 13.6](#) and in the Physical Security Plan, which is a separate document.

#### **13.2.4.4 Station Management Training Program**

Station supervisors receive Fitness for Duty (FFD) supervisory training in accordance with 10 CFR 26.22. The remaining definitions and recommendations in this subsection are taken from ANSI/ANS-3.1-1993 ([Reference 13.2-14](#)) as endorsed by Regulatory Guide 1.8 ([Reference 13.2-16](#)).

The qualification requirements for managers and middle managers include training or experience in supervision or management. Training for supervisors develops their skills in the following areas:

- Leadership
- Interpersonal communications
- Management responsibilities and limits
- Motivation of personnel
- Problem analysis and decision making
- Administrative policies and procedures
- Observation skills
- Coaching

### **13.2.5 Training Effectiveness Evaluation Program**

The program to evaluate the effectiveness of training programs is based on three independent inputs or perspectives: the supervisor of the trainee, the trainee, and an educational content evaluation. Each of these reviews is discussed below.

#### **13.2.5.1 Supervisory Review for Training Effectiveness**

The purpose of this review is to monitor the content and effectiveness of training programs as related to the duties and job responsibilities of the trainees. Reviews may be performed by supervisors of employees meeting with appropriate Training personnel, by designated oversight personnel, or by observing subsequent job performance. Observations are discussed to determine topics that may require additional training or subjects that may be removed from the training program.

#### **13.2.5.2 Trainee Review of Training Effectiveness**

Following selected courses, or training cycles, trainees have the opportunity to provide comments regarding the effectiveness of the instructional methods and content relevancy to their jobs. These comments are used in the evaluation of both instruction and content of the training program.

#### **13.2.5.3 Review for Effectiveness of Instructional Techniques and Materials**

Training material and instructional aids are assessed for clarity and applicability. Observations of instructors in the teaching environment are conducted by this qualified individual to monitor classroom performance. Full time instructors receive basic indoctrination in instructional techniques as soon as practicable after assuming instructional duties. The educational specialist conducts periodic seminars in instructional techniques, discussing areas where group performance could be improved and recommends innovative techniques observed at this or other power stations.

### **13.2.6 Combined License Information Item**

The training programs for plant personnel, including the training program for the operations personnel who participate as subjects in the human factors engineering verification and validation and the scope of licensing examinations, as well as new training requirements, are addressed in [Section 13.2](#).

### **13.2.7 References**

- 13.2-1. 10 CFR 19, "Notices, Instructions, and Reports to Workers; Inspection and Investigations"
- 13.2-2. 10 CFR 26, "Fitness for Duty"

- 13.2-3. 10 CFR 50.47, "Emergency Plans"
- 13.2-4. 10 CFR 50.120, "Training and Qualification of Nuclear Power Plant Personnel"
- 13.2-5. 10 CFR 50 Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities"
- 13.2-6. 10 CFR 52.78, "Contents of Applications; Training and Qualification of Nuclear Power Plant Personnel"
- 13.2-7. 10 CFR 55, "Operator's Licenses"
- 13.2-8. 10 CFR 55.4, "Definitions"
- 13.2-9. 10 CFR 55.41, "Written Examinations: Operators"
- 13.2-10. 10 CFR 55.43, "Written Examinations, Senior Operators"
- 13.2-11. 10 CFR 55.45, "Operating Tests"
- 13.2-12. 10 CFR 55.46(c), "Plant-Referenced Simulators"
- 13.2-13. 10 CFR 55.59, "Requalification"
- 13.2-14. American National Standards Institute, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants," ANSI/ANS-3.1-1993
- 13.2-15. National Fire Protection Association, "Standard on Industrial Fire Brigade," NFPA Standard 600, 2005 Edition
- 13.2-16. U.S. Nuclear Regulatory Commission, "Qualification and Training of Personnel for Nuclear Power Plants," Regulatory Guide 1.8, Revision 3, May 2000
- 13.2-17. U.S. Nuclear Regulatory Commission, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Regulatory Guide 1.149, Revision 3, October 2001
- 13.2-18. U.S. Nuclear Regulatory Commission, "Instruction Concerning Prenatal Radiation Exposure," Regulatory Guide 8.13, November, 1980.
- 13.2-19. U.S. Nuclear Regulatory Commission, "Clarification of TMI Action Plan Requirements", NUREG-0737, Revision 3, June 1999
- 13.2-20. U.S. Nuclear Regulatory Commission, "Policy Statement on Engineering Expertise on Shift", GL 86-04
  
- 201. Westinghouse, "Designer's Input to the Training of the Human Factors Engineering Verification and Validation Personnel," WCAP-14655, Revision 1, August 1966.
- 202. NEI 06-13A, "Template for an Industry Training Program Description," Nuclear Energy Institute, Revision 2, March 2009.

## 13.2A — Cold License Training Plan

### LICENSED OPERATOR TRAINING PROGRAM PRIOR TO COMPLETION OF THE FIRST REFUELING OUTAGE

Prior to operation, plant experience requirements specified in Regulatory Guide 1.8 (Revision 3) and ANSI/ANS 3.1-1993 cannot be met. Additionally, other standard guidance for operator selection, training, and qualification cannot be met.

Cold licensing of operators provides the method for operations personnel to acquire the knowledge and experience required for licensed operator duties during the unique conditions of new plant construction and initial operation.

Persons eligible for the cold license process shall meet the following requirements:

- Candidates for a Reactor Operator license shall have a High School Diploma or equivalent as required by R.G. 1.8 Revision 3.
- Candidates for a Senior Reactor Operator license shall have at least one of the following qualifications:
  - Previously held a Senior Reactor Operator license for an operating nuclear power plant.
  - Previously held a Reactor Operator license for an operating nuclear power plant.
  - Bachelor's Degree in engineering or science as defined by R.G. 1.8 Revision 3.
  - Experience as a licensed operator training instructor with an SRO certification. This experience will be evaluated and approved on a case by case basis by the NRC.
  - Two years military experience in a position equivalent to a reactor operator.

The provisions in this section are applicable to each unit of a multiple unit site separately.

The cold licensing process for the selection, training and licensing of Operations personnel for the new nuclear plants adheres to current industry guidance for operating plants with exemptions and alternatives in the following areas.

#### 13.2A.1 Licensed Operator Experience Requirements Prior To Commercial Operation

Licensed operator candidates need not satisfy the experience requirements prior to entering a licensed operator training program. Experience and plant evolution requirements that have not been met at the time the licensed operator examination is administered shall be met prior to issuing the individual's NRC operator license. In such a case, the Licensee will notify the NRC when the candidate meets the experience and plant evolution requirements.

The methods listed below provide the licensed operator candidate with meaningful experience on the reactor for which the license is sought. Methods for gaining meaningful experience include completing systematically designed training courses, and participating in practical work assignments such as preoperational testing, procedure development and validation, human factors engineering activities, task analysis verification, or conducting licensed operator classroom or simulator training. Additionally, for these activities to be considered meaningful, they must be associated with safety significant, defense-in-depth, or other major plant components or systems. All cold licensed operator candidates will:

- Complete a systematically designed site layout course.
- Complete a site-specific non-licensed operator on-the-job training program on selected non-licensed operator tasks. The selected non-licensed operator tasks are those tasks that are important to plant operation with regard to nuclear safety, defense-in-depth, or that are risk significant.
- Participate in practical work assignments for a minimum of six months that includes preoperational testing, and one or more of the following:
  - Procedure development and validation
  - Human factors engineering activities
  - Task analysis verification
  - Licensed operator classroom presentations or simulator training implementation

Senior reactor operator cold license candidates will complete a site-specific reactor operator and senior reactor operator training course.

Senior reactor operator cold license candidates without "hot" plant experience will complete a plant operational excellence course that is conducted in a plant simulator or they will observe control room activities at an operating nuclear plant for at least six weeks. The course and the observation activity are designed to familiarize the candidate with the operational interfaces encountered by decision makers in a nuclear plant control room.

Hot plant experience is defined as performance of senior reactor operator duties for at least six months including:

- At least 6 weeks of operation above 20 percent power
- A startup from subcritical to 20 percent power
- A shutdown from above 20 percent power to cold (less than 212°F) and subcritical
- Startup preparations following a fueling or refueling outage

The startup, shutdown, and startup preparations may have been performed at an operating plant or a plant simulator.

**Table 13.2A-201**, Comparison of Hot and Cold License Guidance, shows the current experience requirement and the associated cold license experience method. **Table 13.2A-202**, Illustration of Cold Licensing Plan by Candidate Type, shows education and experience methods for each licensed operator candidate type.

### **13.2A.2 Crew Experience Requirements during First Year of Operation**

Each operating crew's cumulative nuclear power plant experience shall be > 6 years; and the crew's cumulative power plant experience shall be > 13 years.

The crew's cumulative nuclear power plant experience is gained by working at nuclear power plants and military nuclear propulsion plants, conducting licensed operator training, participating in new nuclear plant construction and testing, and completing academic degree requirements. The

cumulative crew nuclear power plant experience is the sum of each individual's experience after applying weighting factors and maximum credit limits in [Table 13.2A-201](#), Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies.

When determining cumulative nuclear power plant experience, all 6 years shall not be attributed from one crew member.

The crew's cumulative power plant experience is the sum of each individual's power plant experience. Power plant experience, for example, is experience gained by working at nuclear power plants, conventional power plants, and military propulsion plants. Cumulative power plant experience does not involve weighting factors or maximum credit limits.

In addition to the experience requirement mentioned above, each operating crew shall be staffed with a senior reactor operator with hot plant experience (previously defined in 1.1, Licensed Operator Experience Requirements Prior to Commercial Operation). If a senior reactor operator with hot plant experience is not available, then a shift advisor may be substituted. The shift advisor will have at least one year of on-shift licensed senior reactor operator experience at a similar type (PWR/BWR) operating plant, and will have completed a training program on the design for which they are advising. While observing crew performance, the shift advisor will make recommendations to the shift manager only, and will not interfere with the licensed responsibilities of the operating crew. The shift advisor will have direct access to plant senior management to resolve issues. Shift advisor duties include, but are not limited to the following:

- Monitor procedure adherence
- Observe the conduct of prejob briefs shift turnover, plant evolutions, non- licensed operator rounds, plant tours, and post job debriefs
- Monitor overall station risk

Weighting factors and maximum credit limits for determining cumulative nuclear power plant operating crew experience are shown in [Table 13.2A-203](#), Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies.

### **13.2A.3 Conduct of On-the-Job Training (OJT)**

Until plant construction is completed, acceptable methods for the conduct of on-the-job training include discussion, simulation, and use of mockup equipment and virtual reality technology.

### **13.2A.4 Use of Part-Task/Limited Scope Simulators**

Part-task or limited scope simulators may be used during licensed operator training.

### **13.2A.5 Licensed Operator Continuing Training**

Licensed operator continuing training begins within 90 days following the issuance of the first operator license. Continuing training content is systematically determined to maintain operator knowledge of plant operation.

### **13.2A.6 Cold Licensing Process Applicability and Termination**

The cold licensing process described in this document may be applied to each unit of a multi-unit site.

Cold license guidance items 1 through 9 on **Table 13.2A-201** will apply to any licensed operator training class started prior to initial fuel load.

Cold license guidance items 3 through 9 on **Table 13.2A-201** will apply to any licensed operator training class started after initial fuel load and before completion of the first refueling outage. Items 1 and 2 cold license guidance are no longer allowable after initial fuel load.

The cold licensing process will terminate after completion of the first refueling outage.

As plant systems, components, and structures are completed, and as integrated plant operations begin, the systematic approach to training process will be used to adjust cold license class training methods and settings used to implement the guidance in **Table 13.2A-201** items 1 through 9. The purpose is to optimize student learning using actual in-plant training and experience opportunities as they become available.

### **13.2A.7 Initial Licensed Operator Examination Schedule**

Administration of licensed operator examinations begins approximately 18 months prior to fuel load.

### **13.2A.8 References**

- 13.2-201. Nuclear Energy Institute (NEI), "Technical Report on a Template for an Industry Training Program Description," NEI 06-13A



**Table 13.2A-201  
Comparison of Hot and Cold License Guidance**

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p>1. Six months onsite at reactor for which license is sought.</p>	<p>All</p>	<p>ANSI 3.1-1993; 4.4.1 4.4.2 4.5.1. Regulatory Guide 1.8 Rev 3: 2.8 2.10. NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments and Complete a site layout course</p>
<p>2. One year onsite at the reactor for which the license is sought with six months as a nonlicensed operator.</p>	<p>Reactor operator</p>	<p>ANSI 3.1-1993: 4.5.1. Regulatory Guide 1.8 Rev 3: 2.10. NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments and Complete a site layout course and Complete a site-specific non-licensed operator training program for selected nonlicensed operator tasks</p>

**Table 13.2A-201  
Comparison of Hot and Cold License Guidance**

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p><b>3.</b> Pre-requisite experience requirements must be met to enter training program.</p>	<p>All</p>	<p>NUREG 1021 Rev 9 ES-202 Section D.</p>	<p>Applicable experience requirements shall be met prior to NRC license issuance.</p>
<p><b>4.</b> Three years power plant experience at least one of which should have been at the plant for which the license is sought.</p>	<p>Reactor operator</p>	<p>ANSI 3.1-1993: 4.5.1 Regulatory Guide 1.8 Rev 3: 2.10 NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments and Cumulative operating crew experience requirements apply</p>
<p><b>5.</b> Reactor operator license actively involved in the performance of licensed duties for at least one year.</p>	<p>Senior reactor operator (Non-degreed)</p>	<p>Regulatory Guide 1.8 Rev 3: 2.8 NUREG 1021 Rev 9 ES-202</p>	<p>Complete a site layout course and Complete a site-specific non-licensed operator training program for selected nonlicensed operator tasks and Complete a reactor operator and senior reactor operator training course</p>

**Table 13.2A-201  
Comparison of Hot and Cold License Guidance**

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p>6. At least three years of responsible nuclear power plant experience.</p>	<p>Senior reactor operator (Degreed)</p>	<p>Regulatory Guide 1.8 Rev 3: 1.3 2.8</p>	<p>Complete a site layout course  and  Complete a site-specific non-licensed operator training program for selected nonlicensed operator tasks  and  Complete a reactor operator and senior reactor operator training course</p>
<p>7. At least six weeks of operation above 20% power, and startup from subcritical to 20% power, and shutdown from above 20% power to cold (less than 212°F) and subcritical, and startup preparations following a fueling or refueling outage.</p>	<p>Shift Supervisor (Shift Manager)</p>	<p>ANSI 3.1-1993: 4.4.1</p>	<p>Cumulative Operating Crew Experience requirements apply  and  Complete a Plant Operational Excellence Course or plant observation activity</p>

**Table 13.2A-201  
Comparison of Hot and Cold License Guidance**

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p><b>8.</b> At least six weeks of operation above 20% power.</p>	<p>Senior reactor operator</p>	<p>ANSI 3.1-1993: 4.4.2</p>	<p>Cumulative Operating Crew Experience requirements apply  and  Complete a Plant Operational Excellence Course or plant observation activity</p>
<p><b>9.</b> Three years power plant experience and three years nuclear power plant experience</p>	<p>Senior reactor operator</p>	<p>ANSI 3.1-1993 4.4.1 4.4.2 Regulatory Guide 1.8 Rev 3: 2.8  NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments  and  Cumulative Operating Crew Experience requirements apply</p>

**Table 13.2A-202**  
**Illustration of Cold Licensing Plan by Candidate Type**

License Candidate	Education	Site Layout Course	NLO Task Training	RO Training	SRO Training	Plant Operational Excellence Course or Observation Activity	Six Months Practical Work Assignments (1)
Reactor operator	High school diploma	Yes	Yes	Yes	N/A	N/A	Yes
Senior reactor operator – degreed manager or degreed nonlicensed operator or technical staff	Bachelor of Science or equivalent in engineering, engineering technology, or physical science	Yes	Yes	Yes	Yes	Yes	Yes
Senior reactor operator – previous license or military equivalent	High school diploma	Yes	Yes	Yes	Yes	Yes (2)	Yes
Senior reactor operator – certified instructor	High school diploma	Yes	Yes	Yes	Yes	Yes	Yes

(1): practical work assignments includes activities such as participating in preoperational testing, procedure development and validation, human factors engineering activities, and task analysis verification, or conducting licensed operator classroom or simulator training

(2): No, if candidate has hot license experience

**Table 13.2A-203  
Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)**

Type of Experience	Weighting Factor	Max Credit	Justification
1. Commercial Nuclear Plant RO/SRO on same type plant (PWR/BWR)	1.00	No Limit	Task Analysis for same type plant are essentially the same
2. Commercial Nuclear Plant RO/SRO from different type plant (PWR/BWR)	0.75	No Limit	Task Analysis demonstrates that 75% of PWR/BWR tasks are similar
3. Military Nuclear Propulsion Plant Experience (Propulsion Plant Watch Officer, Engineering Watch Supervisor, Reactor Operator, Engineering Officer of the Watch, Propulsion Plant Watch Supervisor)	0.5	36 months	For these military nuclear propulsion plant watch qualifications, approximately 50% of the job tasks are similar
4. Military Nuclear Propulsion Plant Experience (Other than watch qualifications in 3 above such as Machinist Mate, Electricians Mate, Engineering Laboratory Technician, or Electronics Technician)	0.25	36 months	For these (other) watch qualifications, a range of similarities between job tasks (25-75%) exists, so a conservative value of 25% is credited

**Table 13.2A-203  
Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)**

Type of Experience	Weighting Factor	Max Credit	Justification
5. Reference Plant Simulator	5.00	12 months	Industry analysis demonstrated that activities completed in a simulator, compare to an operating Control Room, occur in a ratio of approx. 400/1
6. Limited Scope Simulator	3.00	9 months	Similar to Reference Plant
7. Actual nuclear plant experience during construction	0.25	12 months	Approximately 25% of the tasks during construction testing in preparation for system turnover to operations is similar to an operating facility
8. Actual nuclear plant experience during pre-operational testing	0.75	12 months	75% of tasks during pre- operational testing are similar to an operating facility
9. Actual nuclear plant experience during fuel load and startup testing	1.00	12 months	Tasks during initial startup are similar to operating facility

**Table 13.2A-203  
Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)**

Type of Experience	Weighting Factor	Max Credit	Justification
10. License Classroom training	0.25	9 months	Theory of ops and specific plant design knowledge is critical to an operator's success
11. Participation in operator duties at another commercial nuclear facility. This includes nonlicensed operator duties	0.75	12 months	Task similarities
12. Other Nuclear Plant experience	0.25	12 months	Procedure writing, facility operation (water plant and other support facilities, etc)
13. Licensed operator instructor	0.50	12 months	Instructors will have participated in a train-the- trainer program that includes simulator, classroom (systems, theory).
14. Bachelors Degree in an Engineering, Science or Technical field	n/a	24 months	College work (in these fields) gives student an understanding of the fundamentals of plant operations



**Table 13.2A-203  
Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)**

Type of Experience	Weighting Factor	Max Credit	Justification
15. Associates Degree (technical)	n/a	6 months	Student gains knowledge of fundamentals
(1): Weighting factors and max credit values based on those in "Industry Evaluation of Operating Shift Experience Requirements" By: J.H. Miller Jr. 2/24/1984, and endorsed by Generic Letter number 84-16, Adequacy of On-Shift Operating Experience For Near Term Operating License Applicants, except for shaded rows which are added experience types based on new technology or additional analysis.			

### 13.3 Emergency Planning

See [Subsection 1.2.5](#) for the locations of the technical support center, the operations support center and the decontamination facilities. See [Section 9.4](#) for a description of the HVAC systems for the main control room/control support area and the annex building. See [Section 18.8](#) for the high level requirements for the technical support center and the operations support center. See [Section 7.5](#) for identification of plant variables that are provided for interface to the emergency planning areas.

Communication interfaces among the main control room, the technical support center and the emergency planning centers are discussed [below](#).

Staffing of the emergency operations facility occurs consistent with current operating practice and with revision 1 of NUREG-0654/FEMA-REP-1.

The emergency planning information is submitted to the Nuclear Regulatory Commission as a separate licensing document and is incorporated by reference. (see [Table 1.6-201](#)).

Post-72 hour support actions, as discussed in [Subsections 1.9.5.4](#) and [6.3.4](#), are addressed in [Subsections 6.2.2](#), [8.3](#), and [9.1.3](#). Provisions for establishing post-72 hour ventilation for the main control room, instrumentation and control rooms, and dc equipment rooms are established in operating procedures.

The emergency plan describes the plans for coping with emergency situations, including communications interfaces and staffing of the emergency operations facility.

[Table 13.4-201](#) provides milestones for emergency planning implementation.

#### 13.3.1 Combined License Information Item

Emergency planning including post-72 hour actions and its communication interface are addressed in [Section 13.3](#).

Activation of the emergency operations facility consistent with current operating practice and NUREG-0654/FEMA-REP-1 is addressed in [Section 13.3](#) and in the [Emergency Plan](#).

## 13.4 Operational Programs

Operational programs are specific programs that are required by regulations. Table 13.4-201 lists each operational program, the regulatory source for the program, the section of the FSAR in which the operational program is described, and the associated implementation milestone(s).

### 13.4.1 Combined License Information Item

Operational programs are addressed in Section 13.4.

### 13.4.2 References

201. ASME Boiler and Pressure Vessel Code (B&PVC), “Section XI - Rules for Inservice Inspection of Nuclear Power Plant Components.”
202. ASME “OM Code for the Operation and Maintenance of Nuclear Power Plants.”

**Table 13.4-201 (Sheet 1 of 6)**  
**Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
1.	Inservice Inspection Program	10 CFR 50.55a(g)	5.2.4, 5.4.2.5, 6.6	Prior to Commercial service	10 CFR 50.55a(g), ASME XI IWA 2430(b) (Reference 201)
2.	Inservice Testing Program	10 CFR 50.55a(f), 10 CFR Part 50, Appendix A	3.9.6, 5.2.4	After generator online on nuclear heat <sup>(a)</sup>	10 CFR 50.55a(f), ASME OM Code (Reference 202)
3.	Environmental Qualification Program	10 CFR 50.49(a)	3.11	Prior to initial fuel load	License Condition
4.	Preservice Inspection Program	10 CFR 50.55a(g)	5.2.4, 5.4.2.5, 6.6	Completion prior to initial plant start-up	10 CFR 55a(g), ASME Code Section XI IWB-2200(a) (Reference 201)
5.	Reactor Vessel Material Surveillance Program	10 CFR 50.60, 10 CFR 50.61, 10 CFR Part 50, Appendix H	5.3.2.6	Prior to initial criticality	License Condition
6.	Preservice Testing Program	10 CFR 50.55a(f)	3.9.6	Prior to initial fuel load	License Condition
7.	Containment Leakage Rate Testing Program	10 CFR 50.54(o), 10 CFR Part 50, Appendix A (GDC 52), 10 CFR Part 50, Appendix J	6.2.5.1	Prior to initial fuel load	License Condition
8.	Fire Protection Program  (portions applicable to radioactive material)	10 CFR 50.48  10 CFR 30.32 10 CFR 40.31 10 CFR 70.22	9.5.1.8	Prior to receipt of fuel onsite Prior to initial fuel load  Prior to initial receipt of byproduct, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18)	License Condition  10 CFR 30.32(a) 10 CFR 40.31(a) 10 CFR 70.22(a)

**Table 13.4-201 (Sheet 2 of 6)  
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
9.	Process and Effluent Monitoring and Sampling Program:				
	Radiological Effluent Technical Specifications/Standard Radiological Effluent Controls	10 CFR 20.1301 and 20.1302, 10 CFR 50.34a, 10 CFR 50.36a, 10 CFR Part 50, Appendix I, Section II and IV	11.5	Prior to initial fuel load	License Condition
	Offsite Dose Calculation Manual	Same as above	11.5	Prior to initial fuel load	License Condition
	Radiological Environmental Monitoring Program	Same as above	11.5	Prior to initial fuel load	License Condition
	Process Control Program	Same as above	11.4	Prior to initial fuel load	License Condition
10.	Radiation Protection Program (including ALARA principle)	10 CFR 20.1101 10 CFR 20.1406	12.1, 12.5		License Condition
	<ul style="list-style-type: none"> <li>• Radioactive Source Control (assignment of RP Supervisor)</li> <li>• Assignment of RP Supervisor</li> <li>• Minimization of Contamination</li>   <li>• Personnel Dosimetry</li> <li>• Radiation Monitoring and Surveys</li> <li>• Radiation Work Permits</li>   <li>• Assignment of RP Manager</li> <li>• Respiratory Protection</li> <li>• Bioassay</li> <li>• Effluents and Environmental Monitoring and Assessment</li> <li>• Job Coverage</li>   <li>• Radioactive Waste Shipping</li> </ul>		<ol style="list-style-type: none"> <li>1. Prior to initial receipt of byproduct, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18)</li>   <li>2. Prior to receipt of fuel onsite</li>   <li>3. Prior to initial fuel load</li>   <li>4. Prior to first shipment of radioactive waste</li> </ol>		

**Table 13.4-201 (Sheet 3 of 6)**  
**Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
11.	Non-Licensed Plant Staff Training Program  (portions applicable to radioactive material)	10 CFR 50.120  10 CFR 30.32 10 CFR 40.31 10 CFR 70.22	13.2	18 months prior to scheduled date of initial fuel load  Prior to initial receipt of byproduct, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18)	10 CFR 50.120(b)  10 CFR 30.32(a) 10 CFR 40.31(a) 10 CFR 70.22(a)
12.	Reactor Operator Training Program	10 CFR 55.13, 10 CFR 55.31, 10 CFR 55.41, 10 CFR 55.43, 10 CFR 55.45	13.2	18 months prior to scheduled date of initial fuel load	License Condition
13.	Reactor Operator Requalification Program	10 CFR 50.34(b), 10 CFR 50.54(i), 10 CFR 55.59	13.2	Within 3 months after the date the Commission makes the finding under 10 CFR 52.103(g)	10 CFR 50.54 (i-1)
14.	Emergency Planning	10 CFR 50.47, 10 CFR Part 50, Appendix E	13.3	Full participation exercise conducted within 2 years of scheduled date for initial loading of fuel.  Onsite exercise conducted within 1 year before the schedule date for initial loading of fuel  Applicant's detailed implementing procedures for its emergency plan submitted at least 180 days prior to scheduled date for initial loading of fuel.	10 CFR Part 50, Appendix E, Section IV.F.2.a(ii)  10 CFR Part 50, Appendix E, Section IV.F.2.a(ii)  10 CFR Part 50, Appendix E, Section V

**Table 13.4-201 (Sheet 4 of 6)**  
**Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
15.	Security Program: Physical Protection Program (applicable to protection of special nuclear material prior to the protected area being declared operational) Physical Security Program  Safeguards Contingency Program  Training and Qualification Program	10 CFR 73.1 10 CFR 73.67  10 CFR 73.55(b); 10 CFR 73.55(c)(3); 10 CFR 73.56; 10 CFR 73.57;  10 CFR 73.55(c)(5); 10 CFR 73.55(k); 10 CFR Part 73, Appendix C  10 CFR 73.55(c)(4); 10 CFR 73.55(d)(3); 10 CFR Part 73, Appendix B	13.5.2.2.8 13.6  13.6  13.6  13.6	180 days prior to initial receipt of new fuel or non-fuel special nuclear material  Prior to receipt of fuel onsite (protected area)  Prior to receipt of fuel onsite (protected area)  Prior to receipt of fuel onsite (protected area)	10 CFR 73.1(a) 10 CFR 73.67  10 CFR 73.55(a)(4)  10 CFR 73.55(a)(4)  10 CFR 73.55(a)(4)
16.	Quality Assurance Program – Operation	10 CFR 50.54(a), 10 CFR Part 50, Appendix A (GDC 1),  10 CFR Part 50, Appendix B	17.5	COL issuance	10 CFR 50.54(a)(1)
17.	Maintenance Rule	10 CFR 50.65	17.6	Prior to fuel load authorization per 10 CFR 52.103(g)	10 CFR 50.65(a)(1)
18.	Motor-Operated Valve Testing	10 CFR 50.55a(b)(3)(ii)	3.9.6.2.2	Prior to initial fuel load	License Condition
19.	Initial Test Program	10 CFR 50.34, 10 CFR 52.79(a)(28)	14.2	Prior to the first construction test being conducted for the Construction Test Program  Prior to the first preoperational test for the Preoperational Test Program  Prior to initial fuel load for the Startup Test Program	License Condition

**Table 13.4-201 (Sheet 5 of 6)  
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
20.	Fitness for Duty (FFD) Program for Construction (workers and first-line supervisors)	10 CFR 26.4(f)	13.7	Prior to initiating 10 CFR Part 26 construction activities	10 CFR Part 26, Subpart K
	FFD Program for Construction (management and oversight personnel)	10 CFR 26.4(e)	13.7	Prior to initiating 10 CFR Part 26 construction activities	10 CFR Part 26, Subparts A–H, N, and O
	FFD Program for Security Personnel	10 CFR 26.4(e)(1)	13.7	Prior to initiating 10 CFR Part 26 construction activities	10 CFR Part 26, Subparts A–H, N, and O
		10 CFR 26.4(a)(5) or 26.4(e)(1)		Prior to the earlier of: A. Licensee’s receipt of SNM in the form of fuel assemblies, or B. Establishment of a protected area, or C. The 10 CFR 52.103(g) finding	10 CFR Part 26, Subparts A–I, N, and O
	FFD Program for FFD Program personnel	10 CFR 26.4(g)	13.7	Prior to initiating 10 CFR Part 26 construction activities	10 CFR Part 26, Subparts A, B, D–H, N, O, and C per licensee’s discretion
	FFD Program for persons required to physically report to the Technical Support Center (TSC) or Emergency Operations Facility (EOF)	10 CFR 26.4(c)	13.7	Prior to the conduct of the first full-participation emergency preparedness exercise under 10 CFR Part 50, App. E, Section F.2.a	10 CFR Part 26, Subparts A–I, N, and O, except for §§26.205–209
FFD Program for Operation	10 CFR Part 26.4(a) and (b)	13.7	Prior to the earlier of: A. Establishment of a protected area, or B. The 10 CFR 52.103(g) finding	10 CFR Part 26, Subparts A–I, N, and O, except for individuals listed in §26.4(b), who are not subject to §§26.205–209	



**Table 13.4-201 (Sheet 6 of 6)  
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
21.	Cyber Security Program	10 CFR 73.54(b); 10 CFR 73.55(b)(8); 10 CFR 73.55(c)(6)	13.6	Prior to receipt of fuel onsite (protected area)	10 CFR 73.55(a)(4)
22.	SNM Material Control and Accounting Program	10 CFR 74, Subpart B (§§ 74.11 – 74.19, excl. § 74.17)	13.5.2.2.9	Prior to receipt of special nuclear material.	License Condition

(a) Inservice Testing Program will be fully implemented by generator on line on nuclear heat. Appropriate portions of the program are implemented as necessary to support the system operability requirements of the technical specifications

## 13.5 Plant Procedures

This section describes the administrative and other procedures that the operating organization (plant staff) uses to conduct the routine operating, abnormal, and emergency activities in a safe manner.

The Quality Assurance Program Description (QAPD), as discussed in [Section 17.5](#), describes procedural document control, record retention, adherence, assignment of responsibilities, and changes.

Procedures are identified in this section by topic, type, or classification in lieu of the specific title and represent general areas of procedural coverage.

Procedures are issued prior to fuel load to allow sufficient time for plant staff familiarization and to develop operator licensing examinations.

The format and content of procedures are controlled by the applicable AP1000 Writer's Guideline.

Each procedure is sufficiently detailed for an individual to perform the required function without direct supervision, but does not provide a complete description of the system or plant process. The level of detail contained in the procedure is commensurate with the qualifications of the individual normally performing the function.

Procedures are developed consistent with guidance described in [Section 18.9](#), "Procedure Development" and with input from the human factors engineering process and evaluations.

References to applicable combined license information are included in [Section 1.8](#). This includes, for example, reference to guidelines on inservice inspection in [Chapters 3](#) and [8](#), and initial testing in [Chapter 14](#). Operational experience and the resolution of generic issues to be considered in the preparation of plant procedures are outlined in [Section 1.9](#). Procedures to perform rod control system surveillance tests specified in WCAP-13864, Revision 1 ([Reference 7](#)), at the beginning of each fuel cycle will be provided as discussed in [Subsection 13.5.3](#). All portions of the safety-related logic circuitry will be adequately covered in the surveillance procedures as described in Generic Letter 96-01 ([Reference 8](#)).

The acceptability of the computerized procedure system, and its backup, for application to the AP1000 design will be determined as outlined in [Section 18.8](#).

The development of plant specific refueling plans ([Appendix 19E](#) provides input for refueling plans) is as discussed in [Subsection 13.5.2.1](#).

Outage plans are discussed in [Subsection 13.5.2.1](#) and should as a minimum address the following elements:

- An outage philosophy, which includes safety as a primary consideration in outage planning and implementation,
- Separate organizations responsible for scheduling and overseeing the outage; provisions for an independent safety review team that would be assigned to perform final review and grant approval for outage activities,
- Control procedures, which address both the initial outage plan and all safety-significant changes to schedule,
- Provisions to ensure that all activities receive adequate resources,

- Provisions to ensure defense-in-depth during shutdown and ensure that margins are not reduced; an alternate or backup system must be available if a safety system or a defense-in-depth system is removed from service, and
- Provisions to ensure that all personnel involved in outage activities are adequately trained; this should include operator simulator training to the extent practicable; other plant personnel, including temporary personnel, should receive training commensurate with the outage tasks they will be performing.

If freeze seals are to be used, plant-specific guidelines will be developed to reduce the potential for loss of RCS boundary and inventory when they are in use.

### 13.5.1 Administrative Procedures

This section describes administrative procedures that provide administrative control over activities that are important to safety for the operation of the facility.

Procedures outline the essential elements of the administrative programs and controls as described in ANSI/ANS 3.2-1988 (Reference 201) and in Section 17.5. These procedures are organized such that the program elements are prescribed in documents normally referred to as administrative procedures. Regulatory and industry guidance for the appropriate format, content and typical activities delineated in written procedures is implemented as appropriate.

Administrative procedures contain adequate programmatic controls to provide effective interface between organizational elements. This includes contractor and owner organizations providing support to the station operating organization.

A Writer's Guideline promotes the standardization and application of human factors engineering principles to procedures. The Writer's Guideline establishes the process for developing procedures that are complete, accurate, consistent, and easy to understand and follow. The Writer's Guideline provides objective criteria so that procedures are consistent in organization, style, and content. The Writer's Guideline includes criteria for procedure content and format including the writing of action steps and the specification of acceptable acronym lists and acceptable terms to be used.

Procedure maintenance and control of procedure updates are performed in accordance with the QAPD, as discussed in Section 17.5.

The administrative programs and associated procedures developed in the pre-COL phase are described in Table 13.5-201 (for future designation as historical information).

The plant administrative procedures provide procedural instructions for the following:

- Procedures review and approval.
- Equipment control procedures - These procedures provide for control of equipment, as necessary, to maintain personnel and reactor safety, and to avoid unauthorized operation of equipment.
- Control of maintenance and modifications.
- Crane Operation Procedures - Crane operators who operate cranes over fuel pools are qualified and conduct themselves in accordance with ANSI B30.2 (Chapter 2-3), "Overhead and Gantry Cranes" (Reference 202).

- Temporary changes to procedures.
- Temporary procedure issuance and control.
- Special orders of a temporary or self-canceling nature.
- Standing orders to shift personnel, including the authority and responsibility of the shift manager, unit supervisor, reactor control operator, and shift technical advisor
- Manipulation of controls and assignment of shift personnel to duty stations per the requirements of 10 CFR 50.54 (i), (j), (k), (l), and (m) including delineation of the space designated for the “At the Controls” area of the control room.
- Shift relief and turnover procedures.
- Fitness for Duty.
- Control Room access.
- Working hour limitations.
- Feedback of design, construction, and applicable important industry and operating experience.
- Shift Manager administrative duties.
- Verification of correct performance of operational activities.
- A vendor interface program that provides vendor information for safety related components is incorporated into plant documentation.
- Fire protection program implementation.
- A process for implementing the safety/security interface requirements of 10 CFR 73.58.

A process is in effect at the time of issuance of the combined license and was developed using NRC endorsed industry guidance. This process is used to manage safety/security interface while the security procedures and emergency plan implementing procedures are being developed and implemented.

## **13.5.2 Operating and Maintenance Procedures**

### **13.5.2.1 Operating and Emergency Operating Procedures**

The process to manage the development, review, and approval of AP1000 Normal Operating, Abnormal Operating, Emergency Operating, Refueling and Outage Planning, Alarm Response, Administrative, Maintenance, Inspection, Test, and Surveillance Procedures, as well as the procedures which address the operation of post-72 hour equipment, is delineated in APP-GW-GLR-040 (**Reference 10**). In addition, APP-GW-GLR-040 provided to the NRC the Writer’s Guidelines for Normal Operating and Two-Column Format Procedures, APP-GW-GJP-100 and APP-GW-GJP-200, respectively.

### **13.5.2.2 Maintenance and Other Operating Procedures**

The QAPD, as described in [Section 17.5](#), provides guidance for procedural adherence. Regulatory and industry guidance for the appropriate format, content, and typical activities delineated in written procedures is implemented as appropriate.

#### **13.5.2.2.1 Plant Radiation Protection Procedures**

The plant radiation protection program is contained in procedures. Procedures are developed and implemented for such things as: maintaining personnel exposures, plant contamination levels, and plant effluents ALARA; monitoring both external and internal exposures of workers, considering industry-accepted techniques; routine radiation surveys; environmental monitoring in the vicinity of the plant; radiation monitoring of maintenance and special work activities; evaluation of radiation protection implications of proposed modifications; establishing quality assurance requirements applicable to the radiation protection program; and maintaining radiation exposure records of workers and others.

#### **13.5.2.2.2 Emergency Preparedness Procedures**

A discussion of emergency preparedness procedures can be found in the Emergency Plan.

#### **13.5.2.2.3 Instrument Calibration and Test Procedures**

The QAPD, as discussed in [Section 17.5](#), provides a description of procedural requirements for instrumentation calibration and testing.

#### **13.5.2.2.4 Chemistry Procedures**

Procedures provided for chemical and radiochemical control activities include the nature and frequency of sampling and analyses; instructions for maintaining fluid quality within prescribed limits; the use of control and diagnostic parameters; and limitations on concentrations of agents that could cause corrosive attack, foul heat transfer surfaces or become sources of radiation hazards due to activation.

Procedures are also provided for the control, treatment, and management of radioactive wastes and control of radioactive calibration sources.

#### **13.5.2.2.5 Radioactive Waste Management Procedures**

Procedures for the operation of the radwaste processing systems provide for the control, treatment, and management of onsite radioactive wastes. Procedural controls are in place for radiological releases.

As required by License Condition, operating procedures that include provisions to assure that  $A_2$  quantities for radionuclides specified in Appendix A to 10 CFR Part 71 are not exceeded will be developed, implemented and maintained prior to initial fuel load. Procedural controls limit the radionuclide inventory to less than the  $A_2$  limit in each of the three (3) monitor tanks, and in each of up to three (3) mobile radwaste processing systems. Procedures also ensure that any additional equipment to be located in the radwaste building is limited to  $A_2$  quantities. Spent media transfer from a mobile radwaste processing system located in the radwaste building is procedurally controlled such that spent media transfer and packaging for offsite shipment must be complete prior to placing the mobile radwaste processing system back into service. The procedures also ensure that the total cumulative source term of unpackaged wastes, including liquid waste, wet waste, solid waste, gaseous waste, activated or contaminated metals and components, and contaminated waste present

at any time in the radwaste building is limited consistent with RG 1.143, Revision 2, unmitigated radiological release criteria (as revised by Standard Review Plan 11.2, SRP Acceptance Criterion 3), so that an unmitigated release, occurring over a two hour time period, would not result in a dose of greater than 100 millirem at the protected area boundary, or an unmitigated exposure, occurring over a two hour time period, would not result in a dose of greater than 5 rem to site personnel located 10 feet from the total cumulative radioactive inventory. The unmitigated, unshielded worker dose is calculated at 10 feet from the source. Unlimited worker occupancy workstations and low dose rate waiting areas are located no closer than 10 feet from a mobile radwaste processing system or a waste monitor tank. The liquid radwaste system is discussed in [Section 11.2](#).

### **13.5.2.2.6 Maintenance, Inspection, Surveillance, and Modification Procedures**

#### **13.5.2.2.6.1 Maintenance Procedures**

Maintenance procedures describe maintenance planning and preparation activities. Maintenance procedures are developed considering the potential impact on the safety of the plant, license limits, availability of equipment required to be operable, and possible safety consequences of concurrent or sequential maintenance, testing or operating activities.

Maintenance procedures contain sufficient detail to permit the maintenance work to be performed correctly and safely. Procedures include provisions for conducting and recording results of required tests and inspections, if not performed and documented under separate test and inspection procedures. References are made to vendor manuals, plant procedures, drawings, and other sources as applicable.

Instructions are included, or referenced, for returning the equipment to its normal operating status. Testing is commensurate with the maintenance that has been performed. Testing may be included in the maintenance procedure or be covered in a separate procedure.

The preventive maintenance program, including preventive and predictive procedures, as appropriate for structures, systems and components, prescribes the frequency and type of maintenance to be performed. An initial program based on service conditions, experience with comparable equipment and vendor recommendations is developed prior to fuel loading. The program is revised and updated as experience is gained with the equipment. To facilitate this, equipment history files are created and kept current. The files are organized to provide complete and easily retrievable equipment history.

#### **13.5.2.2.6.2 Inspection Procedures**

The QAPD, as discussed in [Section 17.5](#), provides a description of procedural requirements for inspections.

#### **13.5.2.2.6.3 Modification Procedures**

Plant modifications and changes to setpoints are developed in accordance with approved procedures. These procedures control necessary activities associated with the modifications such that they are carried out in a planned, controlled, and orderly manner. For each modification, design documents such as drawings, equipment and material specifications, and appropriate design analyses are developed or the as-built design documents are utilized. Separate reviews are conducted by individuals knowledgeable in both technical and QA requirements to verify the adequacy of the design effort.

Proposed modification(s) which involve a license amendment or a change to Technical Specifications are processed as proposed license amendment request(s).

Plant procedures impacted by modifications are changed prior to declaring the system operable to reflect revised plant conditions; and cognizant personnel who are responsible for operating and maintaining the modified equipment are adequately trained.

#### **13.5.2.2.7 Material Control Procedures**

The QAPD, as discussed in [Section 17.5](#), provides a description of procedural requirements for material control.

#### **13.5.2.2.8 Security Procedures**

A discussion of security procedures is provided in the Security Plan.

The Special Nuclear Material (SNM) Physical Protection Program Description describes the 10 CFR Part 70 required protection program in effect for the period of time during which new fuel as SNM or non-fuel SNM is received and stored in a controlled access area (CAA), in accordance with the requirements of 10 CFR 73.67.

The New Fuel Shipping Plan addresses the applicable 10 CFR 73.67 requirements in the event that unirradiated new fuel assemblies or components are returned to the supplying fuel manufacturer(s) facility.

#### **13.5.2.2.9 Special Nuclear Material (SNM) Material Control and Accounting Procedures**

A material control and accounting system consisting of special nuclear material accounting procedures is utilized to delineate the requirements, responsibilities, and methods of special nuclear material control from the time special nuclear material is received until it is shipped from the plant. These procedures provide detailed steps for SNM shipping and receiving, inventory, accounting, and preparing records and reports. The Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program description is submitted to the Nuclear Regulatory Commission as a separate licensing basis document.

### **13.5.3 Combined License Information Item**

The plant procedures are addressed in APP-GW-GLR-040 ([Reference 10](#)), and in [Section 13.5](#).

### **13.5.4 References**

1. Not used.
2. Not used.
3. Not used.
4. Not used.
5. Not used.
6. Not used.
7. WCAP-13864, "Rod Control System Evaluation Program," Revision 1-A, November 1994.
8. USNRC Generic Letter 96-01, "Testing of Safety-Related Logic Circuits," January 10, 1996.

9. Not used.
10. APP-GW-GLR-040, "Plant Operations Maintenance and Surveillance Procedures," Westinghouse Electric Company LLC.
201. ANSI/ANS 3.2-1988, "Administrative Control and Quality Assurance for the Operational Phase of Nuclear Power Plants."
202. ANSI B30.2 (Chapter 2-3), "Overhead and Gantry Cranes."



**Table 13.5-201**  
**Pre-COL Phase Administrative Programs and Procedures**

(This table is included for future designation as historical information.)

- Design/Construction Quality Assurance Program
  - Reporting of Defects and Noncompliance, 10 CFR Part 21 Program
  - Design Reliability Assurance Program
-

## 13.6 Security

The Security Plan consists of the “AP1000 Physical Security Plan,” Training and Qualification Plan, and Safeguards Contingency Plan. The Security Plan will be submitted to the Nuclear Regulatory Commission as a separate licensing document in order to fulfill the requirements for 10 CFR 52.79(a)(35) and 10 CFR 52.79(a)(36). The Security Plan will meet the requirements of 10 CFR 52.98(c). The plan is classified as Security Safeguards Information and is withheld from public disclosure pursuant to 10 CFR 73.21. Additionally, the “AP1000 Interim Compensatory Measures Report” (Reference 2), the “AP1000 Enhancement Report” (Reference 3), and the “AP1000 Safeguards Assessment Report” (Reference 4) are submitted to the Nuclear Regulatory Commission as separate licensing documents to establish the design of the AP1000 Security Systems. Each document is classified as Security Safeguards information and is withheld from public disclosure pursuant to 10 CFR 73.21.

The Security Plan consists of the Physical Security Plan, the Training and Qualification Plan, and the Safeguards Contingency Plan. The Security Plan is submitted to the Nuclear Regulatory Commission as a separate licensing document in order to fulfill the requirements of 10 CFR 52.79(a)(35) and 52.79(a)(36) and is incorporated by reference (see Table 1.6-201). The Security Plan meets the requirements contained in 10 CFR Part 73 and will be maintained in accordance with the requirements of 10 CFR 52.98. The Plan is categorized as Security Safeguards Information and is withheld from public disclosure pursuant to 10 CFR 73.21.

The Cyber Security Plan is submitted to the Nuclear Regulatory Commission as a separate licensing document to fulfill the requirements contained in 10 CFR 52.79(a)(36) and 10 CFR 73.54 and is incorporated by reference (see Table 1.6-201). The Cyber Security Plan will be maintained in accordance with the requirements of 10 CFR 52.98. The Plan is withheld from public disclosure pursuant to 10 CFR 2.390.

Table 13.4-201 provides milestones for security program and cyber security program implementation.

### 13.6.1 Combined License Information Item

Information for the Security Plan is addressed in Section 13.6.

Information for the Physical Security ITAAC is addressed in Subsection 14.3.2.3.2.

Information for the cyber security program is addressed in Section 13.6.

### 13.6.2 References

1. Not used.
2. APP-GW-GLR-067, “AP1000 Interim Compensatory Measures Report,” Westinghouse Electric Company LLC.
3. APP-GW-GLR-062, “AP1000 Enhancement Report,” Westinghouse Electric Company LLC.
4. APP-GW-GLR-066, “AP1000 Safeguards Assessment Report,” Westinghouse Electric Company LLC.

## 13.7 Fitness for Duty

The Fitness for Duty Program (FFD) is implemented and maintained in multiple and progressive phases dependent on the activities, duties, or access afforded to certain individuals at the construction site. In general, two different FFD programs will be implemented: a construction FFD program and an operations FFD program. The construction and operations phase programs are illustrated in [Table 13.4-201](#).

The construction FFD program is consistent with NEI 06-06 ([Reference 201](#)). NEI 06-06 applies to persons constructing or directing the construction of safety- and security-related structures, systems, or components performed onsite where the new reactor will be installed and operated. Management and oversight personnel, as further described in NEI 06-06, and security personnel prior to the receipt of special nuclear material in the form of fuel assemblies (with certain exceptions) will be subject to the operations FFD program that meets the requirements of 10 CFR Part 26, Subparts A through H, N, and O. At the establishment of a protected area, all persons who are granted unescorted access will meet the requirements of an operations FFD program. Prior to issuance of a Combined License, the construction FFD program at a new reactor construction site for those subject to Subpart K will be reviewed and revised as necessary should substantial revisions occur to either NEI 06-06 following NRC endorsement or the requirements of 10 CFR Part 26.

The following site-specific information is provided:

- The FFD program for the construction site, as defined in NEI 06-06, will be administered under an FPL-approved EPC contractor program. The 10 CFR Part 26 requirements are implemented for the construction site area based on the descriptions provided in [Table 13.4-201](#).
- Construction Workers & First Line Supervisors (EPC contractor employees and subcontractors) are covered by the FPL-approved EPC contractor FFD Program (elements Subpart K).
- FPL employees and FPL subcontractor's construction management and oversight personnel are covered by the Turkey Point Units 3 & 4 Operations FFD Program and the EPC contractor's employees and subcontractors construction management and oversight personnel are covered by the FPL-approved EPC contractor FFD Program (elements Subpart A–H, N, and O).
- FPL security personnel are covered by the Turkey Point Units 3 & 4 Operations FFD Program and the EPC contractor's security personnel are covered by the FPL-approved EPC contractor FFD Program (elements Subpart A–H, N, and O). This coverage is applicable from the start of construction activities to the earlier of (1) the receipt of SNM in the form of fuel assemblies, (2) the establishment of a protected area, or (3) the 10 CFR 52.103(g) finding.
- FPL FFD Program personnel are covered by the Turkey Point Units 3 & 4 Operations FFD Program and the EPC contractor's FFD Program personnel are covered by the FPL-approved EPC contractor FFD Program (elements Subpart A, B, D–H, N, O, and C per licensee's discretion).
- FPL security personnel protecting fuel assemblies, or the established protected area, or the facility following the 10 CFR 52.103(g) finding are covered by the Turkey Point Units 3 & 4 Operations FFD Program (elements Subpart A–I, N, and O).

- Personnel required to physically report to the Technical Support Center (TSC) or Emergency Operations Facility (EOF) when that requirement is in effect are covered by the Turkey Point Units 3 & 4 FFD Program (elements Subpart A–I, N, and O, except for §§ 26.205–209).

The operations phase FFD program is consistent with the applicable subparts of 10 CFR Part 26 (elements Subpart A – I, N, and O, except for individuals listed in §26.4(b), who are not subject to §§ 26.205 – 209.

### **13.7.1 References**

201. Nuclear Energy Institute “Fitness for Duty Program Guidance for New Nuclear Power Plant Construction Sites,” NEI 06-06, Revision 5, August 2009 (ML092430016).

## Appendix 13AA Construction-Related Organization

The information in this appendix is included for future designation as historical information. Paragraphs are numbered to be subsequent to **Subsection 13.1.1.1**.

### 13AA.1.1.1.1 Design and Construction Activities

The Westinghouse Electric Company (WEC) was selected to design, fabricate, deliver, and install the AP1000 advanced light water pressurized water reactors (PWR) and to provide technical direction for installation and startup of this equipment. **Subsection 1.4.1** provides detailed information regarding WEC past experience in designing, developing, and manufacturing nuclear power facilities. Operating experience from designing, constructing, and operating earlier WEC PWRs is applied in designing, constructing, and operating the AP1000 as described in numerous locations throughout the DCD (e.g., **Subsections 3.6.4.4, 3.9.4.2.1, 4.2.3.1.3**).

A construction architect/engineer provides the construction of the plant and additional design engineering for selected site-specific portions of the plant. The architect/engineer is selected based on experience and proven technical capability in nuclear construction projects or projects of similar scope and complexity.

Other design and construction activities are generally contracted to qualified suppliers of such services. Implementing or delegating design and construction responsibilities is described in the subsections below. QA aspects of these activities are described in **Chapter 17**.

#### 13AA.1.1.1.1.1 Principal Site-Related Engineering Work

The principal site engineering activities accomplished toward plant construction and operation are:

##### a. Meteorology

Information concerning local (site) meteorological parameters is developed and applied by plant and contract personnel to assess the impact of Units 6 & 7 on local meteorological conditions. An onsite meteorological measurements program is employed by unit personnel to produce data for the purpose of making atmospheric dispersion estimates for postulated accidental and expected routine airborne releases of effluents. A maintenance program is established for surveillance, calibration, and repair of instruments. More information regarding the study and meteorological program is found in **Section 2.3**.

##### b. Geology

Information relating to site and regional geotechnical conditions is developed and evaluated by utility and contract personnel to determine if geologic conditions could present a challenge to plant safety. Items of interest include geologic structure, seismicity, geological history, and ground water conditions. During construction, foundations in the power block area are mapped or visually inspected and photographed. **Section 2.5** provides details of these investigations.

##### c. Seismology

Information relating to seismological conditions is developed and evaluated by utility and contract personnel to determine if the site location and area surrounding the site are appropriate from a safety standpoint for constructing and operating a nuclear power plant. Information regarding tectonics, seismicity, correlation of seismicity with tectonic structure, characterization of seismic sources, and ground motion are assessed to estimate the potential for strong earthquake ground motions or surface deformation at the site. **Section 2.5** provides details of these investigations.

d. Hydrology

Information relating to hydrological conditions at the plant site and the surrounding area is developed and evaluated by utility and contract personnel. The study includes hydrologic characteristics of streams, lakes, shore regions, the regional and local groundwater environments, and existing or proposed water control structures that could influence flood control and plant safety. [Section 2.4](#) includes more detailed information regarding this subject.

e. Demography

Information relating to local and surrounding area population distribution is developed and evaluated by utility and contract personnel. The data is used to determine if requirements are met for establishment of exclusion area, low population zone, and population center distance. [Section 2.1](#) includes more detailed information regarding population around the plant site.

f. Environmental Effects

Monitoring programs are developed to enable the collection of data necessary to determine possible impact on the environment as a result of construction, startup, and operational activities and to establish a baseline from which to evaluate future environmental monitoring.

**13AA.1.1.1.1.2 Design of Plant and Ancillary Systems**

Responsibility for design and construction of systems outside the power block such as circulating water, service water, switchyard, and secondary fire protection systems is delegated to qualified contractors.

**13AA.1.1.1.1.3 Review and Approval of Plant Design Features**

Design engineering review and approval are performed in accordance with the reactor technology vendor QA program and [Section 17.1](#). The reactor technology vendor is responsible for design control of the power block. Verification is performed by competent individuals or groups other than those who performed the original design. Design issues arising during construction are addressed and implemented with notifying and communicating changes to the engineering director for review. As systems are tested and approved for turnover and operation, control of design is turned over to plant staff. The engineering director, along with functional managers and staff, assumes responsibility for reviewing and approving modifications, additions, or deletions in plant design features, as well as control of design documentation, in accordance with the operational QA program. Design control becomes the responsibility of the engineering director before loading fuel. During construction, startup, and operation, changes to human-system interfaces of control room design are approved using a human factors engineering evaluation addressed in [Chapter 18](#). See organization charts, [Figures 13.1-201](#), and [13AA-201](#) for reporting relationships.

**13AA.1.1.1.1.4 Site Layout With Respect to Environmental Effects and Security Provisions**

Site layout was considered when determining the expected environmental effects from construction.

The Physical Security Plan is designed with provisions that meet the applicable NRC regulations. Site layout was considered when developing the Security Plan.

**13AA.1.1.1.1.5 Development of Safety Analysis Reports**

Information regarding the development of the Final Safety Analysis Report is found in [Chapter 1](#).

### **13AA.1.1.1.1.6 Review and Approval of Material and Component Specifications**

Safety-related material and component specifications of structures, systems, and components designed by the reactor technology vendor are reviewed and approved in accordance with the reactor technology vendor QA program and **Section 17.1**. Review and approval of items not designed by the reactor vendor are controlled for review and approval by **Section 17.5** and the QAPD.

### **13AA.1.1.1.1.7 Procurement of Materials and Equipment**

Procurement of materials during the construction phase is the responsibility of the reactor technology vendor and constructor. The process is controlled by the construction QA programs of these organizations. Oversight of the inspection and receipt of materials process is the responsibility of the manager in charge of QA.

### **13AA.1.1.1.1.8 Management and Review of Construction Activities**

Overall management and responsibility for construction activities is assigned to the executive vice president-engineering, construction and corporate services. The project director new nuclear projects is accountable to the vice president-new nuclear projects for construction activities. See Organization Chart **Figure 13AA-201**. Monitoring and review of construction activities by utility personnel is a continuous process at the plant site. Contractor performance is monitored to provide objective data to utility management to identify problems early and develop solutions. Monitoring of construction activities verifies that the contractors are in compliance with contractual obligations for quality, schedule, and cost. Monitoring and review of construction activities is divided functionally across the various disciplines of the utility construction staff (e.g., electrical, mechanical, instrumentation and controls [I&C]) and tracked by schedule based on system and major plant components/areas.

After each system is turned over to plant staff, the construction organization relinquishes responsibility for that system. At that time they are responsible for completion of construction activities as directed by plant staff and available to provide support for preoperational and startup testing as necessary.

To ensure equipment operability and reliability, plant maintenance programs such as preventive and corrective maintenance are developed and made effective during preoperation/startup phase with approved administrative procedures under the direction of the managers in charge of maintenance, engineering, and work control.

Periodic assessment involving both the construction and operations organizations continues to identify SSCs that could reasonably be expected to be impacted by scheduled construction activities. Appropriate administrative and managerial controls are then established as necessary. Specific hazards, impacted SSCs, and managerial and administrative controls are reviewed on a recurring basis and, if necessary, controls are revised/developed and implemented and maintained current as work progresses on site. For example, prior to construction activities that involve the use of large construction equipment such as cranes, managerial and administrative controls are in place to prevent adverse impacts on any operating unit(s) overhead power lines, switchyard, security boundary, etc., by providing the necessary restrictions on the use of large construction equipment.

### **13AA.1.1.1.2 Startup Activities**

The Units 6 & 7 plant general manager reports to the site vice president. The plant general manager, with the aid of those managers who report directly to the plant general manager (see **Figure 13AA-201**), is responsible for the plant activities required to transition the unit from the construction phase to the operational phase. These activities include coordinating the turnover to the plant staff of systems from the construction and preoperational testing phase, establishing the plant



work management system, implementation of the initial fuel load, the integrated startup testing program and the development and issuance of the associated fuel load and startup procedures.

#### **13AA.1.1.1.2.1 Development of Human Factors Engineering Design Objectives and Design Phase Review of Proposed Control Room Layouts**

Human factors engineering (HFE) design objectives are initially developed by the reactor technology vendor in accordance with **Chapter 18** of the FSAR and the Design Control Document (DCD). As a collaborative team, personnel from the reactor technology vendor design staff and personnel, including licensed operators, engineers, and I&C technicians from owner and other organizations in the nuclear industry assess the design of the control room and human-machine interfaces (HMIs) to attain safe and efficient plant operation. See **Section 18.2** for additional details of HFE program management.

Modifications to the certified design of the control room or HMIs described in the DCD are reviewed in accordance with engineering and site support procedures, as required by **Section 18.2**, to evaluate the impact to plant safety. The engineering director–new nuclear projects is responsible for the HFE design process and for the design commitment to HFE during construction and throughout the life of the plant as noted in **Subsection 13.1.1.2.1**. The HFE program is established in accordance with the description and commitments in **Chapter 18**.

#### **13AA.1.1.1.2.2 Preoperational and Startup Testing**

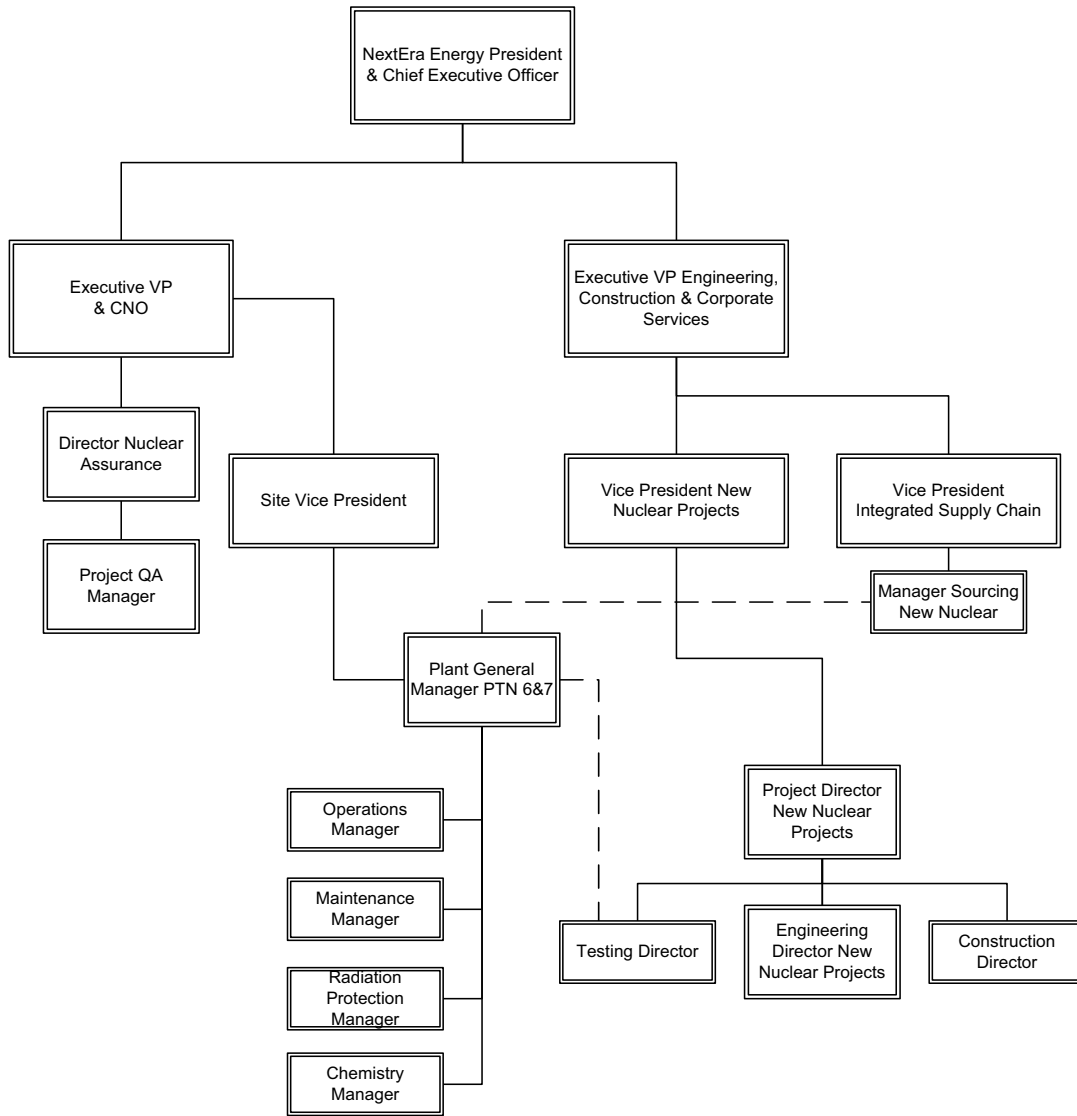
Preoperational and startup testing is conducted by the plant test and operations (PT&O) organization. The PT&O organization, functions, and responsibilities are addressed in **Section 14.2**. Sufficient numbers of personnel are assigned to perform preoperational and startup testing to facilitate safe and efficient implementation of the testing program. Plant-specific training provides instruction on the administrative controls of the test program. To improve operational experience, operations and technical staff are used as support in conducting the test program and in reviewing test results.

#### **13AA.1.1.1.2.3 Developing and Implementing Staff Recruiting and Training Programs**

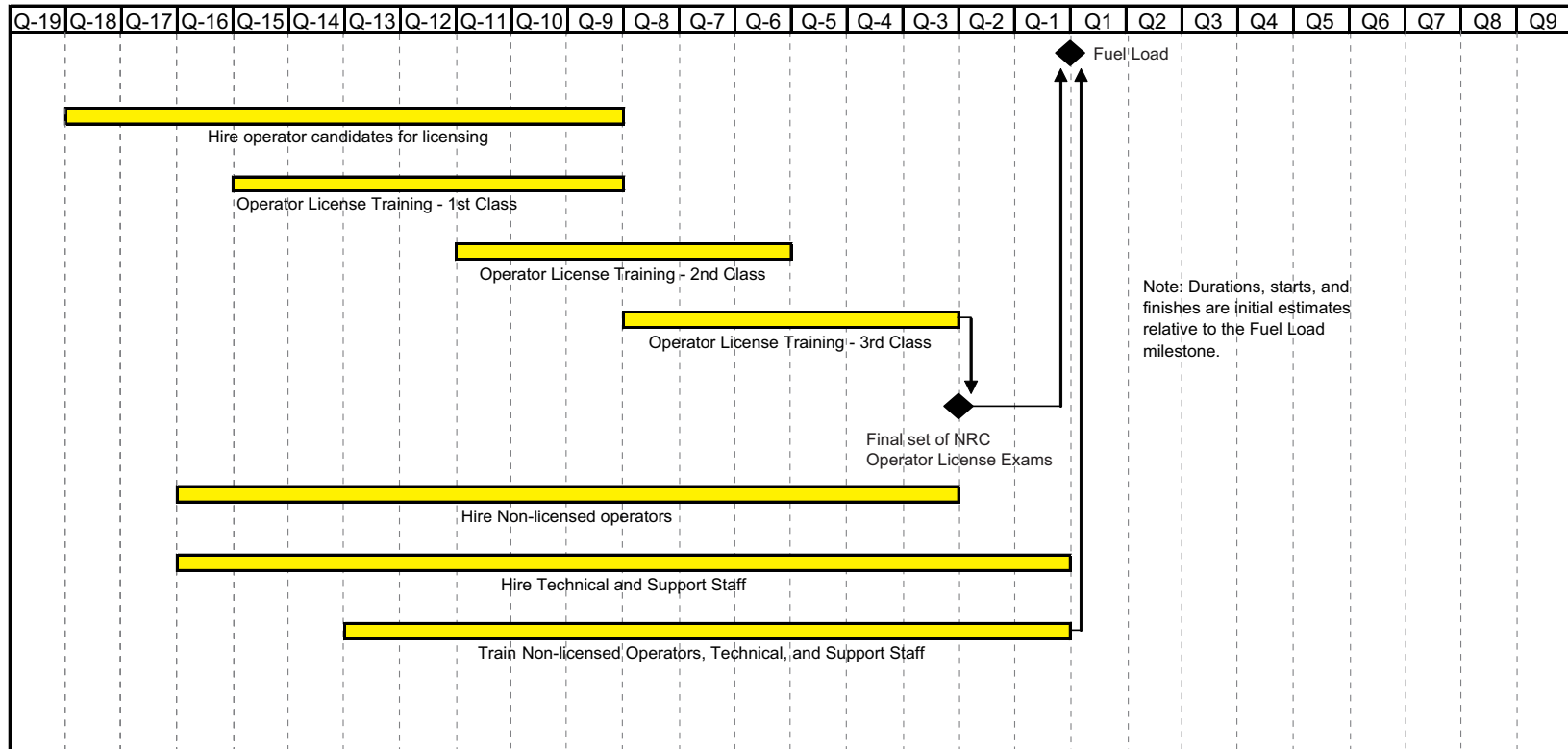
Staffing plans are developed based on operating plant experience, with input from the reactor technology vendor for safe plant operation as determined by HFE. See **Section 18.6**. These plans are developed under the direction and guidance of the vice president–new nuclear projects and the site vice president. Staffing plans are completed and manager level positions are filled before preoperational testing is started. Personnel selected to be licensed reactor operators and senior reactor operators, along with other staff necessary to support safe plant operation, are hired with sufficient time available to complete appropriate training programs and to become qualified, and licensed, if required, before fuel is loaded into the reactor vessel. See **Figure 13AA-202** for an estimated timeline of hiring requirements for operator and technical staff relative to fuel load.

Because of the dynamic nature of the staffing plans and changes that occur over time, it is expected that specific numbers of personnel on site will change, however, **Table 13.1-201** includes the initial estimated number of staff for selected positions and the estimated number of additional positions required for a second unit. Recruiting personnel to fill positions is the shared responsibility of the manager in charge of human resources and the various heads of departments. The training program is described in **Section 13.2**.





**Figure 13AA-201 Construction Management Organization**



**Figure 13AA-202 Hiring Schedule for Plant Staff**