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Color	Description
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Chapter 13 Conduct of Operation

This chapter provides information relating to the preparations and plans for operation of the AP1000 units at Vogtle 3 and 4 after construction. 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. The requirements for Initial Test Program personnel and activities are covered under Chapter 14, Initial Test Program.

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 station and owner/applicant corporations and associated functions and responsibilities. The position titles used in the text are generic and describe the function of the position. Table 13.1-201, Generic Position/Site-Specific Position Cross-Reference, provides a cross-reference to identify the corresponding site-specific position titles.

13.1.1 Management and Technical Support Organization

Southern Nuclear Operating Company, Inc. (SNC) has over 30 years of experience in the design, construction, and operation of nuclear generating plants. SNC, with its architectural engineering predecessor Southern Company Services, Inc., has designed, constructed, and currently operates six nuclear units at three sites: Edwin I. Hatch Nuclear Plant Units 1 and 2, Joseph M. Farley Nuclear Plant Units 1 and 2, and Vogtle Electric Generating Plant Units 1 and 2.

Vogtle 3 and 4 will be owned by Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia¹, and the City of Dalton, and operated by SNC.

13.1.1.1 Design, Construction, and Operating Responsibilities

The Chairman, President & Chief Executive Officer (CEO) Southern Nuclear has overall responsibility for functions involving design, construction, and operation. Line responsibilities for those functions are assigned to the Executive Vice President of Construction for the design and construction of new nuclear plants and to the Chief Nuclear Officer (CNO) for operation. At the appropriate time prior to fuel receipt, the CNO accepts responsibility for the additional unit/units at the VEGP site and then maintains direct control of nuclear plant operation through the Site Vice President, operations support, engineering, and other direct reports.

The first priority and responsibility of each member of the nuclear staff throughout the life of the plant is nuclear safety. Decision-making for plant activities is performed in a conservative manner with expectations of this core value regularly communicated to appropriate personnel by management interface, training, and plant directives. Lines of authority, decision making, and communication are clearly and unambiguously established to enable the understanding of the various project members, including contractors, that utility management is in charge of and directs on the project. Key executive and corporate management positions, functions, and responsibilities are discussed in Subsection 13.1.1.3.1. The corporate organization is shown in Figure 13.1-201. The management

1. On June 24, 2015, Municipal Electric Authority of Georgia (MEAG) transferred its ownership interest to its wholly owned subsidiaries: MEAG Power SPVM, LLC; MEAG Power SPVJ, LLC; and MEAG Power SPVP, LLC.

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-Nuclear Plant Site, the Vice President-Fleet Operations, and the Vice President-Engineering establish the organization of managers, functional managers, supervisors, and staff sufficient to perform required functions for support of safe and efficient preoperational and startup testing. Sufficient numbers of personnel are assigned to perform preoperational and startup testing to facilitate safe and efficient implementation of the testing program. To improve operational experience, operations and technical staff are used as support in conducting the test program and in reviewing test results. Prior to fuel load, the organization of managers, functional managers, supervisors, and staff sufficient to perform the required functions for support of safe plant operation shall be present. These functions include the following:

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

In the event that plant personnel are not qualified to deal with a specific problem, the services of qualified individuals from other functions within 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 13.1-202](#) illustrates the management and technical support organizations supporting operation of the plant. See [Subsection 13.1.2.1.3](#) for description 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 assigned to a specific unit, with the exception of some shared shift support supervisor and system operator positions. Physical

separation of units helps to minimize wrong-unit activities. In addition, plant 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

The engineering department consists of system engineering, engineering programs, and design engineering. These groups are responsible for performing the site engineering activities as well as providing engineering expertise in other areas. Each of the engineering groups has a functional manager who reports to the engineering director.

The engineering department is responsible for:

- Support of 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 the plant manager with emphasis on issues affecting safe operation of the plant.
- Engineering programs.
- Support of procurement, chemical, and environmental analysis and maintenance activities in the plant as requested by the plant manager.
- Performance of design engineering of plant modifications.
- Human factors engineering design process

Reactor engineering, part of system engineering, provides technical assistance in the areas of core design, core operations, core thermal limits, and core thermal hydraulics.

Engineering work may be contracted to and performed by outside companies in accordance with the quality assurance (QA) program.

Engineering resources are shared between units. A single management organization oversees the engineering work associated with the plant units.

13.1.1.2.2 Safety Review

Review and audit activities are addressed in [Chapter 17](#). Safety review oversight of plant programs, procedures, and activities is performed by a plant review board and a corporate safety review board.

Personnel who perform safety review are shared between units.

13.1.1.2.3 Quality Assurance

Safety-related activities associated with the operation of the plant are governed by QA direction established in [Chapter 17](#) and the QA Program Description (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 must 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.
- Auditing, performing surveillance, and evaluating nuclear division suppliers.
- Supporting general QA indoctrination and training for the nuclear station personnel.

The QA organization is independent of the plant management line organization.

Quality control (QC) inspection/testing activities to support plant operation, maintenance, and outages are independent of the plant management line organization.

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

13.1.1.2.4 Chemistry

A chemistry program is established to monitor and control the chemistry of various plant systems such that corrosion of components and piping is minimized to maintain reliable equipment performance and radiation from corrosion byproducts is kept to levels that allow operations and maintenance with radiation doses as low as reasonably achievable. Department responsibilities include:

- Primary and secondary water chemistry
- Process and effluent monitoring and sampling
- Closed cooling water chemistry
- Demineralized water treatment chemistry
- Diesel fuel oil testing, analysis, and controls
- Plant chemical control

The Chemistry Manager reports to the Plant Manager. 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. A single management organization oversees the chemistry group for the plant units.

13.1.1.2.5 Radiation Protection

A radiation protection (RP) program is established to protect the health and safety of the public and the personnel working at the plant by establishing means to maintain radiation exposure as low as reasonably achievable (ALARA) and to prevent the spread of contamination. The RP program is described in [Appendix 12AA](#). 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 RP department is staffed by RP 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 Manager.

Personnel resources of the RP organization are shared between units. A single management organization oversees the RP group for both units.

The terms radiation protection and health physics are used interchangeably in function descriptions.

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 support organization. The manager in charge of outage support is responsible for planning and scheduling outages and for refueling support and reports to the Plant Manager.

Personnel resources of the outage support organization are shared between units. A single management organization oversees outage support work associated with the station units.

13.1.1.2.7 Training and Development

The training department is responsible for analysis, design, development, implementation and evaluation of plant training programs in accordance with regulatory requirements, accreditation standards, and company policies. The objective of the training programs is to qualify operations, maintenance, RP, chemistry, and engineering personnel to operate and maintain the plant in a safe and efficient manner and in compliance with the license, technical specifications, and applicable regulations. In addition, the training department administers plant access (general employee) training, radworker training, security training, and emergency response training. The Training Manager reports independently of the line organization to provide for independence from operating pressures. Plant training programs are described in [Section 13.2](#).

Personnel resources of the training department are shared between units. A single management organization provides oversight of plant training activities.

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 plant schedule for evaluation of

operating or safe shutdown risk elements and to provide for efficient and safe performance. The Maintenance Director reports to the Plant Manager.

Personnel of the maintenance support organization are shared between units. A single management organization oversees the function of maintenance support for the plant units.

13.1.1.2.9 Operations Support

The operations support function is provided under the direction of the Operations Director. Operations support includes the following programs:

- Operations procedures
- Operations surveillances
- Equipment tagging

13.1.1.2.10 Fire Protection

The plant is committed to maintaining a fire protection program as described in [Section 9.5](#). Once the nuclear plant is operational, the Site Vice President, through the engineer in charge of fire protection, 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 fire protection staff. Fire protection for the facility is organized and administered by the engineer in charge of fire protection. The engineer in charge of fire protection is trained and experienced in fire protection and nuclear plant safety or has available personnel who are trained and experienced in fire protection and nuclear plant safety.

The Site Vice President, through the engineer in charge of fire protection, is responsible for developing and implementing the fire protection program including developing fire protection procedures, site personnel and fire brigade training, and inspections of fire protection systems and functions. The engineer in charge of fire protection coordinates operations-related fire protection program activities with the Operations Director or his designee. Functional descriptions of position responsibilities are included in appropriate procedures. Plant personnel are responsible for adhering to the fire protection/prevention requirements detailed in [Section 9.5](#). The Construction Vice President has the lead responsibility for the overall site fire protection during construction of the new units.

Personnel resources of the fire protection organization are shared between units. A single management organization oversees the fire protection group for the plant units.

13.1.1.2.11 Emergency Organization

The emergency organization is a matrixed organization 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 plant personnel assigned positions in the emergency organization are responsible for supporting the emergency preparedness organization and emergency plan as required. The staff members of the emergency planning organization administrate and orchestrate drills and training to maintain qualification of plant staff members and develop procedures to guide and direct the emergency organization during an emergency. The staff is also responsible for maintaining emergency facilities and equipment. The functional manager in charge of emergency preparedness reports to the manager in charge of site support. Once the protected area is combined with Units 1 and 2, emergency response is combined with Units 1 and 2.

The site emergency plan organization is described in the Emergency Plan. Resources of the emergency planning group are shared between units. A single management organization oversees the emergency planning group for the plant 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 utility staff is provided by the materials, purchasing, and contracts organization. Personnel in the materials, purchasing, and contracts organization 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 functional manager in charge of materials, purchasing, and contracts reports to the department manager in charge of materials, purchasing, and contracts, and secondarily to the manager in charge of site support.

Resources of the materials, purchasing, and contracts organization are shared between units. A single management organization oversees the materials, purchasing, and contracts group for the plant units.

13.1.1.3 Organizational Arrangement

13.1.1.3.1 Executive Management Organization

The nuclear operations organization, under the supervision of the Chairman, President & CEO Southern Nuclear, has direct responsibility for the operation and maintenance of Southern Company's nuclear plants. Executive management establishes expectations such 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 utility headquarters and engineering organization is illustrated in **Figure 13.1-201**. Site executives and management with direct line of authority for activities associated with operation of the plant are shown in **Figure 13.1-202**. The structure of the nuclear operations organization is described in the following paragraphs. Portions of the SNC Fleet Operations Support, Engineering, Corporate Services, General Counsel and External Affairs, and Human Resources organizations are also described in the following paragraphs.

13.1.1.3.1.1 Chairman, President and CEO

The Chairman, President & CEO Southern Nuclear is responsible for all aspects of operation of Southern Company's nuclear plants including employment decisions. The Chairman, President & CEO is also responsible for all technical and administrative support activities provided by SNC and nonaffiliated contractors. The Chairman, President & CEO directs the Executive Vice President/Chief Nuclear Officer, the Executive Vice President of Construction, the Vice President and General Counsel; the Vice President-Comptroller and Treasurer, and the Regulatory Affairs Vice President in fulfillment of their responsibilities. The Chairman, President & CEO reports to the Board of Directors with respect to all matters.

13.1.1.3.1.2 Executive Vice President of Construction

Executive Vice President of Construction reports directly to the Chairman, President & CEO of Southern Nuclear. The Executive Vice President of Construction will oversee construction compliance and coordinate with the Southern Nuclear operational readiness team to prepare for an effective transition from construction to operations.

13.1.1.3.1.2.1 Nuclear Development Vice President

The Nuclear Development Vice President is functionally matrixed to the Executive Vice President of Construction and is responsible for effective implementation of the Nuclear Development Quality Assurance Program and for cost control and contract compliance oversight for Vogtle 3&4 construction project.

13.1.1.3.1.3 Vice President of Regulatory Affairs

The Vice President of Regulatory Affairs is responsible for all regulatory compliance, fleet nuclear licensing, and regulatory response activities associated with the operating fleet of nuclear plants as well as the regulatory compliance activities during the design and construction of new nuclear plants. The Vice President of Regulatory Affairs reports directly to the Chairman, President & CEO Southern Nuclear.

13.1.1.3.1.3.1 Nuclear Regulatory Affairs Director

The Nuclear Regulatory Affairs Director reports to the Vice President of Regulatory Affairs and directs operating plant licensing managers, the regulatory response manager, and their staffs.

13.1.1.3.1.3.2 Manager of Fleet Emergency Preparedness

The Nuclear Fleet Emergency Preparedness Manager reports to the Vice President-Regulatory Affairs and is responsible for management of the Emergency Preparedness organization and the corporate emergency planning programs (including the common Emergency Operations Facility). The Nuclear Fleet Emergency Preparedness Manager also has the responsibility for site emergency response communication. The Nuclear Fleet Emergency Preparedness organization is responsible for providing information and support concerning emergency plans to the Nuclear Development organization.

13.1.1.3.1.3.3 Manager of Fleet Performance Improvement

The Performance Improvement Manager reports to the Vice President-Regulatory Affairs and is responsible for overall governance, oversight, and support for fleet performance improvement activities, procedures, and records management. The Fleet Performance Improvement Manager establishes policy level guidance, provides direction to nuclear plant performance improvement staffs regarding practices and standards, evaluates programs for conformance to industry best practices, and drives performance improvements where needed. The Fleet Performance Improvement Manager is also responsible for administration of the corrective action program in the corporate headquarters.

13.1.1.3.1.4 Executive Vice President/Chief Nuclear Officer

The Executive Vice President (EVP) reports to the Chairman, President & CEO. The EVP also serves as the CNO for SNC. The CNO becomes responsible for 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. The EVP/CNO delegates authority and responsibility for the operation and support of the site through the Site Vice President, vice president of fleet operations, vice president-engineering, and vice president of nuclear oversight. It is the responsibility of the CNO to provide guidance and direction such that safety-related activities, including engineering, construction, operations, operations support, maintenance, and planning, are performed following the guidelines of the QA program for the operating units. The CNO has no ancillary responsibilities that might detract attention from nuclear safety matters. The EVP/CNO is also responsible for the safe, reliable, and efficient operation of the Edwin I. Hatch Nuclear Plant Units 1

and 2, the Joseph M. Farley Nuclear Plant Units 1 and 2, and the Vogtle Electric Generating Plant Units 1 and 2.

13.1.1.3.1.4.1 Site Vice President

The Site Vice President is directly responsible for management and direction of activities associated with the efficient, safe, and reliable testing and operation of the nuclear plant. The Plant Manager, the Site Integration Director, and the site Engineering Director report to the Site Vice President. The Training Director for the site personnel will also report to the Site Vice President.

13.1.1.3.1.4.2 Vice President-Fleet Operations

The Vice President-Fleet Operations reports to the EVP/CNO and is responsible for identifying and resolving fleet issues, and using trends, operating experience, and industry best practices to improve fleet performance. The Vice President-Fleet Operations directs the Fleet Nuclear Security Manager, the Fleet Maintenance managers, the Fleet Work Management Director, the Fleet Emergency Preparedness Manager, the Fleet Support Manager, the Fleet Environmental Affairs, Chemistry, and Radiological Services Manager, the Nuclear Fleet Safety Supervisor, the Fleet Training Manager, and the Fleet Performance Improvement Manager.

13.1.1.3.1.4.2.1 Manager of Fleet Security

The Nuclear Fleet Security Manager reports to the Vice President–Fleet Operations and is responsible for management of the Nuclear Fleet Security organization and the overall coordination of fleet security activities and programs and the Access Authorization program. The Nuclear Fleet Security organization is responsible for providing information and support concerning nuclear corporate and site security to the Nuclear Development organization.

13.1.1.3.1.4.2.2 Manager of Fleet Training

The manager in charge of nuclear fleet training is responsible for supporting the development of training programs and providing fleet guidance to the function manager in charge of training at the site. The manager in charge of nuclear training reports to the Vice President-Fleet Operations.

13.1.1.3.1.4.2.3 Fleet Operations Support Manager

The Fleet Operations Support Manager is responsible for overall governance, oversight, and support of nuclear plant operations and related functions. The Fleet Operations Support Manager establishes policy level guidance, provides strategic direction to plant operations departments regarding operating practices and standards, evaluates programs for conformance to industry best practices, and drives performance improvements where needed.

13.1.1.3.1.4.2.4 Fleet Maintenance Manager

The Fleet Maintenance Manager is responsible for overall governance, oversight, and support of nuclear plant maintenance. The Fleet Maintenance Manager establishes policy level guidance, provides direction to plant maintenance departments regarding maintenance practices, and drives performance improvements where needed.

13.1.1.3.1.4.2.5 Fleet Work Management Director

The Fleet Work Management Director for fleet refueling outages and work controls is responsible for overall governance, oversight, and support of refueling outage planning and execution and the on-line work control process. The Fleet Work Management Director establishes policy level

guidance, provides direction to plant staffs regarding on-line work controls and outage practices and standards, evaluates programs for conformance to industry best practices, and drives performance improvements where needed.

13.1.1.3.1.4.2.6 Fleet Environmental Affairs Manager

The senior manager responsible for environmental affairs is responsible for providing supervision and direction for the environmental implementation of the governance, oversight, support and performance model as related to environmental, transportation, navigation, endangered species, Radiological Environmental Monitoring Programs (REMP), and the Environmental Protection Plans. This position also evaluates programs for conformance to industry standards and formalizes this into governing procedures where needed, monitors and reports performance results to assure functional area expectations are met, and manages external relationships with regulatory and industry oversight agencies, utility and industry peers, industry groups and other advisory groups.

13.1.1.3.1.4.2.7 Fleet Chemistry Manager

The senior manager responsible for chemistry is responsible for providing governance, oversight, and support of plant chemistry. This position evaluates programs for conformance to industry standards and formalizes this into governing procedures where needed, monitors and reports performance results to assure functional area expectations are met, and manages external relationships with regulatory and industry oversight agencies, utility and industry peers, industry groups and other advisory groups. This position also provides expertise and oversight in PWR and BWR primary chemistry, secondary chemistry, closed cooling water chemistry, make-up water treatment, auxiliary systems chemistry, corrosion control, EPRI chemistry standards, INPO chemistry requirements and radiochemistry.

13.1.1.3.1.4.2.8 Fleet Radiation Protection Manager

The senior manager responsible for radiation protection is responsible for providing governance, oversight and support of the radiation protection program for each nuclear station by minimizing radiation exposure to plant personnel, contractors, members of the public, and the environment to levels as low as reasonable achievable (ALARA) while supporting safe, reliable, and effective power generation. This position is also responsible for supporting industry benchmarking, implementing special projects, and providing technical support.

13.1.1.3.1.4.2.9 Fleet Safety Manager

The Fleet Safety Manager is responsible for ensuring excellence in safety and health and compliance with all applicable safety and health rules, regulations, and permit requirements governing the operating fleet. The Fleet Safety Manager establishes policy level guidance, provides direction to the sites regarding practices and standards, evaluates programs for conformance to industry best practices, and drives improvements where needed.

13.1.1.3.1.4.3 Nuclear Oversight Vice President (Quality Assurance)

The Nuclear Oversight Vice President reports to the EVP/CNO for the operations activities and is responsible for developing and maintaining the quality assurance programs, evaluating compliance to the programs and managing the Nuclear Oversight organization resources.

13.1.1.3.1.4.3.1 Nuclear Development Quality Assurance Manager and Staff

The Nuclear Development Quality Assurance Manager is responsible to the Nuclear Oversight Vice President (VP) for the direction of the assigned staff. Direct reports to the Nuclear Development

Quality Assurance Manager are Nuclear Oversight (Quality Assurance) supervisors. The staff shall be located either at the plant site during plant operations or the corporate office, and shall provide an independent review and evaluation of the implementation of the Quality Assurance Program (QAP).

In accordance with the QAP, the Nuclear Development Quality Assurance Manager shall have the authority from the Nuclear Oversight VP to stop or recommend stopping, through appropriate channels, unsatisfactory work which is not in compliance with the QAP.

Specific duties and the responsibilities of the Nuclear Development Quality Assurance Manager are:

- Developing and implementing procedures for audits, surveillances, procedure reviews, training and qualification and associated activities.

Specific duties and the responsibilities of the Nuclear Development Quality Assurance Staff are:

- Evaluating site and corporate activities for conformance to QAP requirements and procedures.
- Preparing a schedule of audits to be performed on site and corporate organizations and activities (line organization, contractors and/or suppliers, as appropriate).
- Performing planned and periodic audits of site and corporate organizations and activities (line organization, contractors and/or suppliers, as appropriate).
- Following up on audit findings until resolved and closed out.
- Preparing reports of audits, surveillances, reviews and other assigned activities and providing them to the Nuclear Oversight VP and appropriate line management.

13.1.1.3.1.4.4 Vice President-Engineering

The Vice President-Engineering reports directly to the EVP/CNO. This organization includes both project-specific and generic engineering support organizations for operating plants. Additionally, the Vice President-Engineering is responsible for providing plant specific and generic engineering support, nuclear fuel, design engineering for plant modifications, project management for major improvement projects, supply chain activities, assuring that specialized engineering expertise is available as needed for normal operations and emergency situations, assessing nuclear industry issues through contact with owners and ad hoc groups, nuclear utility interfaces, assuring that documentation and records of design activities are properly maintained.

The Vice President - Engineering directs the Fleet Engineering Director, the Projects Manager, the Nuclear Fuel Director, and the Severe Accident Management Program Director.

The key functional organization within SNC providing support to the Plants is the engineering organization that provides design support, risk-informed engineering (including PRA modeling and support) and engineering support. SNC engineering is also responsible for nuclear fuel and projects management. Support activities provided by these SNC organizations and contractors include, but are not limited to, the following:

- Design support including creation, revision, and retention of calculations, domestic documents, vendor drawings, and other design basis material.
- Inservice inspection and testing.

- Nuclear fuel procurement, nuclear fuel and core design, nuclear fuel reload licensing, nuclear fuel performance, dry storage fuel selection, nuclear fuel procurement vendor oversight.
- Maintenance of the plant design basis (e.g., calculations, design criteria, and functional system descriptions) for each site.
- Major project management.

13.1.1.3.1.4.4.1 Fleet Engineering Director

The Fleet Design Director reports to the Vice President-Engineering and acts as the design authority for SNC plants. The fleet design director manages the activities associated with configuration management and major plant modifications.

13.1.1.3.1.4.4.2 Nuclear Fuel Director

The Nuclear Fuel Director is responsible for providing nuclear fuel and related business and technical support consistent with the operational needs of the plant. Activities include scheduling and procuring uranium concentrates, conversion, enrichment, and fabrication services. The department provides expertise and support for high-level waste disposal management. The Nuclear Fuel Director is assisted by an engineering staff and reports directly to the Vice President-Engineering.

13.1.1.3.1.4.4.3 Projects Manager

The Projects Manager is responsible for long range planning and project management services and cyber security.

13.1.1.3.1.4.4.4 Severe Accident Management Program Director

The Severe Accident Management Program Director reports to the Vice President-Engineering and is responsible for providing direction and oversight to the fleet in support of managing severe accidents.

13.1.1.3.1.5 Vice President and General Counsel

The Vice President and General Counsel is a matrixed report to the Chairman, President & CEO. This individual is responsible for the legal, compliance, and external affairs associated with the SNC plants. This individual is also responsible for external affairs activities which include governmental affairs and corporate communications. The corporate concerns and compliance manager also reports to this position.

13.1.1.3.1.6 Vice President — Comptroller and Treasurer

The Vice President-Comptroller and Treasurer reports directly to the Chairman, President & CEO and is responsible for the development, coordination, management, and communication of all financial matters, including budgeting and analysis, accounting and billing, and the maintenance of an effective system of internal controls.

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 Regulatory Guide 1.8. The qualification and

experience requirements of headquarters staff is established in corporate policy and procedure manuals.

13.1.2 Operating Organization

13.1.2.1 Plant Organization

As stated above, the site vice president is responsible for direct management of the plant during testing and operations, including industrial relations, planning, coordination, direction of operation, training, maintenance, refueling, and technical activities. Reporting to the Site Vice President, in addition to the supportive roles, is the Plant Manager.

The plant management, technical support, and plant operating organizations are shown in [Figure 13.1-202](#). The on-shift operating organization is presented in [Figure 13.1-203](#) 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 as they apply to the nuclear development organization are incorporated by reference in [Chapter 17](#). Administrative procedures or standing orders include:

- Establishment of a QA program for the operational phase.
- Preparation of procedures necessary to carry out an effective QA program. See [Section 13.5](#) for description of the plant procedure program.
- A program for review and audit of activities affecting plant safety. See [Section 17.5](#) for description of plant review and audit programs.
- 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 within the plant operating organization are responsible for establishing goals and expectations for their organization and to reinforce behaviors that promote radiation protection. Specifically, managers and supervisors are responsible for the following, as applicable to their position within the plant organization:

- Interface directly with RP staff to integrate RP measures into plant procedures and design documents and into the planning, scheduling, conduct, and assessment of operations and work.
- Notify RP personnel promptly when RP problems occur or are identified, take corrective actions, and resolve deficiencies associated with operations, procedures, systems, equipment, and work practices.
- Ensure department personnel receive RP training and periodic retraining, in accordance with 10 CFR 19 so that they are properly instructed and briefed for entry into restricted areas.
- Routinely observe and correct, as necessary, radiation worker practices.
- Support RP management in implementing the RP program.

- Maintain exposures to site personnel ALARA.

13.1.2.1.1 Plant Manager

Once the nuclear plant is operational, the Plant Manager reports to the Site Vice President, is responsible for overall safe operation of the plant, and has control over those onsite activities necessary for safe operation and maintenance of the plant including the following:

- Maintaining the plant in a safe condition at all times.
- Operating station equipment.
- Monitoring and surveillance of safety and nonsafety-related equipment.
- Fuel loading.
- Providing the nucleus of emergency and firefighting teams.
- Maintenance and modification of plant structures, systems, and components
- Chemistry and radiochemistry
- Outage management

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 Director, who, through his direct reports, directs the day-to-day operation of the plant.

Specific duties, functions, and responsibilities of key shift members are discussed in **Subsection 13.1.2.1.1.3** and in plant administrative procedures and the technical specifications. The minimum shift manning requirements are shown in **Table 13.1-202**. Prior to fuel arriving on site, the necessary positions for unit operations will be filled.

Some resources of the operations organization are shared between units. Administrative and support personnel perform their duties on either unit. Additional operations staff is required to fill the on-shift staffing requirements of the additional units. To operate, or supervise the operation of more than one unit, an operator (senior reactor operator [SRO] or reactor operator [RO]) must hold an appropriate, active license for each unit. A single management organization oversees the operations group for the plant units. See **Table 13.1-201** for estimated number of staff in the operations department.

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

Additionally, the Plant Manager has overall responsibility for occupational and public radiation safety. RP responsibilities of the plant manager are consistent with the guidance in Regulatory Guide 8.8 and Regulatory Guide 8.10 including the following:

- Provide management RP policy throughout the plant organization.
- Provide an overall commitment to RP by the plant organization.
- Interact with and support the manager in charge of RP on implementation of the RP program.

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

As described in **Subsection 13.1.2.1.1.3**, the Operations Director is the Plant Manager's direct representative for the conduct of operations. The succession of authority includes the authority to issue standing or special orders as required. The Plant Manager is also responsible for the compliance with the requirements of the operating license, Technical Specifications, and quality assurance program, and approval, prior to implementation, of each proposed test, experiment, or modification to systems or equipment that impact nuclear safety.

The Plant Manager directs the senior manager responsible for maintenance, senior manager responsible for operations, senior manager responsible for chemistry, senior manager responsible for health physics, and the senior manager responsible for work controls.

A plant review board (PRB) will be maintained to review overall plant operations, and advise plant site management on matters related to nuclear safety.

In the Site Vice President's absence, the Plant Manager assumes responsibility for the plant. The Site Vice President will designate in writing other qualified personnel to assume overall plant responsibility in his absence. The line of succession of authority and responsibility for overall operations in the event of unexpected events of a temporary nature is:

- a. Operations Director
- b. Site Support Manager
- c. Maintenance Manager

13.1.2.1.1.1 Radiation Protection Manager

Once the nuclear plant is operational, the Radiation Protection Manager reports to the Plant Manager and serves as the "Radiation Protection Manager" for the facility referenced in Regulatory Guides 8.8 and 8.10. The Radiation Protection Manager has overall responsibility for the radiation protection program, has responsibility for plant activities involving radiological safety, has the authority to prevent unsafe work practices, and directs steps to prevent any unnecessary radiation exposure. The Radiation Protection Manager will ensure that Radiation Protection activities comply with the requirements of the plant operating license, Technical Specifications, approved fleet and plant procedures, the Security Plan, the Emergency Plan, the Quality Assurance Program, and applicable local, site, and federal regulations. The Radiation Protection Manager must meet or exceed the requirements of Regulatory Guide 1.8.

13.1.2.1.1.1.1 Radiation Protection Support Supervisor

The Radiation Protection Support Supervisor reports to the Radiation Protection Manager and is responsible for, but not limited to, Radiation Protection support programs, such as Dosimetry, ALARA, Rad Waste, Respiratory Protection, and fixed and portable radiological instrumentation. The Radiation Protection Support Supervisor may substitute for and perform the duties of the Radiation Protection Manager when designated and qualified under Regulatory Guide 1.8.

13.1.2.1.1.1.2 Plant Health Physicist

The Health Physicist reports to the Health Physics Manager and is responsible for, but not limited to, monitoring Health Physics programs and indicators which include the ALARA program, radioactive waste management, shipping of radioactive material/waste, and outage preparedness. The Health Physicist tracks and evaluates performance indicators, supports industry benchmarking, implements special projects, and provides technical support. The Health Physicist may substitute for and perform the duties of the Health Physics Manager when designated and qualified under Regulatory Guide 1.8.

13.1.2.1.1.1.3 Health Physics Foreman

Health Physics Foremen report to the Health Physics Manager and the Health Physics Support Supervisor and are directly responsible for, but not limited to, directing, scheduling, and coordinating the activities of the HP Technicians to support plant activities.

13.1.2.1.1.1.4 Health Physics Technician

Health Physics Technicians report to Health Physics Supervision. Their responsibilities include the following:

- Monitoring radiation controlled areas on a regularly scheduled basis using fixed and portable survey instruments to evaluate contamination, radiation fields and airborne radiation levels and measure dose rates for job coverage.
- Storing, issuing, and testing of respiratory protection equipment.
- Support calibrating fixed and portable radiation survey instruments.
- Providing health physics coverage of plant personnel to ensure safe radiological practices.
- Radiological evaluations of area decontamination activities.
- Prepare and authorize Radiation Work Permits.
- Provide support to the Dosimetry Program, as needed.

13.1.2.1.1.2 Maintenance Manager

Once the nuclear plant is operational, the Maintenance Manager reports to the Plant Manager and defines, communicates, and reinforces high standards for performance of maintenance activities and holds himself and others accountable for meeting those standards. The Maintenance Manager is responsible for:

- Establishing department goals and objectives.

- Ensuring that the roles and responsibilities of maintenance management personnel are communicated and reinforced.
- Setting standards for training of maintenance personnel to ensure that they have the necessary knowledge and skills.
- Maintaining the plant materiel condition.

13.1.2.1.1.2.1 Assistant Maintenance Manager and Maintenance Superintendents

The Assistant Maintenance Manager and the Maintenance Superintendents report to the Maintenance Manager and reinforce standards of performance as described in the Maintenance Manager's responsibilities and perform specific additional Maintenance Department roles, such as:

- Oversight for the maintenance support activities.
- Responsible for day-to-day administrative, training and qualification, and budget activities.
- Oversight of the Daily and Outage Planning Supervisors.
- Responsible for the Maintenance Procedure Program.
- Managing the Corrective Action Program for Maintenance.
- Responsible for the Predictive Maintenance Program.

13.1.2.1.1.2.1.1 Mechanical Maintenance, Electrical Maintenance, and Instrument and Controls Supervisors

Maintenance supervisors report to the Maintenance Superintendents and are responsible for:

- Coaching workers and reinforcing expectations and standards. During oversight of work activities, reinforcing positive behaviors, identifying when worker performance does not meet expectations, and addressing performance shortfalls.
- Ensuring that qualifications and proficiency of assigned personnel are consistent with the assigned work.
- Actively participating in training development and delivery, and helping identify performance gaps that can be addressed in training.
- Promoting craft ownership of equipment, processes, and programs to facilitate improvement.
- Executing the work schedule.

13.1.2.1.1.3 Operations Director

Once the nuclear plant is operational, the Operations Director is responsible for the overall management of the Operations Department to ensure safe and efficient operation of the plant. The Operations Director defines, communicates, and reinforces standards for performance. Reporting to him are the Operations Outage Manager, Shift Operations Manager and the Operations Support Manager. The Operations Director:

- Ensures safe operation of the nuclear unit(s).

- Promotes a strong safety culture, with nuclear safety as an overriding priority.
- Establishes goals, objectives, and standards for operational activities.
- Provides direction in the training of operators.
- Monitors and assesses performance.
- Issues standing orders and special orders.

13.1.2.1.1.3.1 Operations Managers

The Operations Outage Manager, Shift Operations Manager, and Operations Support Manager report to the Operations Director and share the following duties and responsibilities:

- Provide direction to the Shift Managers for routine scheduling and coordination of Operations shift activities, including interfacing with other plant departments.
- Ensure plant operations are conducted per Technical Specifications, standing orders, the Offsite Dose Calculation Manual (ODCM) and approved procedures.
- Review and approve operating procedures, standing orders, and other special orders.
- May function as Operations Director when designated.
- Supervise the preparation and review of plant operating procedures.
- Provide input to the Training Department for development and conduct of training and qualification of Operations Department personnel.
- Provide interface between Operations and other departments on administrative matters.

13.1.2.1.1.3.2 Shift Manager (SM)

The Shift Manager (SM) reports to the Shift Operations Manager. The SM is the senior management representative on each shift and is responsible for the safe and efficient operation of the plant. The Shift Manager shall possess an SRO License. He has the following duties and responsibilities:

- Ensures plant operations are conducted in accordance with appropriate standing orders, the ODCM, unit operating procedures, and Technical Specifications.
- Maintains responsibility and oversight of activities that could affect core reactivity.
- Functions as Site Emergency Director when required.
- Has responsibility for the entire plant in the absence of the Site VP, Plant Manager, and Operations Director. The SM has their authority, including issuing standing orders and other special orders, in their absence.
- Ensures the shift is properly manned, including the Fire Brigade.
- Provides leadership of crew in training and qualification programs.

13.1.2.1.1.3.2.1 Shift Supervisor (SS)

One Shift Supervisor (SS) is assigned to each operating unit on each shift. He is responsible for the safe and efficient operation of the assigned unit. Each SS shall possess an SRO License. The SS(s) report to the Shift Manager (SM) and have the following specific duties and responsibilities:

- Maintains responsibility and oversight of activities that could affect core reactivity.
- Ensures that plant operations are conducted per the Technical Specifications, ODCM, and approved procedures and standing orders.
- In charge of unit operation during startup, power operation, and shutdown.
- Supervise the Reactor Operators, Non-Licensed Operators, and Shift Support Supervisors to ensure proper performance of their assigned duties.
- Approves the removal of equipment and systems from service for maintenance, testing or operational activities.
- Authorizes maintenance and/or testing activities to be performed and ensures plant conditions are suitable for performing such activities. Maintains status of equipment and determines operability of equipment upon return to service.
- Ensures equipment clearances and tagging functions are performed.
- Administers the Operations Surveillance program.

13.1.2.1.1.3.2.1.1 Reactor Operator (RO)

The Reactor Operators report to the SS.

Duties and responsibilities include:

- Operate the reactor and power plant safely.
- Perform reactivity changes.
- Maintain a broad awareness of activities in the Main Control Room and the plant.
- Monitor and control key parameters during normal operation.
- Perform shift operations and surveillance testing per approved procedures, standing orders, and Technical Specifications.

13.1.2.1.1.3.2.1.2 Non-Licensed Operator (NLO)

Non-Licensed Operators report to the respective unit's Shift Supervisor (SS) or Support Shift Supervisor (SSS).

Duties and responsibilities include:

- Monitor plant auxiliary equipment and/or systems outside the main control room.
- Operate systems in the field at the direction of the control room or SSS.

- Perform rounds to ensure proper operation of equipment.
- Remove equipment from service and execute clearance orders; restore equipment to service and remove clearances as directed by the SS or SSS.
- Respond to fire emergencies as a member of the Fire Brigade and perform fire fighting activities as directed by the Fire Brigade Leader.
- Perform assigned Emergency Response duties.

13.1.2.1.1.3.2.2 Shift Support Supervisor (SSS)

The SSS reports to the Shift Manager (SM) and have the following duties and responsibilities:

- Monitors performance of operator rounds, system and equipment lineups, surveillances, and other routine shift activities.
- Ensures shift operations are conducted per Technical Specifications, ODCM, and approved procedures.
- Authorizes maintenance and/or testing activities to be performed, and ensures plant conditions are suitable.
- Issues equipment clearances.
- Responds during fire emergencies and acts as the Fire Brigade Leader in directing the fire fighting efforts of the Fire Brigade, as required.
- Coordinates the Fire Protection program for on shift operations.
- Assists with administration of the Operations Surveillance program.

13.1.2.1.1.3.3 Shift Technical Advisor (STA)

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, NRC'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. **Section 13.2** describes STA training, and **Subsection 13.1.3** describes STA qualifications.

The STA position has the following responsibilities:

- Maintain independence from the normal operations shift as much as necessary to be able to make objective evaluations of plant operations and to advise or assist plant supervision in correcting conditions that may compromise safe operations.
- Serves in an advisory capacity to the SS. Upon entry into emergency operating procedures, the STA supports monitoring and reporting of the Critical Safety Functions to the SS.
- Investigates the causes of abnormal or unusual events, assesses adverse effects on plant operation, and reports any abnormality to the SS.

13.1.2.1.1.3.4 Conduct of Operations

Plant 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 Regulatory Guide 1.114, address the following:

- Position/placement of operator at the controls workstation and the expected area of the control room where the majority of the time of the supervisor/manager in charge on shift 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 supervisor/manager in charge on shift.

In accordance with 10 CFR 50.54:

- Reactivity controls may be manipulated only by licensed ROs and SROs except as allowed for training under 10 CFR 55.
- Apparatus and mechanisms other than controls that may affect reactivity or power level of the reactor shall be operated only with the consent of the operator at the controls or the manager/supervisor in charge on-shift.
- During operation of the facility in modes other than cold shutdown or refueling, an SRO shall be in the control room and a licensed RO or SRO shall be present at the controls.

13.1.2.1.1.3.5 Operating Shift Crews

Plant administrative procedures 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 and shift staffing requirements defined by TMI Action Plan I.A.1.3 are retained in plant procedures. When overtime is necessary, the provisions in the Technical Specifications, 10 CFR 26, 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 proceduralized 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 staffing for various modes of operation are contained in Technical Specifications, administrative procedures, and [Table 13.1-202](#), and illustrated in [Figure 13.1-203](#).

13.1.2.1.1.4 Chemistry Manager

Once the nuclear plant is operational, the Chemistry Manager reports to the Plant Manager and is responsible for chemical and radiochemical activities at the plant; chemistry related engineering activities including filter / demineralizer control and hydrogen water chemistry; administrative control of effluent releases from the plant to ensure that the releases are maintained as low as reasonably

achievable and within the required limits; and implementing primary, secondary, and component cooling water chemistry programs.

13.1.2.1.1.4.1 Chemistry Support Supervisor

The Chemistry Support Supervisor reports to the Chemistry Manager and is responsible for, but not limited to, general chemistry program oversight, procedural development, department compliance with Technical Specifications, the ODCM, and approved procedures, and direction of special projects.

13.1.2.1.1.4.2 Plant Chemist

The Plant Chemist reports to the Chemistry Manager and is responsible for, but not limited to, chemistry quality control, monitoring plant system data trends for primary and secondary chemistry parameters, including radiochemistry, monitoring fuel reliability, approving new chemicals, resin management, and troubleshooting and resolution of analytical problems or issues. The Plant Chemist tracks and evaluates performance indicators, supports industry benchmarking, and implements special projects.

13.1.2.1.1.4.3 Chemistry Foreman

Chemistry Foremen report to the Chemistry Manager and the Chemistry Support Supervisor and are directly responsible for, but not limited to, primary water chemistry sampling, count room activities, calibration of process radiation monitors, closed cooling water treatment programs, and maintenance and operations of instrumentation. The Chemistry Foremen are responsible for directing, scheduling, and coordinating the activities of the Chemistry Technicians to support plant activities, and monitoring shift personnel for proper performance of department practices.

13.1.2.1.1.5 Work Management Director

Once the nuclear plant is operational, the Work Management Director reports to the Plant Manager and is responsible for ensuring maximum advantage is taken of forced outages and load reductions to do needed repair, replacement, modification, and inspection work; working with Maintenance to ensure management control of work is accomplished through the use of an effective priority system; preparing Outage Safety Assessments in support of scheduled re-fueling outages; and conducting ongoing outage risk assessments.

13.1.2.1.1.6 Fire Protection Engineer

The Fire Protection Engineer reports through engineering. See [Subsection 13.1.2.1.2.2.1.1](#).

13.1.2.1.2 Site Engineering Director

The site Engineering Director is the onsite lead position for engineering and reports to the Site Vice President. The site Engineering Director is responsible for equipment reliability, engineering programs, systems engineering, design engineering, plant modifications, the rapid response team, as well as engineering activities related to the operation or maintenance of the plant and design change implementation support activities. The Design, Engineering Systems and Programs Managers report to the Engineering Director.

13.1.2.1.2.1 Engineering Systems Manager

The Engineering Systems Manager reports directly to the Engineering Director. The Engineering Systems Manager is responsible for providing technical direction to other departments regarding the safe, efficient, and reliable operation of the systems and for reactor engineering. Along with the

Engineering Support supervisors, the Engineering Systems Manager provides direction and oversight for the system engineers and the reactor engineers. The Engineering Systems Manager also has the following responsibilities:

- Provide technical direction for equipment reliability review function.
- Act as the chairperson for the Equipment Reliability Board (ERB).
- Review and approve Temporary Modifications.

13.1.2.1.2.1.1 Systems Engineering Supervisors

Each Systems Engineering Supervisor reports directly to the Engineering Systems Manager. The Engineering Supervisors provide oversight to systems engineers. In addition, the nuclear systems Engineering Supervisor provides oversight to reactor engineers. The supervisors also have the following responsibilities:

- Provide technical direction to other departments regarding the safe, efficient, and reliable operation of systems and technical direction related to reactor engineering (system engineers and reactor engineers).
- Ensure training and qualification of personnel in accordance with applicable Engineering Training procedures.
- Complete assigned surveillance testing in accordance with frequencies in the Technical Specifications.
- Ensure proper design configuration control of structures, systems, and components.
- Function as acting Engineering Support Manager when necessary.

13.1.2.1.2.2 Engineering Programs Manager

The Engineering Programs Manager reports directly to the Engineering Director. The Engineering Programs Manager is responsible for providing technical direction for development and implementation of engineering programs. Along with the Engineering supervisors, the Engineering Programs Manager provides direction and oversight for the program engineers and Non-Destructive Examination (NDE) specialists/coordinators. The Engineering Programs Manager also has the following responsibilities:

- Provide technical direction regarding implementation of engineering programs such as ISI, IST, FAC, containment testing, etc.
- Ensure training and qualification of personnel in accordance with applicable Engineering Training procedures.
- Complete assigned surveillance testing in accordance with frequencies in the Technical Specifications.
- Function as acting Engineering Support Manager when necessary.

13.1.2.1.2.2.1 Programs Engineering Supervisor

Once the nuclear plant is operational, the Programs Engineering Supervisor reports directly to the Engineering Programs Manager and is responsible for supervising the operability, maintenance, direction, support, functionality of assigned engineering-related programs, and NDE specialists/coordinators. In addition to those responsibilities, this programs supervisor also provides oversight to the programs engineers.

13.1.2.1.2.2.1.1 Fire Protection Engineer

Once the nuclear plant is operational, the Senior Site Vice President, through the engineer in charge of fire protection, is responsible for the fire protection program, reference **Subsection 13.1.1.2.10**. The Fire Protection Engineer is responsible for the following:

- Fire protection program requirements, including consideration of potential hazards associated with postulated fires, knowledge of building layout, and system design.
- Design, maintenance, surveillance, and quality assurance 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.
- Pre-fire planning.

In accordance with Regulatory Guide 1.189, the engineer in charge of fire protection is a graduate of an engineering curriculum of accepted standing and has completed not less than six years of engineering experience, three of which were in a responsible position in charge of fire protection engineering work. The engineer in charge of fire protection is trained and experienced in fire protection and nuclear safety or has available personnel who are trained and experienced in fire protection and nuclear plant safety.

13.1.2.1.2.3 Design Engineering Manager

Once the nuclear plant is operational, the Design Engineering Manager reports to the Engineering Director and serves as the key design lead for the nuclear plant and functions as the primary interface between the Major Projects and Design Support departments in Corporate and the site's Change Control Board (CCB). Along with the Design Supervisor, the Design Engineering Manager facilitates design change package development and implementation. The Design Engineering Manager also has the following responsibilities:

- Provide technical oversight and approval of design products generated by the Design department.
- Ensure changes to plant design are technically adequate.
- Maintain administrative control of design calculations.
- Establish administrative controls for technical software.
- Interface with contracted Architect Engineers and other engineering firms providing design.

- Interface with Corporate Stress Analysis, Fire Protection and Environmental Qualification groups in Engineering Programs providing design.
- Ensure training and qualification of department personnel.

13.1.2.1.3 Site Support Organization

As stated above, the site vice president is responsible for direct management of the plant during operations, including industrial relations, planning, coordination, direction of operation, training, maintenance, refueling, and technical activities. Reporting to the site vice president in supportive roles are the site support manager and the site engineering director.

13.1.2.1.3.1 Site Support Manager

Once operational, the SSM will report to the Vogtle 3 & 4 Site Vice President.

The SSM is responsible for supporting operations and maintenance of the plant. This includes emergency preparedness, nuclear security plan implementation (during the construction phase), fleet procedure development, supply chain management, and performance improvement. In addition, this position is responsible for managing the document control function for the plant.

The Security Manager, Supply Chain Superintendent, Emergency Preparedness Manager and Fleet Procedures Supervisor report to the SSM during construction.

Once operational, the Performance Improvement Manager, Safety Team Leader, Supply Chain Superintendent, Procedures Writing Group and the Emergency Preparedness Manager will report to the SSM. The site support manager is responsible for supporting the operating units.

13.1.2.1.3.1.1 Senior Manager Responsible for Plant Security

The senior manager responsible for plant security reports to the Site Support Manager and is responsible to maintain the security department in accordance with the security plan, training and qualification plan, and contingency plan for the plant; control safeguards material; maintain interfaces with offsite agencies; and coordinate the security drill and exercise program. Once the protected area is combined with Units 1 and 2, one security manager reporting to the Unit 1 and 2 SSM will be responsible for site security.

13.1.2.1.3.1.2 Senior Manager Responsible for Performance Improvement

The senior manager responsible for performance improvement reports to the Site Support Manager once operational. During construction this position reports to the Vogtle 3 & 4 Regulatory Affairs Vice President. This manager is responsible to administer the plant corrective action program; lead analyses; develop and implement plans that work to identify and to close key performance gaps; coordinate problem solving teams to focus plant performance improvements; and develop and maintain plant performance monitoring, action tracking and communications to monitor and communicate progress in performance changes.

13.1.2.1.3.1.3 Senior Manager Responsible for Emergency Preparedness

The senior manager responsible for emergency preparedness (EP) is responsible for managing the onsite emergency preparedness effort. The EP Supervisor also coordinates Vogtle 3&4 emergency planning needs with the EP staff on Vogtle 1&2.

13.1.2.1.3.1.4 Senior Manager Responsible for Supply Chain

The Plant Supply Chain Superintendent reports directly to the Site Support Manager with matrixed accountability to the Corporate Supply Chain Director.

The Plant Supply Chain Superintendent serves as the Site Functional Area Manager (SFAM) for Supply Chain activities.

Reporting to the Site Support Manager, the Plant Supply Chain Superintendent guides, leads, and manages the supply chain activities that support emergent needs for materials and services for their respective nuclear plant site. Such activities shall be conducted to ensure materials are on hand to support plant activities.

The Plant Supply Chain Superintendent will develop policies, procedures, and practices that are common to the fleet and establish processes unique to Vogtle 3&4 (due to construction needs or license commitments) utilized to requisition, handle, receive, store, and issue materials, equipment, and services to support the operations, maintenance, and support of the plant.

13.1.2.1.4 Senior Manager Responsible for Training

The senior manager responsible for training reports to the Vogtle 3 & 4 Site Vice President when the plant is operational. This manager is responsible for developing and maintaining training/retraining programs for plant personnel that meets the security plan and emergency response plans; and maintaining the training simulator.

13.1.2.1.5 Fire Brigade

The station is designed and the fire brigade organized to be self-sufficient with respect to firefighting activities. The fire brigade is organized to deal with 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 on site during each shift. The fire brigade consists of at least five members on each shift. The fire brigade leader and at least two members will be knowledgeable of the building layout and system design sufficient to understand the effects of fire fighting on safety-related equipment. The assigned fire brigade members for any shift does 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. Fire brigade personnel may include personnel from Units 1 and 2 once the protected area is combined.

13.1.3 Qualifications of Nuclear Plant Personnel

13.1.3.1 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 Regulatory Guide 1.8.

13.1.3.2 Qualifications of Plant Personnel

Résumés and/or other documentation of qualification and experience of initial appointees to appropriate management and supervisory positions are available for review by regulators upon request 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 Statement on 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 4)
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 2nd unit
Executive management	chief executive officer	Chairman, President & Chief Executive Officer (CEO)	1	-
	chief operating officer	N/A	N/A	-
	chief nuclear officer	Chief Nuclear Officer	1	-
Nuclear support	executive, operations support	Fleet Operations Vice President	1	-
Plant management	executive	Senior Site Vice President	1	-
	executive	Site Vice President	1	-
	plant manager 4.2.1	Plant Manager	1	-
Engineering	executive	Engineering Vice President	1	-
	manager 4.2.4	Engineering Director	1	-
system engineering	functional manager 4.3.9	Engineering Systems Manager	1	-
	system engineer	Engineer	18	8
design engineering	functional manager 4.3.9	Design Engineering Manager	1	-
	design engineer	Design Engineer	15	2
engineering programs	functional manager 4.3.9	Engineering Programs Manager	1	-
	programs engineer	Engineer	10	2
safety and engineering analysis	functional manager 4.3.9	Performance Improvement Manager	1	-
	analysis engineer	Engineer	3	-
reactor engineering	functional manager 4.3.9	Engineering Supervisor	1	-
	reactor engineer	Engineer	3	1
engineering support	functional manager 4.3.9	NA	-	-
fire protection	supervisor 4.4	Fire Protection Engineer	1	-
Maintenance	manager 4.2.3	Maintenance Manager	1	-

Table 13.1-201 (Sheet 2 of 4)
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 2nd unit	
instrumentation and control	functional manager	4.3.4	Team Superintendant, Instrumentation and Control	1	-
	supervisor	4.4.7	Supervisor, Instrumentation and Control	4	4
	technician	4.5.3.3	Instrumentation and Control Technician	20	10
mechanical	functional manager	4.3.6	Team Superintendant, Mechanical	1	-
	supervisor	4.4.9	Supervisor, Mechanical	2	-
	technician	4.5.7.2	Mechanic	20	8
electrical	functional manager	4.3.5	Team Superintendant, Electrical	1	-
	supervisor	4.4.8	Supervisor, Electrical	2	-
	technician	4.5.7.1	Electrician	15	5
support	functional manager	4.3	Maintenance Superintendent	1	-
Operations	manager	4.2.2	Operations Director	1	-
operations, daily	functional manager	4.3.8	Shift Operations Manager	1	-
operations, support	functional manager	4.3.8	Operations Support Manager	1	-
operations, (on-shift)	functional manager	4.4.1	Shift Manager	5	5
	supervisor	4.4.2	Shift Supervisor	5	5
	supervisor	4.4.2	Shift Support Supervisor	5	0
	licensed operator	4.5.1	Plant Operator	10	10
	non-licensed operator	4.5.2	System Operator	25	10
	shift technical advisor ^(a)	4.6.2	Shift Technical Advisor	5	0
Operations - rad waste	supervisor	4.4	N/A	-	-
operations, outage	functional manager	4.3.8	Operations Outage Manager	1	-
Radiation protection	functional manager	4.3.3	Health Physics Manager	1	-

Table 13.1-201 (Sheet 3 of 4)
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 2nd unit
	supervisor	4.4.6	Health Physics Support Supervisor	1	-
	supervisor	4.4.6	Health Physics Foreman	3	-
	ALARA specialist		Plant Health Physicist	1	0
	technician	4.5.3.2	Health Physics Nuclear Specialist	3	0
	technician	4.5.3.2	Health Physics Technician	10	10
Chemistry	functional manager	4.3.2	Chemistry Manager	1	-
	supervisor	4.4.5	Chemistry Support Supervisor	1	-
	supervisor	4.4.5	Chemistry Foreman	3	-
	supervisor	4.4.5	Plant Chemist	1	-
	technician	4.5.3.1	Chemistry Nuclear Specialist	3	0
	technician	4.5.3.1	Chemistry Technician	10	10
Nuclear safety assurance	manager	4.2	Nuclear Licensing Director	1	-
licensing	functional manager	4.3	Site Nuclear Licensing Manager	1	-
	supervisor		N/A	-	-
	licensing engineer		Licensing Engineer	6	-
corrective action	functional manager	4.3	Fleet Performance Improvement Manager	1	-
	corrective action specialist		Corrective Action Program Coordinator	2	1
emergency preparedness	functional manager	4.3	Emergency Preparedness Supervisor	1	-
	EP planner		EP Coordinator	2	-
Training	functional manager	4.3.1	Training Manager	1	-
	supervisor ops trng	4.4.4	Nuclear Operations Training Supervisor	1	1
	ops training instructor		Nuclear Operations Training Instructor	10	6

Table 13.1-201 (Sheet 4 of 4)
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 2nd unit
			supervisor tech staff/maint trng	Training Supervisor	1 -
			tech staff/maint instructors	Nuclear Plant Instructor	8 2
Purchasing, and contracts	functional manager	4.3	Supply Chain Manager	1	-
Security	functional manager	4.3	Security Manager *(consolidated with Units 1 and 2 when PA is combined)	1*	-
Planning and scheduling	functional manager	4.3	Outage and Scheduling Manager	1	-
	functional manager	4.3	N/A	-	-
Quality assurance	supervisor	4.4	Scheduling Supervisor	2	-
	functional manager	4.3.7	Manager, Nuclear Oversight	1	-
	supervisor	4.4.13	Nuclear Oversight Supervisor	1	-
	QA auditor		QA Auditor	6	2
	supervisor	4.4.13	Quality Control Supervisor	2	-
Startup testing	QC inspector		QC Inspector	4	2
	supervisor	4.4.12	Startup Testing Supervisor	1	-
	startup test engineer		Startup Test Engineer	6	-
	supervisor	4.4.11	Preop Testing Supervisor	1	-
	preop test engineer		Preop Test Engineer	20	-

(a) The shift technical advisor position may be eliminated if the qualifications of the shift manager, shift supervisor, or SRO licensed shift support supervisor meet the requirements of the shift technical advisor position.

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

Units Operating	Two Units Two Control Rooms
All Units Shutdown	1 SM (SRO) 2 RO 3 NLO
One Unit Operating ^(a)	1 SM (SRO) 1 SRO 3 RO 3 NLO
Two Units Operating ^(a)	1 SM (SRO) 2 SRO 4 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.

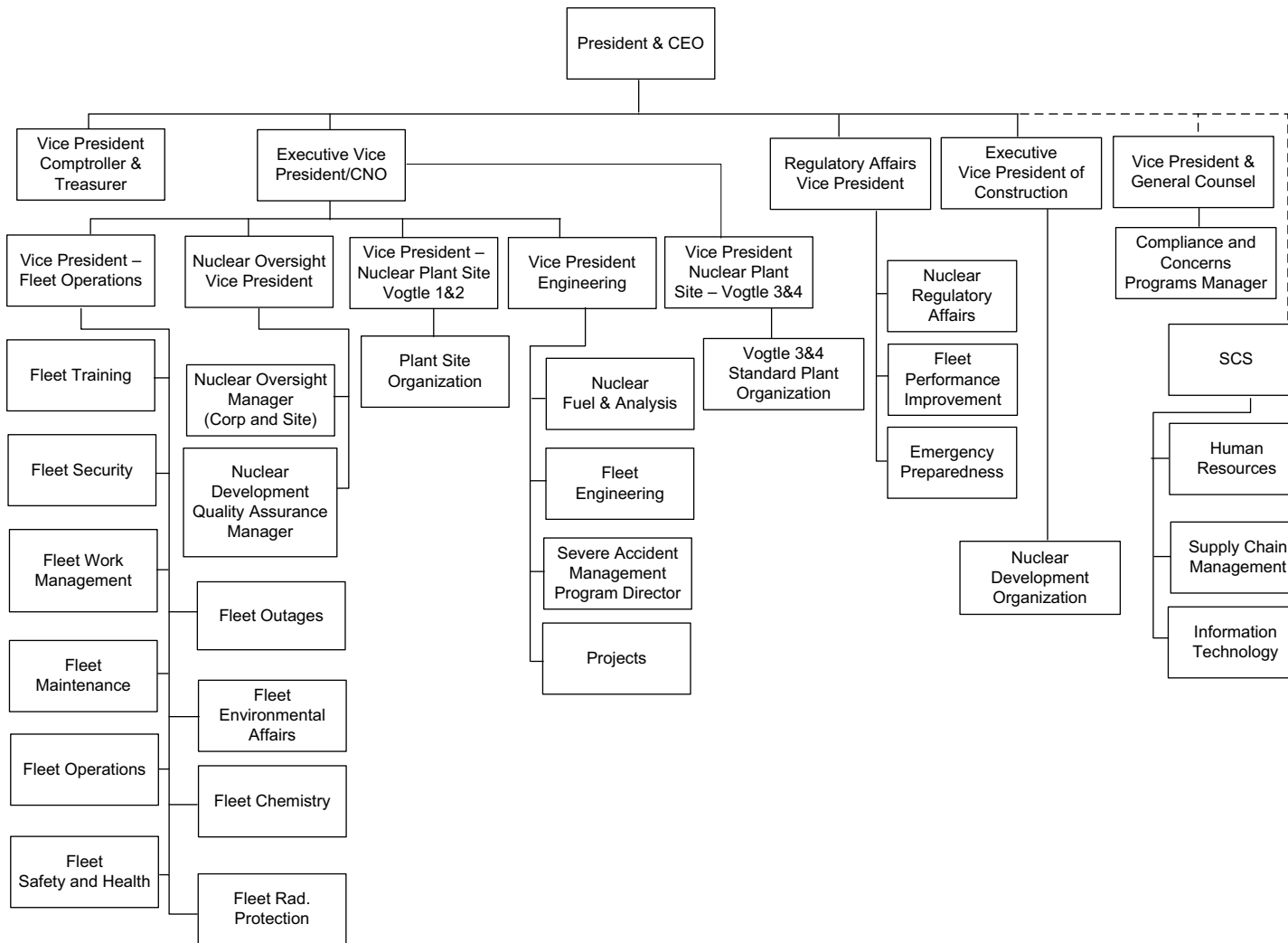


Figure 13.1-201
Corporate and Engineering Organization

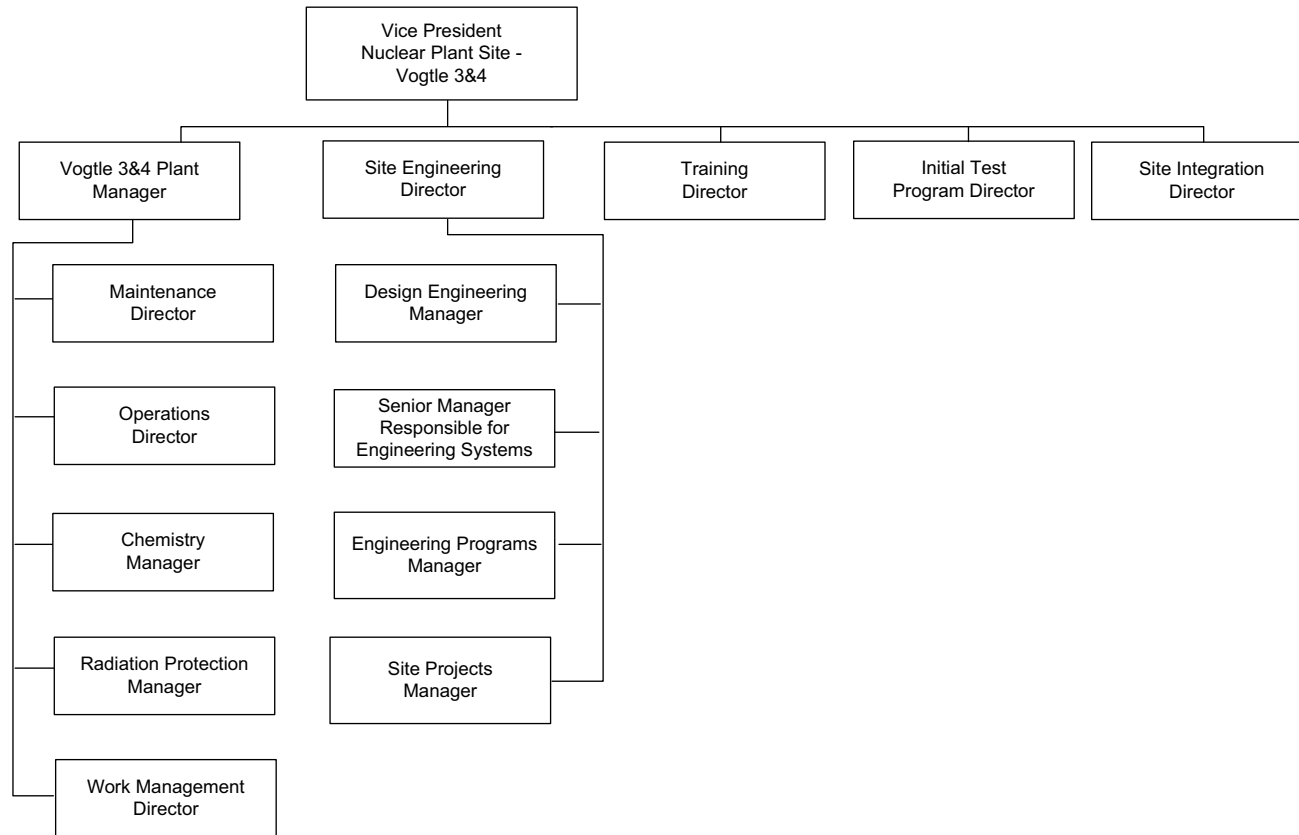
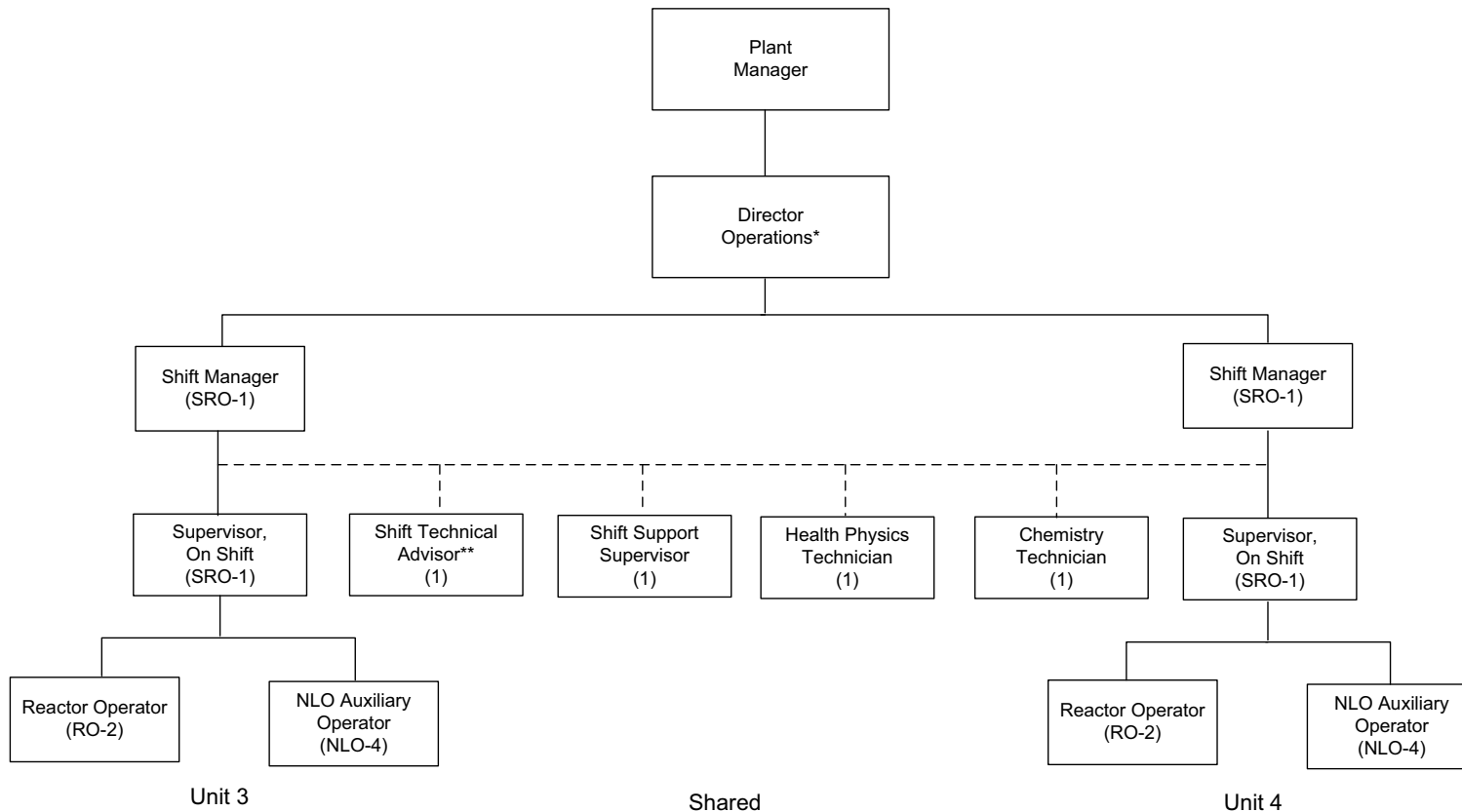


Figure 13.1-202
Plant Management Organization



*The Operations Director or Assistant Operations Director shall hold an SRO license.

** May be met by onshift combined SRO/STA.

SRO – licensed senior reactor operator

RO – licensed reactor operator

NLO – non-licensed operator

Shift Manning – 5 shifts (minimum)

(No.) – indicate number of positions per shift

**Figure 13.1-203
Shift Operations**

Note that the Operations Manager is now the Operations Director (see chart as well as footnotes)
There should be 4 NLO per unit.

13.2 Training

This section incorporates NEI 06-13A, Template for an Industry Training Program Description. VEGP 3&4 takes exception to the annual General Employee Requalification training frequency defined in NEI 06-13A Subsection 1.3.3, as evaluated in a Systematic Approach to Training Difficulty - Importance - Frequency analysis. The General Employee Requalification training frequency is defined in [Subsection 13.2.3.3](#).

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](#)). [Supplemental operator training requirements during startup testing are described in Subsection 14.2.6.1](#). 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 (Reference 13.2-12) and guidance of Regulatory Guide 1.149 (Reference 13.2-17). 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 50.120¹

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

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 requalification training at a frequency of every 24 months nominal, not to exceed 27 months. 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"

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- 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, License Examinations, and Applicant Experience Requirements," Regulatory Guide 1.149, Revision 4, April 2011
 - 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 on-site 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 on-site 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>3. Pre-requisite experience requirements must be met to enter training program.</p>	<p align="center">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>4. Three years power plant experience at least one of which should have been at the plant for which the license is sought.</p>	<p align="center">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>5. Reactor operator license actively involved in the performance of licensed duties for at least one year.</p>	<p align="center">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>8. 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>9. 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 VEGP 3 and 4 Emergency Plan, Section H for the locations of the Technical Support Center and the Operations Support Center. See [Subsection 1.2.5](#) for the location of 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](#) and in the VEGP 3&4 Emergency Plan.

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 9)
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 ^(a)	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 50.55a(g); ASME 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

**Table 13.4-201 (Sheet 2 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
7.	Containment Leakage Rate Testing Program	10 CFR 50.54(o); 10 CFR 50, Appendix A (GDC 52); 10 CFR 50, Appendix J	6.2.1.5	Prior to initial fuel load	License Condition
8.	Fire Protection Program	10 CFR 50.48	9.5.1.8	Prior to receipt of fuel onsite Prior to initial fuel load	License Condition
	(portions applicable to radioactive material)	10 CFR 30.32 10 CFR 40.31 10 CFR 70.22		Prior to initial receipt of byproduct, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18)	10 CFR 30.32(a) 10 CFR 40.31(a) 10 CFR 70.22(a)
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 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

**Table 13.4-201 (Sheet 3 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
	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 10 CFR Part 37	12.1 12.5 11.4		License Condition
	<ul style="list-style-type: none"> • Radioactive Source Control (assignment of RP Supervisor) • Assignment of RP Supervisor • Minimization of Contamination • Personnel Dosimetry • Radiation Monitoring and Surveys • Radiation Work Permits • Assignment of RP Manager • Respiratory Protection • Bioassay 			<ol style="list-style-type: none"> 1. Prior to initial receipt of by-product, source, or special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18) 2. Prior to receipt of fuel onsite 3. Prior to initial fuel load 	

**Table 13.4-201 (Sheet 4 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
	<ul style="list-style-type: none"> • Effluents and Environmental Monitoring and Assessment • Job Coverage • Radioactive Waste Shipping 			4. Prior to first shipment of radioactive waste	
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)

**Table 13.4-201 (Sheet 5 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
14.	Emergency Planning	10 CFR 50.47; 10 CFR 50, Appendix E	13.3	Full participation exercise conducted within 2 years of scheduled date for initial loading of fuel.	10 CFR Part 50, Appendix E, Section IV.F.2.a(ii)
				Onsite exercise conducted within 1 year before the schedule date for initial loading of fuel	10 CFR Part 50, Appendix E, Section IV.F.2.a(ii)
				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 V
15.	Security Program: Physical Protection Program (applicable to protection of special nuclear material prior to the protected area being declared operational)	10 CFR 73.1 10 CFR 73.67	13.5.2.2.8 13.6	Prior to initial receipt of special nuclear material	10 CFR 73.1(a) 10 CFR 73.67
				Physical Security Program	10 CFR 73.55(a)(4)
				10 CFR 73.55(b); 10 CFR 73.55(c)(3); 10 CFR 73.56; 10 CFR 73.57;	10 CFR 73.55(a)(4)

Table 13.4-201 (Sheet 6 of 9)
Operational Programs Required by NRC Regulations

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
	Safeguards Contingency Program	10 CFR 73.55(c)(5); 10 CFR 73.55(k); 10 CFR Part 73, Appendix C	13.6	Prior to receipt of fuel onsite (protected area)	10 CFR 73.55(a)(4)
	Training and Qualification Program	10 CFR 73.55(c)(4); 10 CFR 73.55(d)(3); 10 CFR Part 73, Appendix B	13.6	Prior to receipt of fuel onsite (protected area)	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

**Table 13.4-201 (Sheet 7 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
19.	Initial Test Program	10 CFR 50.34; 10 CFR 52.79(a)(28)	14.2	Prior to the first component test being conducted for the Component 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
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

**Table 13.4-201 (Sheet 8 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
	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

**Table 13.4-201 (Sheet 9 of 9)
Operational Programs Required by NRC Regulations**

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation	
				Milestone	Requirement
	FFD Program for Operation	10 CFR 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
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
23.	10 CFR Part 37 Physical Protection Program	10 CFR 37 Subparts A, B, C, D, F	13.5.2.2.8, 13.5.2.2.10 13.6, 11.4	Prior to possession of aggregated category 1 or category 2 quantity of radioactive material	10 CFR Part 37

(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. Upon site acceptance of these procedures, the format and content will be controlled per plant specific administrative procedures.

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 13.5.1](#). 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, licensed senior reactor operator in the control room, control room 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.

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.

Upon site review and acceptance of the procedures delineated above, these procedures become site specific. The development, review, and approval of these site specific procedures will be controlled per plant specific processes/procedures.

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 on-site radioactive wastes. Procedural controls are in place for radiological releases.

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 describes the 10 CFR Part 70 required protection program in effect for the period of time during which new fuel as 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.

A 10 CFR Part 37 Physical Protection Program addresses the applicable 10 CFR Part 37 requirements to provide physical protection for an aggregated category 1 or category 2 quantity of radioactive material.

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.

13.5.2.2.10 10 CFR Part 37 Physical Protection Program Procedures

A 10 CFR Part 37 Physical Protection Program consisting of procedures is utilized to delineate the requirements, responsibilities, and methods associated with the physical protection of an aggregated category 1 or category 2 quantity of radioactive material. These procedures provide the detailed steps for receipt, use, storage, transport and preparation of records and reports.

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 footprint area for the two new Westinghouse AP1000 units is west of, and adjacent to, the existing units on the VEGP site. There will be a protected area encompassing the new units. Like the existing units, physical protection of the new units will be based on controlling access to the VEGP site and the new units (VEGP Units 3 and 4), screening operating personnel, monitoring security equipment, designing and arranging station features, and obtaining assistance from local law enforcement personnel. Once construction reaches conclusion on the first new unit, a Vehicle Barrier System will be implemented at the appropriate stand-off distance.

The characteristics of the VEGP Units 3 and 4 footprint are such that implementation of the applicable requirements of 10 CFR 73.55, Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage, and NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations, as well as the post-9/11 NRC Orders, can be met. The VEGP site is sufficiently large to provide adequate distances between structures and the probable location of the security boundaries.

The VEGP site is bordered on the east by the Savannah River. For the existing units, SNC has an approved security program in place in compliance with the post-9/11 NRC Orders and in accordance with NEI 03-12, Template for Security Plan and Training and Qualification Plan. In the event that new units are added to the VEGP site, those requirements would continue to be met and would be extended to include the new units.

The final design of the VEGP Units 3 and 4 power block and supporting buildings would utilize design features as appropriate to assure that the existing security spatial distances outlined in the regulations above, as well as the Design Basis Threat requirements, are adequate. In accordance with 10 CFR 100.21(f), SNC will ensure that site characteristics are adequate to provide security plans and measures. The COL application would address the specific design features to assure site security as well as include the design of security monitoring equipment and methods to screen station operating personnel. A security assessment will be conducted as part of the COL application and will address all aspects of security for the new units.

There are no security hazards in the vicinity of the VEGP site. The VEGP site is located in Burke County in the State of Georgia. Written letters of agreement with the Burke County Sheriff and the Georgia State Patrol are currently in place to establish for law enforcement response in the event of a VEGP security (or radiological) emergency (Reference 201; Reference 202). Burke County has mutual aid agreements with surrounding counties in place, if necessary, to provide support during VEGP emergencies.

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.

A 10 CFR Part 37 Physical Protection Program is established, implemented, and maintained in order to protect an aggregated category 1 or category 2 quantity of radioactive material from theft or diversion per 10 CFR Part 37 requirements.

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, 10 CFR Part 37 physical protection 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 ESP COL Action Items

The specific access control measures to address the existing rail spur are addressed in Part 8, Physical Security Plan, Section 11.3.

13.6.3 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.
201. **(Burke County Sheriff 2004)** Burke County Sheriff's Office letter of agreement for law enforcement support for VEGP security and radiological emergencies, dated April 15, 2004.
202. **(Georgia State Patrol 2004)** Georgia State Patrol letter of agreement for law enforcement support for VEGP security and radiological emergencies, dated April 22, 2004.

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 construction site is defined in the Physical Security Plan, Appendix E and is under the control of Westinghouse. 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 (Westinghouse employees and subcontractors) are covered by the SNC-approved Westinghouse FFD Program (elements Subpart K).
- SNC employees and SNC subcontractor's construction management and oversight personnel are covered by the VEGP Units 1 and 2 Operations FFD Program and Westinghouse's employees and Westinghouse's subcontractors construction management and oversight personnel are covered by the SNC-approved Westinghouse FFD Program (elements Subpart A – H, N and O).
- SNC security personnel are covered by the VEGP Units 1 and 2 Operations FFD Program and Westinghouse's security personnel are covered by the SNC-approved Westinghouse 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.
- SNC FFD Program personnel are covered by the VEGP Units 1 and 2 Operations FFD Program and Westinghouse's FFD Program personnel are covered by the SNC approved Westinghouse FFD Program (elements Subpart A, B, D – H, N, O, and C per licensee's discretion).
- SNC 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 VEGP Units 1 and 2 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 VEGP Units 1 and 2 Operations 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 design, development, and manufacturing of nuclear power facilities. Operating experience from design, construction, and operation of earlier WEC PWRs is applied in the design, construction, and operation of the AP1000 as described in numerous locations throughout (e.g., **Subsections 3.6.4.4, 3.9.4.2.1, 4.2.3.1.3**).

Westinghouse also provides the construction of the plant and additional design engineering for selected site specific portions of the plant.

Other design and construction activities are generally contracted to qualified suppliers of such services. Implementation or delegation of design and construction responsibilities is described in the subsections below. Quality assurance 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 towards the construction and operation of the plant are:

a. Meteorology

Information concerning local (site) meteorological parameters is developed and applied by station and contract personnel to assess the impact of the station on local meteorological conditions. An onsite meteorological measurements program is employed by station 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 the safety of the plant. Items of interest include geologic structure, seismicity, geological history, and ground water conditions. During construction, foundations within 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 is appropriate from a safety standpoint for the construction and operation of 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 due to 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 are delegated to qualified contractors.

13AA.1.1.1.1.3 Review and Approval of Plant Design Features

Design engineering review and approval is 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 notification and communication of 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 review and approval of 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 prior to 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 within [Chapter 18](#). See Organization Charts, [Figure 13.1-202](#), and the Nuclear Development Quality Assurance Manual 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 quality assurance 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 Quality Assurance Program Description.

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 quality assurance.

13AA.1.1.1.1.8 Management and Review of Construction Activities

Overall management and responsibility for construction activities is assigned to the Vogtle 3 and 4 Executive Vice President of Construction. The Vogtle 3 and 4 Executive Vice President of Construction directs the organizations responsible for construction oversight. 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 in order to identify problems early and develop proper corrective actions and solutions. Monitoring of construction activities verifies that 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, instrument and control, etc., and tracked by schedule based on system and major plant components/areas. For construction oversight positions and functional area descriptions reporting to the Executive Vice President of Construction during the construction phase, see [Section 17.5](#) and the Nuclear Development Quality Assurance Manual.

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

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 Preoperational Activities

The Site Vice President of Vogtle 3&4 with the aid of those managers that report directly to the Site Vice President of Vogtle 3&4 are responsible for the activities required to transition the unit from the construction phase to the operational phase. These activities include turnover of systems from construction, preoperational testing, schedule management, procedure development for tests, fuel load, integrated startup testing, and turnover of systems to plant staff.

During construction and initial testing, the Engineering, Procurement, and Construction (EPC) contractor is responsible for equipment maintenance. To ensure equipment operability and reliability, plant maintenance programs such as preventive and corrective maintenance are developed prior to system turnover and become effective as each system is turned over from the EPC contractor to the plant staff with approved administrative procedures under the direction of the managers in charge of maintenance, engineering, and work control. For positions and functional area descriptions reporting to the V3&4SVP during operational readiness and preoperational phases, see [Section 17.5](#) and the Nuclear Development Quality Assurance Manual.

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](#). As a collaborative team, personnel from the reactor technology vendor design staff and personnel, including licensed operators, engineers, and instrumentation and control technicians from owner and other organizations in the nuclear industry, assess the design of the control room and man-machine interfaces to attain safe and efficient operation of the plant. See [Section 18.2](#) for additional details of HFE program management.

Modifications to the certified design of the control room or man-machine interface described in the Design Control Document are reviewed per engineering and site support procedures, as required by [Section 18.2](#), to evaluate the impact to plant safety. The engineering director is responsible for the human factors engineering (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 Initial Test Program (ITP) organization. The ITP 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 Development and Implementation of Staff Recruiting and Training Programs

Staffing plans are developed based on operating plant experience with input from the reactor technology vendor for safe operation of the plant as determined by HFE. See [Section 18.6](#). These plans are developed under the direction and guidance of the Vice President Nuclear Plant Site-Vogtle 3&4 and Vice President-Fleet Operations. Staffing plans are completed and necessary manager level positions are filled prior to start of preoperational testing. Personnel selected to be licensed reactor operators and senior reactor operators along with other staff necessary to support the safe operation of the plant are hired with sufficient time available to complete appropriate training programs, and become qualified, and licensed, if required, prior to fuel being loaded in 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 of 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
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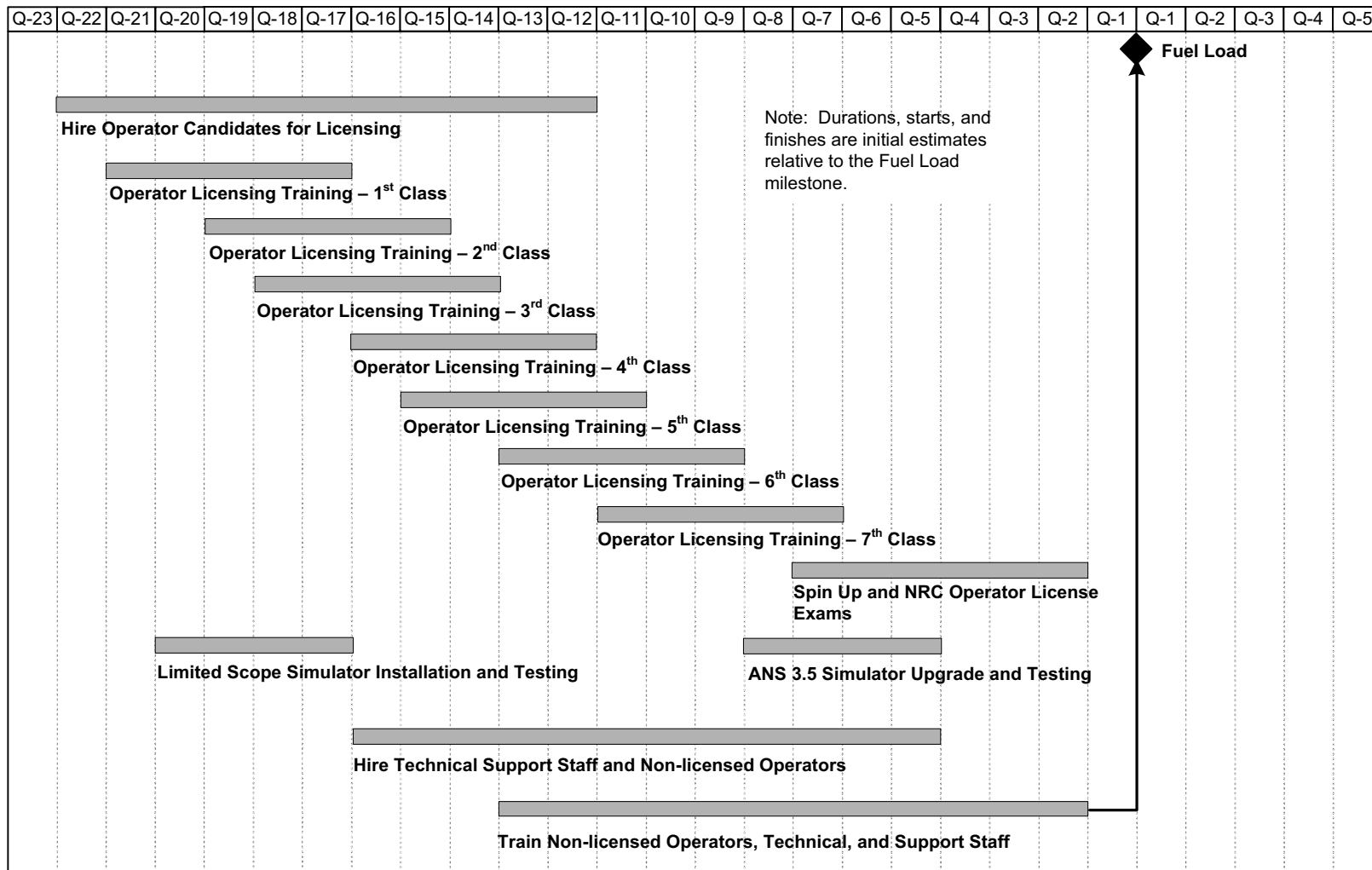


Figure 13AA-202
Hiring Schedule for Plant Staff