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	Original Westinghouse AP1000 DCD Revision 19 content
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Chapter 13 Conduct of Operation

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

13.1 Organizational Structure

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

This section describes organizational positions of a nuclear power station and owner/applicant corporations and associated functions and responsibilities. Prior to the start of construction, the current organization may differ from what is described in this section for the construction and operating WLS organization. The QAPD as described in Section 17.5 contains the description of the current Duke Energy organization including Nuclear Development. 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

Duke Energy has over 40 years of experience in the design, construction, and operation of nuclear generating stations. Duke Energy operates 12 nuclear units on seven sites: McGuire Units 1 and 2; Catawba Units 1 and 2; Oconee Units 1, 2, and 3; Harris Nuclear Plant Unit 1; Brunswick Nuclear Plant Units 1 and 2; H. B. Robinson Nuclear Plant Unit 2; and Crystal River Nuclear Plant Unit 3 (permanent shutdown/retired). The Nuclear Generation organization includes, but is not limited to, nuclear engineering, nuclear operations, corporate governance and operations support, corporate organizational effectiveness, nuclear major projects, nuclear development, and nuclear oversight.

13.1.1.1 Design, Construction, and Operating Responsibilities

The responsibility for the licensing, development and construction of new nuclear generating plants for Duke Energy is assigned to the Vice President of Nuclear Development. The responsibility for the operation of the new nuclear generating plants is assigned to the Chief Nuclear Officer. Each of these individuals reports directly to the President - Duke Energy Nuclear. The division of responsibilities was made to allow the Chief Nuclear Officer and Nuclear Generation to remain focused on improving the performance of the operating fleet and minimize the distractions associated with the construction of new nuclear generating plants. Organizational control and responsibility for the newly constructed nuclear generating plants transfers from Nuclear Development to the Chief Nuclear Officer following the completion of construction activities and prior to loading of fuel. This transition point allows for the continued support by the Nuclear Development organization, while the Operational Readiness (OR) organization transitions to the final structure typical of the operating fleet.

The first priority and responsibility of each member of the nuclear staff throughout the life of the plant is nuclear safety. Decision making for station activities is performed in a conservative manner with expectations of this core value regularly communicated to appropriate personnel by management interface, training, and station 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 and directs the project.

Key executive and corporate management positions, functions, and responsibilities are discussed in Subsection 13.1.1.3.1. Corporate and construction management organizations are shown in Figures 13.1-203 and 13AA-201. The management and technical support organization for design, construction, and preoperational activities is addressed in Appendix 13AA.

13.1.1.2 Provisions for Technical Support Functions

Before beginning preoperational testing, the executive - nuclear development, executive - corporate governance and operations support, the executive - corporate organizational effectiveness, and the executive - nuclear engineering establish the organization of managers, functional managers, supervisors, and staff sufficient to perform required functions for support of safe plant operation. These functions include the following:

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

In the event that station 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 13.1-201 illustrates the management and technical support organizations supporting operation of the plant. Subsection 13.1.2 describes the 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. In addition, station 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 Nuclear Engineering

The nuclear engineering department consists of plant engineering, design engineering, engineering programs, nuclear fuel management, and safety and engineering analysis. These groups are responsible for performing the classical design activities as well as providing engineering expertise in other areas of new plant sites and license renewal at the current plant sites. They are also responsible for probabilistic safety assessment and other safety issues, plant system reliability analysis, performance and technical support, core management and periodic reactor testing, and for programs, such as inservice inspection/inservice testing (ISI/IST), fire protection, snubbers, and valves.

Each of the engineering groups has a functional manager who reports to the executive - nuclear engineering (Figure 13.1-203).

The nuclear 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.
- Major engineering projects for the nuclear fleet.
- 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.
- Maintenance of the design basis by updating the record copy of design documents as necessary to reflect the actual as-built configuration of the plant.
- Accident and transient analyses.
- Human Factors Engineering design process.

Reactor engineering, led by the functional manager in charge of nuclear fuels and analysis 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 program description (QAPD).

Engineering resources are shared between units. A single management organization oversees the engineering work associated with the station units. Physical separation of units helps to minimize wrong-unit activities.

13.1.1.2.2 Nuclear Safety Assurance

Plant licensing, regulatory compliance, corrective actions and performance improvement, and emergency preparedness each have a functional manager who reports to and receives direction from the manager in charge of organizational effectiveness.

The nuclear safety assurance (NSA) organization, through the licensing department, is the normal contact point for the station with the Nuclear Regulatory Commission (NRC) in matters concerning licensing and is responsible for addressing NRC bulletins and orders. Typical duties include:

- Developing licensee event reports (LERs) and responding to notices of violations.
- Writing/submitting operating license and technical specification amendments and updating the FSAR.
- Tracking commitments and answering generic letters.
- Analyzing operating experience data and monitoring industry issues.
- Preparing station for special NRC inspections, interfacing with NRC inspectors, and interpreting NRC regulations.
- Maintaining the licensing basis.

The organizational effectiveness organization administers the corrective action program and the station's emergency preparedness program.

Personnel resources of the NSA organization are shared between units. A single management organization oversees the NSA organization for the station units.

13.1.1.2.3 Quality Assurance

The nuclear oversight organization provides independent oversight of the nuclear plant activities, maintains the Quality Assurance Program Manual, and administers the employee concerns program. The executive - nuclear oversight reports directly to the CNO. However, the executive - nuclear oversight reports to the President - Duke Energy Nuclear on matters related to the development and deployment of new nuclear generating plants.

Safety-related activities associated with the operation of the plant are governed by QA direction established in Chapter 17 and the QAPD. The requirements and commitments contained in the QAPD apply to activities associated with structures, systems, and components which 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 which provide written guidance for the control of quality-related activities and provide for the development of documentation to provide objective evidence of compliance. QA is a corporate function under the executive - nuclear oversight and includes:

- General QA indoctrination and training for the nuclear station personnel.
- Maintenance of the QAPD.
- Coordination of the development of audit schedules.
- Audit, surveillance, and evaluation of nuclear division suppliers.
- Quality control (QC) inspection/testing activities.

Oversight of safety review of station programs, procedures, and activities is performed by a plant safety review committee, a corporate safety review committee, and the QA organization. Review and audit activities are addressed in Chapter 17 and the QAPD.

QA/QC management is independent of the station management line organization. Onsite personnel resources of the QA/QC organization are shared between units. QA and QC personnel report to the functional manager in charge of nuclear oversight at the Lee site. The functional manager in charge of nuclear oversight at the Lee site reports directly to the executive - nuclear oversight.

13.1.1.2.4 Chemistry

The corporate governance and operations support organization provides the standardization and support of the chemistry program at each site. A chemistry department is established to monitor and control the chemistry of various plant systems such that corrosion of components and piping is minimized and radiation from corrosion byproducts is kept to levels that allow operations and maintenance with radiation doses as low as reasonably achievable.

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

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

13.1.1.2.5 Radiation Protection

The corporate governance and operations support organization provides the standardization and support of the radiation protection programs at each site. A radiation protection program is established to protect the health and safety of the surrounding public and personnel working at the plant. The radiation protection program is described in Chapter 12. The program includes:

- Respiratory Protection
- Personnel Dosimetry
- Bioassay
- Survey Instrument Calibration and Maintenance
- Radioactive Source Control
- Effluents and Environmental Monitoring and Assessment
- Radioactive Waste Shipping
- Radiation Work Permits
- Job Coverage
- Radiation Monitoring and Surveys

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

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

13.1.1.2.6 Fueling and Refueling Support

The corporate governance and operations support organization provides the standardization and support of the refueling programs at each site. 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 work control organization. The functional manager in charge of outage and scheduling is responsible for planning and scheduling outages and for refueling support and reports to the plant manager.

Personnel resources of the work control organization are shared between units. A single management organization oversees the work control associated with both units.

13.1.1.2.7 Training and Development

The corporate organizational effectiveness support organization provides the standardization and support of the training programs at each site. The training department is responsible for providing training programs that are established, maintained, and implemented in accordance with applicable plant administrative directives, regulatory requirements, and company operating policies so that station personnel can meet the performance requirements of their jobs in operations, maintenance, technical support, and emergency response. The objective of training programs is to provide qualified personnel to operate and maintain the plant in a safe and efficient manner and to provide compliance with the license, technical specifications, and applicable regulations. The training department's responsibilities encompass operator initial license training, requalification training, and plant staff training as well as the plant access training (general employee training) and radworker training. The functional manager in charge of training at the Lee site is independent of the operating line organization to provide for independence from operating pressures. Nuclear 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 station training activities.

13.1.1.2.8 Maintenance Support

The corporate governance and operations support organization provides the standardization and support of the maintenance programs at each site. 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 station schedule for evaluation of operating or safe shutdown risk elements and to provide for efficient and safe performance. Personnel of the maintenance support organization receive direction from the functional manager in charge of maintenance who 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 station units.

13.1.1.2.9 Operations Support

The corporate governance and operations support organization provides the standardization and support of the operations programs at each site. The operations support function is provided under

the direction of the functional manager in charge of operations. Operations support includes the following programs:

- Operations procedures
- Operations surveillances
- Equipment tagging
- Fire protection testing and surveillance
- Radwaste system operation

13.1.1.2.10 Fire Protection

The station is committed to maintaining a fire protection program as described in Subsection 9.5.1 The site executive in charge of plant management 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. The relationship of the site executive in charge of plant management to other staff personnel with fire protection responsibilities is shown on Figure 13.1-201. Fire protection for the facility is organized and administered by the engineer in charge of fire protection. The site executive in charge of plant management, through the engineer in charge of fire protection, is responsible for development and implementation of the fire protection program including development of fire protection procedures and inspections of fire protection systems and functions. Fire brigade training, drills, and practice are organized by the functional supervisor in charge of emergency preparedness in consultation with the engineer in charge of fire protection. Fire protection trainers are qualified to perform classroom instruction or practical training as discussed in Subsection 9.5.1.8.2.2. The engineer in charge of fire protection reports to the site executive in charge of plant management through engineering department management and coordinates operations related fire protection program activities with the manager in charge of operations. Functional descriptions of position responsibilities are included in appropriate procedures. Station personnel are responsible for adhering to the fire protection/prevention requirements detailed in Subsection 9.5.1. The site executive in charge of plant management has the lead responsibility for the overall site fire protection during construction of new units.

Personnel resources that implement the fire protection program are shared between units. A single management organization oversees the fire protection program for the station units.

13.1.1.2.11 Emergency Organization

The corporate organizational effectiveness support organization provides the standardization and support of the emergency response programs at each site. 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 station 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 orchestrate drills and training to maintain qualification of personnel and develop procedures to guide and direct the emergency organization during an emergency. The functional supervisor in charge of emergency preparedness reports to the functional manager in charge of organizational effectiveness. 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 station 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 Nuclear Generation - supply chain reports to the vice president - supply chain.

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 station units.

13.1.1.3 Organizational Arrangement

13.1.1.3.1 Executive Management Organization

Executive management is ultimately responsible for execution of activities and functions for the nuclear generating plants owned by the utility. 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. The nuclear executive organization is shown in Figure 13.1-203. A high-level chart of the Duke Energy corporate organization showing the relationship of the nuclear division to the rest of the corporate organization is illustrated in Figure 13.1-204. Executives and managers with direct line of authority for activities associated with operation of the plant are shown in Figure 13.1-201. Responsibilities of those executives and managers are specified below.

13.1.1.3.1.1 Chairman, President and CEO

The Duke Energy Chairman, President and CEO has the ultimate responsibility for the safe and reliable operation of each nuclear station owned and/or operated by the utility. The CEO is responsible for the overall direction and management of the corporation and the execution of the company policies, activities, and affairs. The CEO is assisted by the President - Duke Energy Nuclear and other nuclear executive staff. Also reporting to the Chairman, President and CEO are Group Executives responsible for providing support to Nuclear Generation for the following: electrical transmission; electrical distribution; laboratory services; switchyard maintenance and technical support; support for the emergency response communications; information technology services; document control and record management activities; support for contracts, engineering, and management related to new plant construction as requested.

13.1.1.3.1.2 President - Duke Energy Nuclear

The President of Duke Energy Nuclear reports to the Chairman, President and Chief Executive Officer and is responsible for the Duke nuclear fleet, enterprise project management and construction, new plant development and decommissioning activities. The President - Duke Energy Nuclear has overall authority and responsibility for the QA Program. The President - Duke Energy Nuclear directs the following group executives: (1) chief nuclear officer (CNO); (2) nuclear development; (3) project management and construction; (4) nuclear oversight; and (5) site construction. There are two additional direct reports to the President - Duke Energy Nuclear. One is

the functional director of nuclear policy and support. The other position is the functional director for the U.S. nuclear industry for Fukushima responses.

13.1.1.3.1.3 Group Executive Chief Nuclear Officer

The group executive - Nuclear Generation is the CNO. The CNO reports to the President - Duke Energy Nuclear of Duke Energy. The CNO directs the following executives for each nuclear site group in the operation of his applicable unit(s): (1) executive - nuclear engineering, (2) executive - corporate governance and operations support, (3) executive - corporate organizational effectiveness, (4) executive - nuclear major projects, (5) executive - nuclear oversight and (6) the three executives for nuclear operations. The CNO has responsibility 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 CNO delegates authority and responsibility for the operation and support of the sites to the executive - nuclear operations for each site group. It is the responsibility of the CNO to provide guidance and direction such that safety-related activities including engineering, testing, modifications, preoperational testing, operations, maintenance, and planning are performed following the guidelines of the QA program. The Independent Nuclear Oversight Committee reports directly to the CNO. The CNO has no ancillary responsibilities that might detract attention from nuclear safety matters.

13.1.1.3.1.4 Executive - Nuclear Operations (Specified Duke Sites)

The executive(s) in charge of nuclear operations is responsible for oversight of operations at each of the stations under his purview. Currently the sites are divided among three executives in charge of nuclear operations as follows: one responsible for Oconee and Robinson nuclear stations; one responsible for Catawba and McGuire nuclear stations; and one responsible for Brunswick and Harris nuclear stations. With the addition of future sites, responsibilities will be redistributed among the executives - nuclear operations to maintain proper focus and oversight. Reporting to each executive - nuclear operations are the site executives for the respective nuclear stations. The executives - nuclear operations report to the CNO.

13.1.1.3.1.5 Site Executive(s) - Plant Management (McGuire, Catawba, Oconee, Harris, Brunswick, Robinson, and Future Lee Site)

The site executive(s) in charge of plant management reports to the executive(s) in charge of nuclear operations. The site executive in charge of plant management is directly responsible for management and direction of activities associated with the efficient, safe, and reliable operation of the nuclear station, except for those functions delegated to the executive - corporate governance and the executive - corporate organizational effectiveness. The site executive in charge of plant management is assisted in management and technical support activities by the plant manager and managers in charge of organizational effectiveness, engineering, training, security, nuclear oversight, major projects, human resources, corporate communications, and finance. The site executive in charge of plant management is responsible for the site fire protection program through the engineer in charge of fire protection and engineering management. As Lee approaches startup, the site organization transitions to the Operating Plant Site Organization as shown in Figure 13.1-201 from the development focused organization shown in Figure 13AA-201.

13.1.1.3.1.6 Executive - Nuclear Development

The executive in charge of nuclear development is responsible for development of the licensing actions needed in support of new nuclear site development. Responsibilities also include engineering oversight of contractors, licensing, construction, site layout, staffing, and program development. The executive in charge of nuclear development is assisted by a support staff and reports directly to the

President - Duke Energy Nuclear. This position is supported by the functional managers in charge of engineering, licensing, project management, and operational readiness.

13.1.1.3.1.7 Executive - Major Projects

The executive in charge of major projects provides project management, engineering, and vendor oversight for selected large projects at the nuclear sites. Providing oversight for these significant projects provides more focus and continuity for upgrades and eliminates distractions for site management. Nuclear major projects is responsible for contracts, engineering, and management related to fleet and nuclear site major projects. The executive in charge of major projects reports to the CNO.

13.1.1.3.1.8 Executive - Site Construction

The executive for site construction reports directly to the President - Duke Energy Nuclear. This reporting relationship allows the CNO and Nuclear Generation to remain focused on improving the performance of the operating fleet and minimize the distractions associated with the construction of new nuclear generating plants. This position will be filled in support of the start of construction activities for a new nuclear plant. This position is responsible for the control and oversight of all construction activities associated with a new nuclear unit. Reporting to this position will be the manager for construction; manager for site engineering; and the site plant manager as shown on Figure 13AA-201. This position will transfer responsibility for the constructed unit to the site executive reporting to the CNO at the completion of construction activities and prior to the loading of fuel in that unit. This position will retain responsibilities for other units under construction at a multi-unit site until construction activities for each unit are completed. This position is supported during these construction activities by other Duke Energy Nuclear organizations, as needed.

13.1.1.3.1.9 Executive - Corporate Governance and Operations Support

The executive for corporate governance and operations support reports to the CNO. Corporate governance and operations support provides support to help improve overall fleet performance. This centralized organization includes protective services (security and access services); nuclear support services; and operations support.The functional manager of nuclear operations, the functional manager of protective services, the functional manager of Fukushima responses, the functional manager of nuclear merger integration, and the functional manager of nuclear support services report to the executive in charge of corporate governance and operations support.

13.1.1.3.1.10 Executive - Corporate Organizational Effectiveness

The executive for corporate organizational effectiveness reports to the CNO. The executive for corporate organizational effectiveness will support fleet performance through improving overall fleet effectiveness. Reporting to this position will be organizational effectiveness; regulatory affairs; training; leadership development; performance improvement and emergency preparedness.

13.1.1.3.1.11 Executive - Nuclear Engineering

The executive in charge of nuclear engineering provides support to the stations in severe accident analysis, safety analysis, nuclear design, core mechanical and thermal hydraulic analysis, fuel management, switchyard support, metallurgical laboratory services, material aging program, steam generator maintenance, ISI program support, QC inspector training and certification, procurement engineering, welding, and radiological engineering.

The executive - nuclear engineering reports to the CNO. Nuclear engineering provides broad engineering leadership and technical support to the nuclear sites, with emphasis on generic issues

and consistent practices. This includes providing expertise in safety assessment with technical support in the areas of risk assessment, radiological engineering, and safety analysis; fuel management with leadership and technical support in the areas of fuel supply, spent fuel management, and reactor core mechanical and thermal hydraulic analysis; fleet electrical and procurement engineering with technical support in the areas of procurement engineering, nuclear process systems, and electrical systems and analysis; and programs and components support in the areas of steam generator inspections and maintenance, engineering programs, component engineering, material failure analysis and materials science, equipment reliability, and ASME code inspections and testing.

Nuclear engineering provides record storage and document management services, technology planning, project control, and technical support for information technology applications and systems such as equipment databases, applications, infrastructure, and plant process information systems.

13.1.1.3.1.12 Executive - Nuclear Oversight

The executive in charge of nuclear oversight provides support and leadership to the general office and stations with QA program audits, performance assessment, procurement quality, supplier verification, and QA, QC, NDE, and ISI, as applicable. In addition, nuclear oversight provides an advisory function to senior management through the NSRB. The executive - nuclear oversight has the authority and organizational freedom to identify quality problems; initiate, recommend, or provide solutions to quality problems through designated channels; verify the implementation of solutions to quality problems; and ensure cost and schedule do not influence decision-making involving quality. The executive - nuclear oversight has unfettered access to the CNO to communicate QA program concerns and issues.

The executive - nuclear oversight is delegated primary ownership of the department QA program description and is responsible for day-to-day administration of the program and resolution of QA issues. If significant quality problems are identified by nuclear oversight personnel, the executive - nuclear oversight or designee has the responsibility and authority to stop work pending satisfactory resolution of the identified problem. The executive - nuclear oversight reports directly to the CNO. The executive - nuclear oversight is responsible for providing oversight of Nuclear Generation activities; administration of the employee concerns program; and maintenance of the Quality Assurance Program Manual. The executive - nuclear oversight is responsible for and reports to the President - Duke Energy Nuclear on all matters related to the independent monitoring and assessing of activities performed by or in support of the development and deployment of new nuclear generating plants, decommissioning activities, and project management and construction activities not controlled by the CNO. Assisting the executive - nuclear oversight is the functional manager in charge of corporate nuclear oversight and the functional manager(s) in charge of nuclear oversight for each nuclear plant site.

13.1.1.3.1.13 Functional Director - Nuclear Protective Services

The functional director in charge of nuclear protective services is responsible for providing guidance and direction to the functional manager - security at each site on the nuclear security, access authorization, and fitness for duty programs. The director - nuclear protective services reports to the executive - corporate governance and operations support.

13.1.1.3.2 Site Support Organization

13.1.1.3.2.1 The Functional Manager - Engineering

The functional manager in charge of engineering reports to the executive - nuclear engineering. The functional manager in charge of engineering is responsible for engineering activities related to the

operation or maintenance of the plant and design change implementation support activities and other functions described in Subsection 13.1.1.2.1.

The functional manager in charge of engineering directs functional discipline engineers responsible for system engineering, design engineering, and engineering programs.

A single management organization oversees the engineering support for the station units.

13.1.1.3.2.1.1 Functional Manager - Plant Engineering

The functional manager in charge of plant engineering reports to the functional manager in charge of engineering and supervises a technical staff of engineers and other engineering specialists and coordinates their work with that of other groups. System engineering staff includes reactor engineering as discussed in Subsection 13.1.1.2.1. The functional manager in charge of plant engineering is responsible for providing direction and guidance to system engineers as follows:

- Monitoring the efficiency and proper operation of balance of plant and reactor systems.
- Planning programs for improving equipment performance, reliability, or work practices.
- Conducting operational tests and analyzing the results.
- Identification of plant spare parts for systems.

13.1.1.3.2.1.2 Functional Manager - Design Engineering

The functional manager in charge of design engineering reports to the functional manager in charge of engineering and is responsible for:

- Resolution of design issues.
- Onsite development of design related change packages and plant modifications.
- Implementation of effective project management methods and procedures, including cost controls, for implementation of modifications and construction activities.
- Management of contractors who may perform modification or construction activities.
- Maintaining configuration control program.

13.1.1.3.2.1.3 Functional Manager - Engineering Programs

The functional manager in charge of engineering programs reports to the functional manager in charge of engineering and is responsible for programs such as:

- Valve engineering
- Maintenance rule tracking and trending
- Fire protection
- Piping erosion/corrosion

- Inservice testing
- Equipment reliability engineering.

13.1.1.3.2.2 Functional Manager - Organizational Effectiveness

The functional manager in charge of organizational effectiveness is responsible for those functions described in Subsection 13.1.1.2.2 and reports to the site executive in charge of plant management. The responsibilities of the manager in charge of nuclear safety assurance are fulfilled through the functional supervisors in charge of plant licensing and regulatory compliance, corrective actions and performance improvement, emergency preparedness.

13.1.1.3.2.2.1 Functional Supervisor In Charge of Plant Licensing and Regulatory Compliance

The responsibility of the functional supervisor in charge of plant licensing and regulatory compliance is to provide a coordinated focus for interface with the NRC and technical direction and administrative guidance for the licensing staff for those activities listed in Subsection 13.1.1.2.2. The functional supervisor in charge of plant licensing and regulatory compliance reports directly to the functional manager in charge of organizational effectiveness.

13.1.1.3.2.2.2 Functional Supervisor In Charge of Corrective Actions and Performance Improvement

The responsibilities of the functional supervisor in charge of corrective actions and performance improvement includes establishing processes and procedures to facilitate identification and correction of conditions adverse to quality and implement corrective actions. The functional supervisor in charge of corrective actions and performance improvement reports directly to the functional manager in charge of organizational effectiveness.

13.1.1.3.2.2.3 Functional Supervisor In Charge of Emergency Preparedness

The functional supervisor in charge of emergency preparedness is responsible for:

- Coordinating and implementing the plant emergency response plan with state and local emergency plans.
- Developing, planning, and executing emergency drills and exercises including coordination of fire brigade training exercises with the engineer in charge of fire protection.
- Emergency action level development.
- NRC reporting associated with 10CFR50.54(q).

The functional supervisor in charge of emergency preparedness reports directly to the functional manager in charge of organizational effectiveness.

13.1.1.3.2.2.4 Additional Organizational Effectiveness Support

A functional supervisor in charge of procedures develops quality site procedures and reports to the organizational effectiveness manager. In addition, a functional supervisor in charge of human performance works with the site to improve human performance on behalf of the organizational effectiveness manager.

13.1.1.3.2.3 Functional Manager - Finance

The manager in charge of finance is responsible for planning, scheduling, and implementing special projects and financial programs, and for providing oversight of accounting and payroll processes for the site. The manager in charge of finance reports to the site executive in charge of plant management.

13.1.1.3.2.4 Functional Manager - Training and Development

The functional manager in charge of training and development is responsible for training programs at the site required for the safe and proper operation and maintenance of the plant including:

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

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

13.1.1.3.2.5 Functional Manager In Charge of Security

The functional manager in charge of security is responsible for:

- Implementation and enforcement of security directives, procedures and instructions received from appropriate authorities.
- Day-to-day supervision of the security guard force.
- Administration of the security program.

The functional manager in charge of security reports directly to the functional director - nuclear protective services and indirectly to the site executive - plant management.

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. For positions that do not have a cross-reference section in ANSI/ANS-3.1 the most comparable section of ANSI/ANS-3.1 is used for guidance in establishing experience and education requirements. 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

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

Nuclear plant employees are responsible for reporting problems with plant equipment and facilities. They are required to identify and document equipment problems in accordance with the QA program. QA program requirements, as they apply to the operating organization, are described in Chapter 17. The guidelines of Regulatory Guide 1.33, for the operating organization, onsite review, and rules of practice are implemented at the site via administrative procedure or standing order and 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 station procedure program.
- A program for review and audit of activities affecting plant safety. See Section 17.5 for description of station review and audit programs.
- Programs and procedures for rules of practice as described in Section 5.2 of ANSI/ANS-3.2-1988 (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 radiation protection staff to integrate radiation protection measures into plant procedures and design documents and into the planning, scheduling, conduct, and assessment of operations and work.
- Notify radiation protection personnel promptly when radiation protection problems occur or are identified, take corrective actions, and resolve deficiencies associated with operations, procedures, systems, equipment, and work practices.
- Train site personnel on radiation protection, and provide periodic retraining, in accordance with 10 CFR Part 19 so that they are properly instructed and briefed for entry into restricted areas.
- Periodically observe and correct, as necessary, radiation worker practices.
- Support radiation protection management in implementing the radiation protection program.
- Maintain exposures to site personnel ALARA.

13.1.2.1.1 Plant Manager

The plant manager reports to the site executive in charge of plant management, 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:

- Operations
- Maintenance and modification
- Chemistry and radiochemistry
- Outage management
- Scheduling and activity coordination

Additionally, the plant manager has overall responsibility for occupational and public radiation safety. Radiation protection 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 radiation protection policy throughout the plant organization.
- Provide an overall commitment to radiation protection by the plant organization.
- Interact with and support the manager in charge of radiation protection on implementation of the radiation protection program.
- Support identification and implementation of cost-effective modifications to plant equipment, facilities, procedures and processes to improve radiation protection controls and reduce exposures.
- Establish plant goals and objectives for radiation protection.
- Maintain exposures to site personnel ALARA.
- Support timely identification, analysis and resolution of radiation protection problems (e.g., through the plant corrective action program).
- Provide training to site personnel on radiation protection in accordance with 10 CFR Part 19.
- Establish an ALARA Committee with delegated authority from the plant manager that includes, at a minimum, the managers in charge of operations, maintenance, engineering, and radiation protection to help provide for effective implementation of line organization responsibilities for maintaining worker doses ALARA.

The line of succession of authority and responsibility for overall operations in the event of unexpected events of a temporary nature is:

a. Manager in charge of operations

b. Manager in charge of plant maintenance

c. Assistant manager in charge of operations

As described in Subsection 13.1.2.1.2.4, the manager in charge on-shift 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.

13.1.2.1.1.1 Functional Manager - Maintenance

Maintenance of the plant is performed by the maintenance department mechanical, electrical, and instrumentation and control disciplines. The functions of this department are to perform preventive and corrective maintenance, equipment testing, and implement modifications as necessary.

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

13.1.2.1.1.2 Maintenance Discipline Functional Managers

The functional managers of each maintenance discipline (mechanical, electrical, and instrumentation and control) are responsible for maintenance activities within their discipline including plant modifications. They provide guidance in maintenance planning and craft supervision. They establish the necessary manpower levels and equipment requirements to perform both routine and emergency type maintenance activities, seeking the services of others in performing work beyond the capabilities of the plant maintenance group. Each discipline functional manager is responsible for liaison with other plant staff organizations to facilitate safe operation of the station. These functional managers report to the manager in charge of plant maintenance.

13.1.2.1.1.3 Maintenance Discipline Supervisors

The maintenance discipline supervisors (mechanical, electrical, and instrumentation and control) supervise maintenance activities, assist in the planning of future maintenance efforts, and guide the efforts of the craft within their discipline. The maintenance discipline supervisors report to the appropriate maintenance discipline functional managers.

13.1.2.1.1.4 Functional Manager - Work Control

The functional manager in charge of work control is responsible for planning, scheduling, and coordinating maintenance, modification, and testing activities during power operations and shutdown periods. This includes taking necessary measures to minimize risk to the plant and personnel during the above activities.

The functional manager in charge of work control reports to the plant manager.

13.1.2.1.1.5 Functional Manager - Radiation Protection

The functional manager in charge of radiation protection has the responsibility for providing adequate protection of the health and safety of personnel working at the plant and members of the public during activities covered within the scope and extent of the license. Radiation protection responsibilities of the functional manager in charge of radiation protection are consistent with the guidance in Regulatory Guide 8.8 and Regulatory Guide 8.10. They include:

- Manage the radiation protection organization.
- Establish, implement, and enforce the radiation protection program.
- Provide radiation protection input to facility design and work planning.

- Track and analyze trends in radiation work performance and take necessary actions to correct adverse trends.

- Support the plant emergency preparedness program and assign emergency duties and responsibilities within the radiation protection organization.

- Delegate authority to appropriate radiation protection staff to stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety.

The functional manager in charge of radiation protection reports to the plant manager and is assisted by the supervisors in charge of radiation protection.

The functional manager in charge of radiation protection reports indirectly to and receives support from the corporate functional manager in charge of nuclear support.

13.1.2.1.1.6 Functional Supervisor(s) In Charge of Radiation Protection

The functional supervisors in charge of radiation protection are responsible for carrying out the day-to-day operations and programs of the radiation protection department as listed in Subsection 13.1.1.2.5.

Supervisors in charge of radiation protection report to the functional manager in charge of radiation protection.

13.1.2.1.1.7 Radiation Protection Technicians

Radiation protection technicians (RPTs) directly carry out responsibilities defined in the radiation protection program and procedures. In accordance with technical specifications an RPT is on site whenever there is fuel in the vessel. See Table 13.1-202.

The following are some of the duties and responsibilities of the RPTs:

- As delegated authority by the functional manager in charge of radiation protection, stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety.

- Provide coverage and monitor radiation conditions for jobs potentially involving significant radiation exposure.

- Conduct surveys, assess radiation conditions and establish radiation protection requirements for access to and work within restricted, radiation, high radiation, very high radiation, airborne radioactivity areas, and areas containing radioactive materials.

- Provide control over the receipt, storage, movement, use, and shipment of licensed radioactive materials.

- Review work packages, proposed design modifications, and operations and maintenance procedures to facilitate integration of adequate radiation protection controls and dose-reduction measures.

- Review and oversee implementation of plans for the use of process or other engineering controls to limit the concentrations of radioactive materials in the air.

- Provide personnel monitoring and bioassay services.
- Maintain, prescribe and oversee the use of respiratory protection equipment.
- Perform assigned emergency response duties.

13.1.2.1.1.8 Functional Manager - Chemistry

The functional manager in charge of chemistry is responsible for development, implementation, and direction and coordination of the chemistry, radiochemistry and nonradiological environmental monitoring programs. The chemistry department has charge of overall operation of the hot lab, cold lab, emergency offsite facility lab, and non-radiological environmental monitoring. The functional manager in charge of chemistry is responsible for the development, administration, and implementation of procedures and programs which provide for effective compliance with environmental regulations. The functional manager in charge of chemistry reports to the plant manager and directly supervises the chemistry supervisors and chemistry technicians as assigned. The functional manager in charge of chemistry reports indirectly to and receives support from the corporate located functional manager in charge of nuclear support services. Three functional supervisors over chemistry disciplines assist the functional manager in charge of chemistry.

13.1.2.1.2 Operations Department

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

- Operation of station equipment.
- Monitoring and surveillance of safety and non-safety related equipment.
- Fuel handling.
- Providing the nucleus of emergency and fire-fighting teams.

The operations department maintains sufficient licensed and senior licensed operators to staff the control room continuously using a crew rotation system. The operations department is under the direction of the manager in charge of operations, who through the assistant manager in charge of operations directs the day-to-day operation of the plant.

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

Some resources of the operations organization are shared between units. 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, a senior reactor operator (SRO) or reactor operator (RO) must hold an appropriate, current license for each unit. A single management organization oversees the operations group for the station units. See Table 13.1-201 for estimated number of staff in the operations department for a single unit. Positions required for operation of the second unit are also shown.

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

13.1.2.1.2.1 Functional Manager - Operations

The functional manager in charge of operations has overall responsibility for the day-to-day operation of the plant. The functional manager in charge of operations reports to the plant manager and is assisted by the assistant functional manager in charge of operations and assistant functional manager in charge of operations support. The functional manager in charge of operations receives support from the engineer in charge of fire protection for coordination of operations related fire protection activities. The functional manager in charge of operations or the assistant functional manager of operations is SRO licensed.

13.1.2.1.2.2 Assistant Functional Manager - Operations

The assistant functional manager in charge of operations, under the direction of the functional manager in charge of operations, is responsible for:

- Shift plant operations in accordance with the operating license, technical specifications, and written procedures.
- Providing supervision of operating shift personnel for operational shift activities including those of emergency and firefighting teams.
- Coordinating with the assistant functional manager in charge of operations support and other plant staff sections.
- Verifying that nuclear plant operating records and logs are properly prepared, reviewed, evaluated and turned over to the assistant functional manager in charge of operations support.

The assistant functional manager in charge of operations is assisted in these areas by the managers in charge on-shift who direct the operating shift personnel. The assistant functional manager in charge of operations reports to the functional manager in charge of operations and in the absence of the manager in charge of operations or assistant functional manager in charge of operations support may assume the duties and responsibilities of either of these positions.

13.1.2.1.2.3 Assistant Functional Manager In Charge of Operations Support

The assistant functional manager in charge of operations support, under the direction of the functional manager in charge of operations, is responsible for:

- Directing and guiding plant operations support activities in accordance with the operating license, technical specifications, and written procedures.
- Providing supervision of operating support personnel, for operations support activities, and coordination of support activities.
- Providing for nuclear plant operating records and logs to be turned over to the nuclear records group for maintenance as QA records.

The assistant functional manager in charge of operations support is assisted by the supervisors of work management, operations procedures group, and other support personnel. In the absence of the functional manager in charge of operations or assistant functional manager in charge of operations, the assistant functional manager in charge of operations support may assume the duties and responsibilities of either of these positions.

13.1.2.1.2.4 Manager in Charge On-Shift

The manager in charge on-shift is a licensed SRO responsible for the control room command function, and is the plant manager's direct management representative for the conduct of operations. As such, the manager in charge on-shift has the responsibility and authority to direct the activities and personnel onsite as required to:

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

The manager in charge on-shift retains this responsibility and authority until formally relieved of operating responsibilities by a licensed SRO. Additional responsibilities of the manager in charge on-shift include:

- Directing nuclear plant employees to report to the plant for response to potential and real emergencies.
- Seeking the advice and guidance of the shift technical advisor and others in executing the duties of the manager in charge on-shift whenever in doubt as to the proper course of action.
- Promptly informing responsible supervisors of significant actions affecting their responsibilities.
- Participating in operator training, retraining, and requalification activities from the standpoint of providing guidance, direction, and instruction to shift personnel.

The manager in charge on-shift is assisted in carrying out the above duties by the supervisors in charge on-shift and the operating shift personnel. The manager in charge on-shift reports to the assistant functional manager in charge of operations.

13.1.2.1.2.5 Supervisor in Charge On-Shift

The supervisor in charge on-shift is a licensed SRO. The primary function of the supervisor in charge on-shift is to administratively support the manager in charge on-shift such that the "command function" is not overburdened with administrative duties and to supervise the licensed and non-licensed operators in carrying out the activities directed by the manager in charge on-shift. Other duties include:

- Being aware of maintenance and testing performed during the shift.
- Shutting down the reactor if conditions warrant this action.
- Informing the manager in charge on-shift and other station management in a timely manner of conditions which may affect public safety, plant personnel safety, plant capacity or reliability, or cause a hazard to equipment.
- Initiating immediate corrective action as directed by the manager in charge on-shift in any upset situation until assistance, if required, arrives.

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

The supervisor in charge on-shift reports directly to the manager in charge on-shift.

13.1.2.1.2.6 Reactor Operator

The ROs are licensed reactor operators and normally report to the supervisor in charge on-shift or manager in charge on-shift. They are responsible for routine plant operations and performance of major evolutions at the direction of the manager/supervisor in charge on-shift. The RO duties include:

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

Whenever there is fuel in the reactor vessel, at least one reactor operator is in the control room monitoring the status of the unit at the main control panel. The RO assigned to the main control panel is designated the “operator at the controls” and conducts monitoring and operating activities in accordance with the guidance set forth in Regulatory Guide 1.114, which is further described in Subsection 13.1.2.1.3, Conduct of Operations.

13.1.2.1.2.7 Non-Licensed Operator

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

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

Non-licensed operators include auxiliary operators as shown in Figure 13.1-202.

13.1.2.1.2.8 Shift Technical Advisor

The station is committed to meeting NUREG-0737 TMI Action Plan item I.A.1.1 for shift technical advisors. The shift technical advisor (STA) reports directly to the manager in charge on-shift and provides advanced technical assistance to the operating shift complement during normal and abnormal operating conditions. The STA’s responsibilities are detailed in plant administrative

procedures as required by TMI Action Plan I.A.1.1 and NUREG-0737 Appendix C. These responsibilities include:

- Activities to monitor core power distribution and critical parameters.
- Activities to assist the operating shift with technical expertise during normal and emergency conditions.
- Evaluation of technical specifications, special reports, and procedural issues.

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

A SRO on shift who meets the qualifications for the combined SRO/STA position specified for Option 1 of Generic Letter 86-04 (Reference 202) 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.

13.1.2.1.2.9 Engineer - Fire Protection

The engineer in charge of fire protection and the fire protection program staff are responsible for the following:

- Fire protection program requirements, including consideration of potential hazards associated with postulated fires, knowledge of building layout, and system design.
- Post-fire shutdown capability.
- Design, maintenance, surveillance, and QA of fire protection features (e.g., detection systems, suppression systems, barriers, dampers, doors, penetration seals and fire brigade equipment).
- Fire prevention activities (administrative controls and training).
- Fire brigade organization and oversight of fire brigade training.
- Pre-fire planning including review and updating of pre-fire plans at least every two years.

The engineer in charge of fire protection reports through engineering department management to the site executive in charge of plant management who has ultimate responsibility for fire protection of the plant. Additionally, the engineer in charge of fire protection works with the manager in charge of operations to coordinate activities and program requirements with the operations department. 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 nuclear plant safety or has available personnel who are trained and experienced in nuclear plant safety.

13.1.2.1.2.10 Radwaste Operations Lead

The Radwaste Operations lead is responsible for the development, implementation, direction, and coordination of radwaste activities. The Radwaste Operations Lead reports to the operations manager in charge on-shift.

The Radwaste Operations lead supervises radwaste operators assigned to the radwaste area.

13.1.2.1.3 Conduct of Operations

Station operations are controlled and/or coordinated through the control room. Maintenance activities, surveillances, and removal from/return to service of SSCs 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 supervisor/manager in charge on-shift's time should be spent.
- Definition and outline of "surveillance area" and requirement for continuous surveillance by the operator at the controls.
- Relief requirements for operator at the controls and the supervisor/manager in charge on-shift.

In accordance with 10 CFR 50.54:

- Reactivity controls may be manipulated only by licensed reactor operators and senior reactor operators except as allowed for training under 10 CFR Part 55.
- Apparatus and mechanisms other than controls which 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 a senior operator shall be in the control room and a licensed reactor operator or senior reactor operator shall be present at the controls.

13.1.2.1.4 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 station procedures. When overtime is necessary the provisions in the technical specifications and the plant administrative procedures apply. Shift crew staffing plans may be modified during refueling outages to accommodate safe and efficient completion of outage work in accordance with the proceduralized work hour limitations.

The minimum composition of the operating shift crew is contingent upon the unit operating status. Position titles, license requirements and minimum shift manning for various modes of operation are

contained in Technical Specifications, administrative procedures, and Table 13.1-202, and illustrated in Figure 13.1-202.

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. Members of the fire brigade are knowledgeable of building layout and system design. The assigned fire brigade members for any shift does not include the manager in charge on-shift nor any other members of the minimum shift operating crew necessary for safe shutdown of the unit. Nor does it include any other personnel required for other essential functions during a fire emergency. Fire brigade members for a shift are designated in accordance with established procedures at the beginning of the shift.

13.1.3 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. For positions that do not have a cross-reference section in ANSI/ANS-3.1 the most comparable section of ANSI/ANS-3.1 is used for guidance in establishing experience and education requirements.

13.1.3.2 Qualifications of Plant Personnel

Resumes 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, 13.1.1.2.11, 13.1.2, 13.1.2.1.3, 13.1.3, and Appendix 13AA.

13.1.5 References

201. American Nuclear Society, “American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plant,” ANSI/ANS -3.1-1993.

202. U.S. Nuclear Regulatory Commission, “Generic Letter 86-04, Policy Letter, Engineering Expertise on Shift.”

203. American Nuclear Society, “American National Standard for Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants,” ANSI/ANS-3.2-1988.

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 1st unit	Expected additional positions 2nd unit
Executive management	chief executive officer	n/a	President and Chief Executive Officer, Duke Energy	1	-
	----------	n/a	President, Duke Energy Nuclear	1	-
	chief nuclear officer	n/a	Group Executive, Chief Nuclear Officer	1	-
	executive, nuclear operations	n/a	Executive, Nuclear Operations	1	-
	executive, nuclear generation and development	n/a	Executive, Nuclear Plant Development	1	0
Nuclear support	executive, nuclear support	n/a	Executive, Corporate Governance and Operations Support	1	-
	----------	n/a	Executive, Corporate Organizational Effectiveness	1	-
	manager	4.2.4	Manager, Nuclear Plant Support	1	-
Plant management	executive	n/a	Site Executive, Plant Management	1	-
	plant manager	4.2.1	Nuclear Station Plant Manager	1	-
Engineering	executive	n/a	Executive, Nuclear Engineering	1	-
	executive	n/a	Executive, Major Projects	1	-
	manager	4.2.4	Functional Manager, Engineering	1	-
	manager	4.2.4	Manager, Nuclear Support Services	1	-
system engineering	functional manager	4.3.9	Functional Manager, Plant Engineering	1	-
	system engineer	4.6.1	System Engineer	16	4
design engineering	functional manager	4.3.9	Functional Manager, Design Engineering	1	-
	design engineer	4.6 - staff engineer	Design Engineer	23	7
safety and engineering analysis	functional manager	4.3.9	Manager, Safety and Engineering Analysis	1	-
	programs engineer	4.6 - staff engineer	Analysis Engineer	4	-

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 1st unit	Expected additional positions 2nd unit
engineering programs	functional manager	4.3.9	Functional Manager, Engineering Programs	1	-
	programs engineer	4.6 - staff engineer	Programs Engineer	20	5
reactor engineering	functional manager	4.3.9	Functional Supervisor, Reactor Engineering	1	-
	reactor engineer	4.6 - staff engineer	Reactor Engineer	3	1
Maintenance	manager	4.2.3	Manager, Maintenance	1	-
instrumentation and control	functional manager	4.3.4	Functional Manager, Instrumentation and Control	1	-
	supervisor	4.4.7	Supervisor, Instrumentation and Control	7	-
	technician	4.5.3.3	Instrumentation and Control Technician	30	17
mechanical	functional manager	4.3.6	Manager, Mechanical	1	-
	supervisor	4.4.9	Supervisor, Mechanical	9	-
	technician	4.5.7.2	Mechanic	30	14
electrical	functional manager	4.3.5	Manager, Electrical	1	-
	supervisor	4.4.8	Supervisor, Electrical	6	4
	technician	4.5.7.1	Electrician	18	3
support	functional manager	4.3	Manager, Maintenance Support	1	-
Operations	manager	4.2.2	Manager, Operations	1	-
operations, plant	functional manager	4.3.8	Assistant Operations Manager	1	-
operations, admin	functional manager	4.3.8	Assistant Operations Manager Support	1	-
operations, radwaste	supervisor	4.4	Lead - Radwaste Operations	1	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 1st unit	Expected additional positions 2nd unit
operations, (on-shift)	functional manager	4.4.1	Shift Manager	5	5
	supervisor	4.4.2	Shift Supervisor	5	5
	licensed operator	4.5.1	Control Room Operator	10	10
	non-licensed operator	4.5.2	Plant Equipment Operator	30	30
	shift technical advisor	4.6.2	Shift Technical Advisor	5	5
Fire protection	supervisor	4.4	Engineer, Fire Protection Program	1	-
Radiation protection	functional manager	4.3.3	Functional Manager, Radiation Protection	1	-
	supervisor	4.4.6	Radiation Protection Functional Supervisor	3	-
	technician	4.5.3.2	Radiation Protection Technician	20	10
	ALARA specialist	n/a	ALARA Specialist	2	-
Chemistry	functional manager	4.3.2	Functional Manager, Chemistry and Environmental	1	-
	supervisor	4.4.5	Chemistry Functional Supervisor	3	-
	technician	4.5.3.1	Chemistry Technician	14	12
	radwaste operator	4.5.2	Radwaste Operator	5	4
Nuclear safety assurance	manager	4.2	Functional Manager, Organizational Effectiveness	1	-
licensing	functional manager	4.3	Manager, Plant Licensing and Regulatory Compliance	-	-
	supervisor	n/a	Functional Supervisor, Licensing and Regulatory Programs	1	0
	licensing engineer	n/a	Licensing Engineer	5	-
corrective action	functional manager	4.3	Functional Supervisor, Corrective Action and Performance Improvement	1	-
	corrective action engineer	n/a	corrective action engineer	2	-
emergency preparedness	functional manager	4.3	Functional Supervisor, Emergency Preparedness	1	-

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 1st unit	Expected additional positions 2nd unit
	EP planner	n/a	EP Planner	2	-
Training	functional manager	4.3.1	Functional Manager, Training and Development	1	-
	supervisor ops trng	4.4.4	Training Supervisor, Operations	1	-
	ops training instructor	n/a	Ops Training Instructor	6	6
	supervisor tech staff/maint trng	4.5.4	Supervisor Tech Staff/Maint Trng	1	-
	tech staff/maint instructors	4.4.4	Tech Staff/Maint Instructor	8	-
Purchasing, and contracts	functional manager	4.3	Functional Manager, Purchasing and Contracts	1	-
Security	functional manager	4.3	Functional Manager, Security	1	-
Planning and scheduling	functional manager	4.3	Functional Manager, Planning and Scheduling	1	-
	functional manager	4.3	Functional Manager, Outages	1	-
Quality assurance	functional manager	4.3.7	Functional Manager, Nuclear Oversight	1	-
	supervisor	4.4.13	Quality Assurance Supervisor	1	-
	QA auditor	4.5.6	QA Auditor	6	-
	supervisor	4.4.13	Quality Control Supervisor	1	-
	QC inspector	4.5.5	QC Inspector	4	2
Startup testing	supervisor	4.4.11	Startup Testing Supervisor	1	-
	startup test engineer	4.4.1	Startup Test Engineer	6	-
	supervisor	4.4.12	Preop Testing Supervisor	1	-
	preop test engineer	4.4.1	Preop Test Engineer	20	-

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

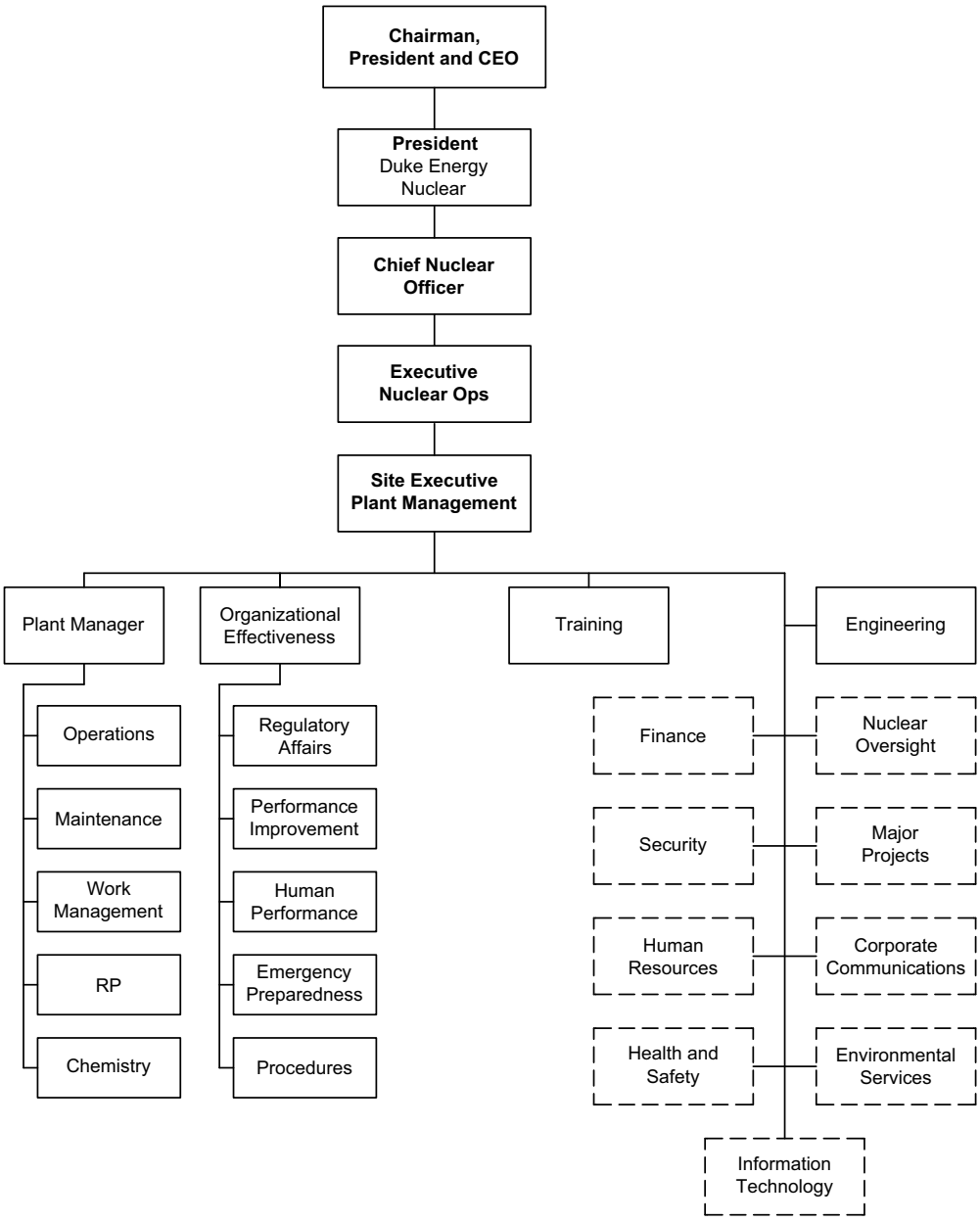
Units Operating	Two Units Two Control Rooms
All Units Shutdown	1 SM (SRO) 2 RO 3 NLO
One Unit Operating[(a)]	1 SM (SRO) 1 SRO 3 RO 3 NLO
Two Units Operating[(a)]	1 SM (SRO) 2 SRO 4 RO 4 NLO

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.

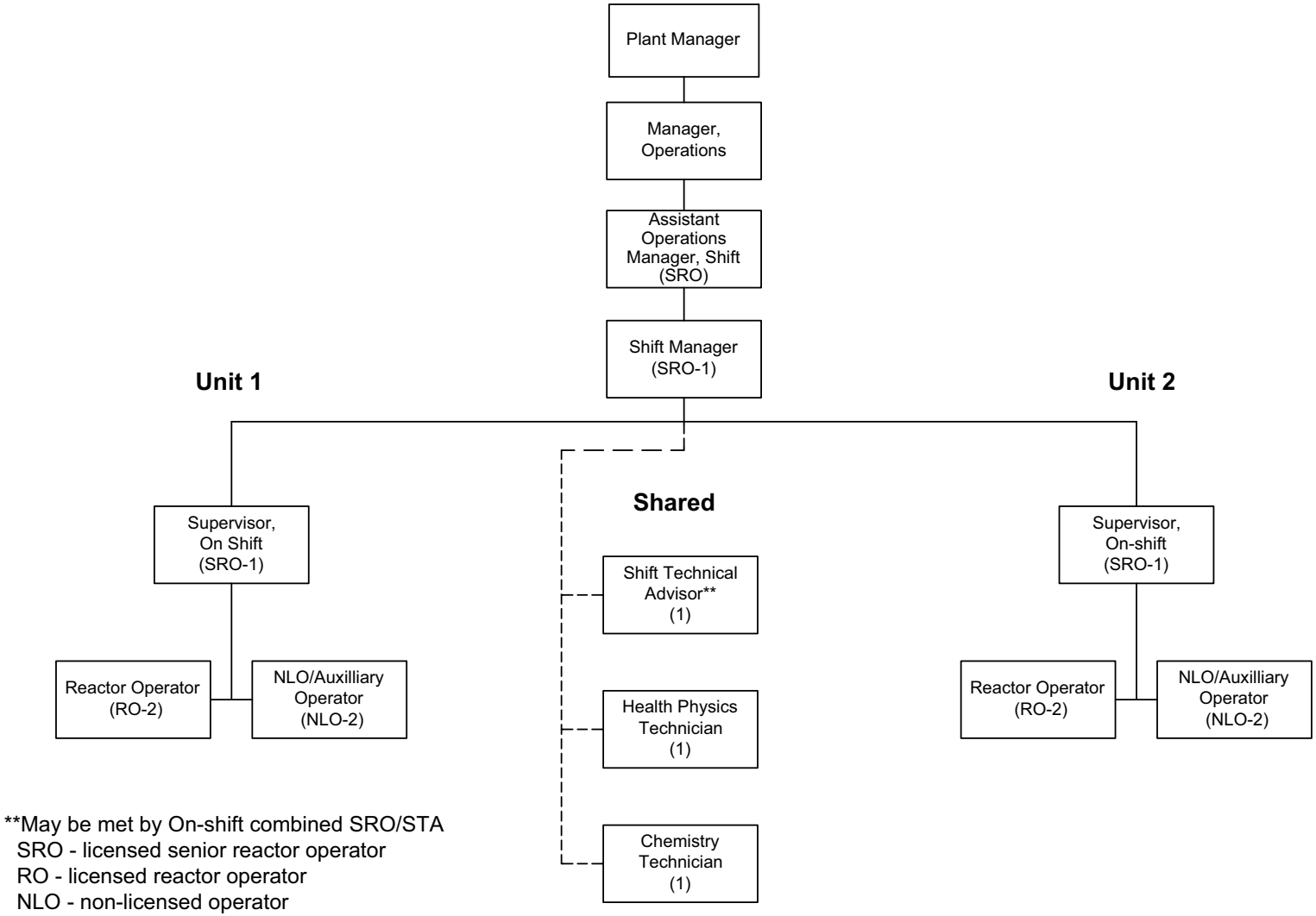
Notes:

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.



Note:
Dashed borders around functional areas indicate matrixed organizations providing support to the nuclear sites.

Figure 13.1-201
Plant Management Organization



**May be met by On-shift combined SRO/STA
SRO - licensed senior reactor operator
RO - licensed reactor operator
NLO - non-licensed operator

Shift Manning - 5 shifts
(No.) - indicate number of positions per shift

Figure 13.1-202
Shift Operations Organization

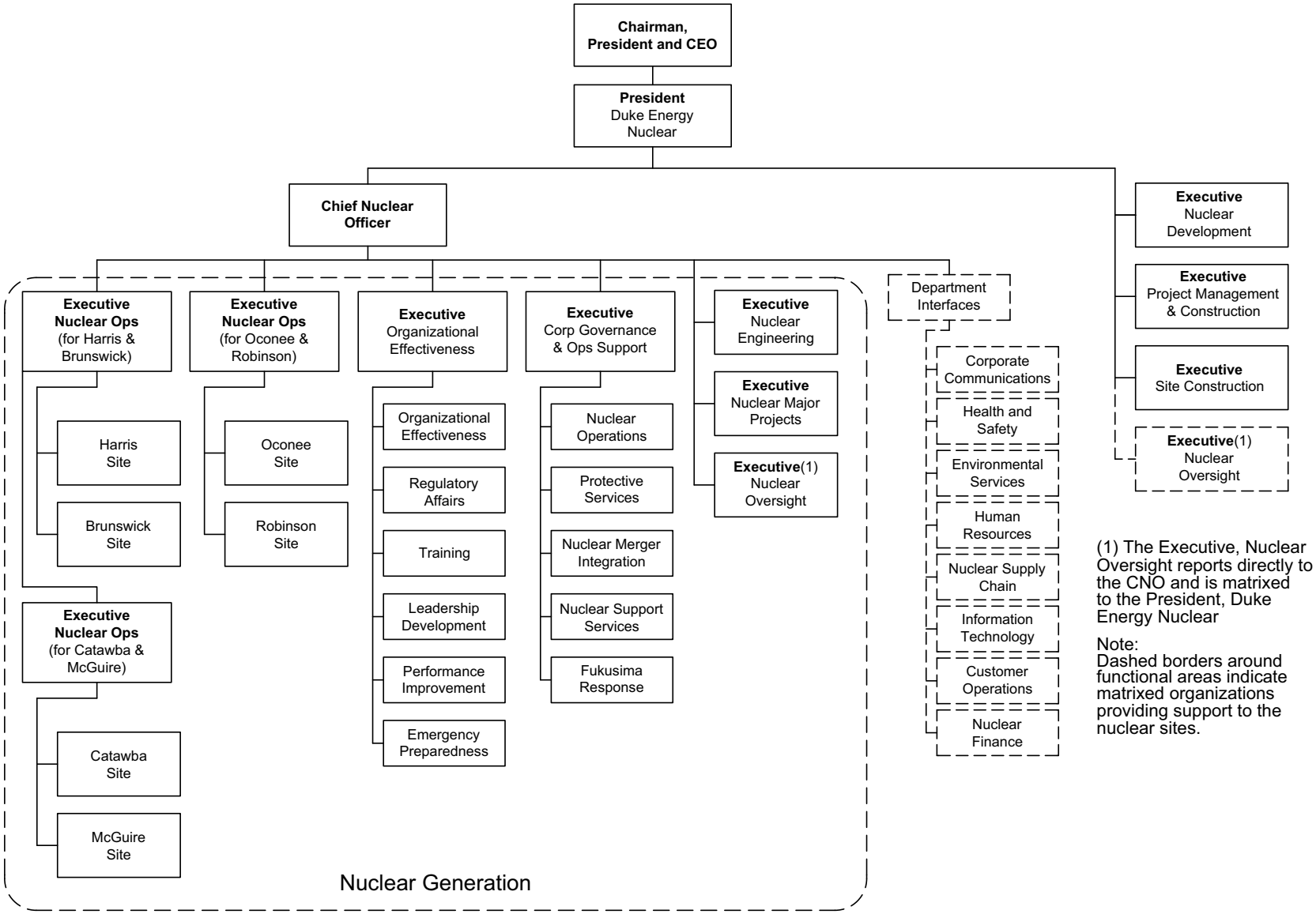


Figure 13.1-203
Nuclear Executive Organization

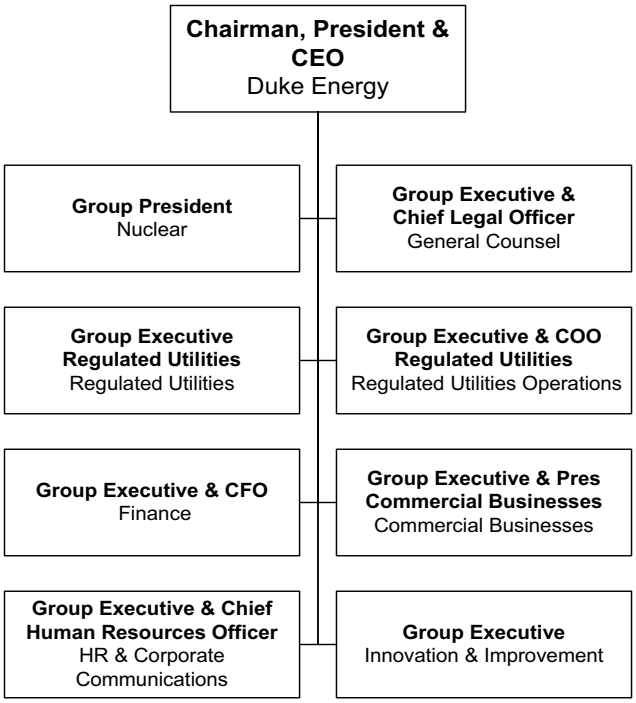


Figure 13.1-204
Duke Energy Corporate

13.2 Training

This section incorporates by reference NEI 06-13A, Template for an Industry Training Program Description.

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

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

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

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

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

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

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

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

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

13.2.1 Licensed Operator Training

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

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

13.2.1.1 Licensed Operator Initial Training Program

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

13.2.1.1.1 Reactor Operator

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

13.2.1.1.2 Senior Reactor Operator

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

13.2.1.2 Continuing Training for Licensed Personnel

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

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

13.2.2 Training for Positions Listed in 10 CFR 50.120[1]

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
- Basis of plant and systems design

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

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

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

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

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

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

13.2.2.5 Electrical Maintenance Initial Training Program

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

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

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

13.2.2.6 Mechanical Maintenance Initial Training Program

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

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

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

13.2.2.7 Radiological Protection Technician Initial Training

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

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

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

13.2.2.8 Chemistry Technician Initial Training

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

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

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

13.2.2.9 Engineering Personnel Initial Training

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

- Records management and document control
- Applicable industrial and nuclear regulations, codes, and standards
- Procedures and drawings
- Applicable programs such as corrective action, configuration management, work control, and the QA program
- Technical Specifications
- Fundamentals such as reactor theory, heat transfer, fluid flow, properties of materials, and chemistry
- Plant systems, instrumentation, and components

- Plant operations
- Introductory review of accidents
- Design processes

13.2.2.10 Continuing Training for Personnel Listed in 10 CFR 50.120

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

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

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

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

13.2.3 General Employee Training (GET) Program

13.2.3.1 Plant Access Training

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

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

13.2.3.2 Radiation Worker Training Program

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

- Sources of radiation
- Types and measurement of radiation
- Biological effects
- Limits and guidelines, including Reg. Guide 8.13 (Reference 13.2-18)
- Concept of As Low As Reasonably Achievable (ALARA)
- Radiation dosimetry
- Contamination
- Internal exposure

- Radiation work permits
- Radiological postings
- Radiological alarms
- Radioactive waste
- Rights and responsibilities
- Protective clothing

13.2.3.3 General Employee Requalification Training

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

13.2.4 Selected Other Training Programs

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

13.2.4.1 Fire Protection Training

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

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

13.2.4.2 Emergency Plan Training Program

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

13.2.4.3 Physical Security Training Program

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

13.2.4.4 Station Management Training Program

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

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

- Leadership
- Interpersonal communications
- Management responsibilities and limits

- Motivation of personnel
- Problem analysis and decision making
- Administrative policies and procedures
- Observation skills
- Coaching

13.2.5 Training Effectiveness Evaluation Program

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

13.2.5.1 Supervisory Review for Training Effectiveness

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

13.2.5.2 Trainee Review of Training Effectiveness

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

13.2.5.3 Review for Effectiveness of Instructional Techniques and Materials

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

13.2.6 Combined License Information Item

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

13.2.7 References

13.2-1. 10 CFR 19, "Notices, Instructions, and Reports to Workers; Inspection and Investigations"

13.2-2. 10 CFR 26, "Fitness for Duty"

13.2-3. 10 CFR 50.47, "Emergency Plans"

13.2-4. 10 CFR 50.120, "Training and Qualification of Nuclear Power Plant Personnel"

13.2-5. 10 CFR 50 Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities"

13.2-6. 10 CFR 52.78, "Contents of Applications; Training and Qualification of Nuclear Power Plant Personnel"

13.2-7. 10 CFR 55, "Operator's Licenses"

13.2-8. 10 CFR 55.4, "Definitions"

13.2-9. 10 CFR 55.41, "Written Examinations: Operators"

13.2-10. 10 CFR 55.43, "Written Examinations, Senior Operators"

13.2-11. 10 CFR 55.45, "Operating Tests"

13.2-12. 10 CFR 55.46(c), "Plant-Referenced Simulators"

13.2-13. 10 CFR 55.59, "Requalification"

13.2-14. American National Standards Institute, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants," ANSI/ANS-3.1-1993

13.2-15. National Fire Protection Association, "Standard on Industrial Fire Brigade," NFPA Standard 600, 2005 Edition

13.2-16. U.S. Nuclear Regulatory Commission, "Qualification and Training of Personnel for Nuclear Power Plants," Regulatory Guide 1.8, Revision 3, May 2000

13.2-17. U.S. Nuclear Regulatory Commission, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Regulatory Guide 1.149, Revision 3, October 2001

13.2-18. U.S. Nuclear Regulatory Commission, "Instruction Concerning Prenatal Radiation Exposure," Regulatory Guide 8.13, November, 1980.

13.2-19. U.S. Nuclear Regulatory Commission, "Clarification of TMI Action Plan Requirements", NUREG-0737, Revision 3, June 1999

13.2-20. U.S. Nuclear Regulatory Commission, "Policy Statement on Engineering Expertise on Shift", GL 86-04

201. Westinghouse, "Designer's Input to the Training of the Human Factors Engineering Verification and Validation Personnel," WCAP-14655, Revision 1, August 1996.

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 (Sheet 1 of 4)
Comparison of Hot and Cold License Guidance

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
1. Six months on-site at reactor for which license is sought.	All	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	Six months practical work assignments and Complete a site layout course
2. One year on-site at the reactor for which the license is sought with six months as a nonlicensed operator.	Reactor operator	ANSI 3.1-1993: 4.5.1. Regulatory Guide 1.8 Rev 3: 2.10. NUREG 1021 Rev 9 ES-202	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

Table 13.2A-201 (Sheet 2 of 4)
Comparison of Hot and Cold License Guidance

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

Table 13.2A-201 (Sheet 3 of 4)
Comparison of Hot and Cold License Guidance

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
6. At least three years of responsible nuclear power plant experience.	Senior reactor operator (Degreed)	Regulatory Guide 1.8 Rev 3: 1.3 2.8	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
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.	Shift Supervisor (Shift Manager)	ANSI 3.1-1993: 4.4.1	Cumulative Operating Crew Experience requirements apply and Complete a Plant Operational Excellence Course or plant observation activity

Table 13.2A-201 (Sheet 4 of 4)
Comparison of Hot and Cold License Guidance

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

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 (Sheet 1 of 4)
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 (Sheet 2 of 4)
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 (Sheet 3 of 4)
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 (Sheet 4 of 4)
Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)

Type of Experience	Weighting Factor	Max Credit	Justification
15. Associates Degree (technical)	n/a	6 months	Student gains knowledge of fundamentals

(1): Weighting factors and max credit values based on those in “Industry Evaluation of Operating Shift Experience Requirements” By: J.H. Miller Jr. 2/24/1984, and endorsed by Generic Letter number 84-16, Adequacy of On-Shift Operating Experience For Near Term Operating License Applicants, except for shaded rows which are added experience types based on new technology or additional analysis.

13.3 Emergency Planning

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

Communication interfaces among the main control room, the technical support center and the emergency planning centers are discussed below.

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

The emergency planning information is submitted to the Nuclear Regulatory Commission as a separate licensing document.

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 7)
Operational Programs Required by NRC Regulations

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation Milestone	Implementation 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
7.	Containment Leakage Rate Testing Program	10 CFR 50.54(o); 10 CFR 50, Appendix A (GDC 52); 10 CFR 50, Appendix J	6.2.5.1	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)

Table 13.4-201 (Sheet 2 of 7)
Operational Programs Required by NRC Regulations

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation Milestone	Implementation Requirement
9.	Process and Effluent Monitoring and Sampling Program:				
	Radiological Effluent Technical Specifications/Standard Radiological Effluent Controls	10 CFR 20.1301 and 20.1302; 10 CFR 50.34a; 10 CFR 50.36a; 10 CFR 50, Appendix I, Section II and IV	11.5	Prior to initial fuel load	License Condition
	Offsite Dose Calculation Manual	Same as above	11.5	Prior to initial fuel load	License Condition
	Radiological Environmental Monitoring Program	Same as above	11.5	Prior to initial fuel load	License Condition
	Process Control Program	Same as above	11.4	Prior to initial fuel load	License Condition

Table 13.4-201 (Sheet 3 of 7)
Operational Programs Required by NRC Regulations

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation Milestone	Implementation Requirement
10.	Radiation Protection Program (including ALARA principle) • 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 • Effluents and Environmental Monitoring and Assessment • Job Coverage • Radioactive Waste Shipping	10 CFR 20.1101 10 CFR 20.1406	12.1 12.5	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 4. Prior to first shipment of radioactive waste	License Condition
11.	Non Licensed Plant Staff Training Program	10 CFR 50.120	13.2	18 months prior to scheduled date of initial fuel load	10 CFR 50.120(b)
	(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)

Table 13.4-201 (Sheet 4 of 7)
Operational Programs Required by NRC Regulations

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation Milestone	Implementation Requirement
12.	Reactor Operator Training Program	10 CFR 55.13; 10 CFR 55.31; 10 CFR 55.41; 10 CFR 55.43; 10 CFR 55.45	13.2	18 months prior to scheduled date of initial fuel load	License Condition
13.	Reactor Operator Requalification Program	10 CFR 50.34(b); 10 CFR 50.54(i); 10 CFR 55.59	13.2	Within 3 months after the date the Commission makes the finding under 10 CFR 52.103(g)	10 CFR 50.54 (i-1)
14.	Emergency Planning	10 CFR 50.47; 10 CFR 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 scheduled 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
				EPZ population change review conducted at least 365 days before scheduled date for initial loading of fuel	10 CFR Part 50, Appendix E, Section IV.7
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

Table 13.4-201 (Sheet 5 of 7)
Operational Programs Required by NRC Regulations

Item	Program Title	Program Source (Required by)	FSAR Section	Implementation Milestone	Implementation Requirement
	Physical Security Program	10 CFR 73.55(b); 10 CFR 73.55(c)(3); 10 CFR 73.56; 10 CFR 73.57;	13.6	Prior to receipt of fuel onsite (protected area)	10 CFR 73.55(a)(4)
	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
19.	Initial Test Program	10 CFR 50.34; 10 CFR 52.79(a)(28)	14.2	Prior to the first construction test being conducted for the Construction Test Program Prior to the first preoperational test for the Preoperational Test Program Prior to initial fuel load for the Startup Test Program	License Condition

Table 13.4-201 (Sheet 6 of 7)
Operational Programs Required by NRC Regulations

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

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

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

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

13.5 Plant Procedures

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

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

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

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

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

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

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

References to applicable combined license information are included in Section 1.8. This includes, for example, reference to guidelines on inservice inspection in Chapters 3 and 6, 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 13.5.2.1. 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.

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

13.5.2 Operating and Maintenance Procedures

13.5.2.1 Operating and Emergency Operating Procedures

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

13.5.2.2 Maintenance and Other Operating Procedures

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

13.5.2.2.1 Plant Radiation Protection Procedures

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

13.5.2.2.2 Emergency Preparedness Procedures

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

13.5.2.2.3 Instrument Calibration and Test Procedures

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

13.5.2.2.4 Chemistry Procedures

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

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

13.5.2.2.5 Radioactive Waste Management Procedures

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

As required by License Condition, operating procedures that include provisions to assure that A_2 quantities for radionuclides specified in Appendix A to 10 CFR Part 71 are not exceeded will be developed, implemented and maintained prior to initial fuel load. Procedural controls limit the radionuclide inventory to less than the A_2 limit in each of the three (3) monitor tanks, and in each of up to three (3) mobile radwaste processing systems. Procedures also ensure that any additional equipment to be located in the Radwaste Building is limited to A_2 quantities. Spent media transfer from a mobile radwaste processing system located in the Radwaste Building is procedurally controlled such that spent media transfer and packaging for offsite shipment must be complete prior to placing the mobile radwaste processing system back into service. The procedures also ensure that the total cumulative source term of unpackaged wastes, including liquid waste, wet waste, solid waste, gaseous waste, activated or contaminated metals and components, and contaminated waste present at any time in the Radwaste Building is limited consistent with RG 1.143, Revision 2,

unmitigated radiological release criteria, so that an unmitigated release, occurring over a two hour time period, would not result in a dose of greater than 500 millirem at the protected area boundary, or an unmitigated exposure, occurring over a two hour time period, would not result in a dose of greater than 5 rem to site personnel located 10 feet from the total cumulative radioactive inventory. The unmitigated, unshielded worker dose is calculated at 10 feet from the source. Unlimited worker occupancy workstations and low dose rate waiting areas are located no closer than 10 feet from a mobile radwaste processing system or a Waste Monitor Tank. The liquid radwaste system is discussed in Section 11.2.

13.5.2.2.6 Maintenance, Inspection, Surveillance, and Modification Procedures

13.5.2.2.6.1 Maintenance Procedures

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

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

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

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

13.5.2.2.6.2 Inspection Procedures

The QAPD, as discussed in Section 17.5, provides a description of procedural requirements for inspections.

13.5.2.2.6.3 Modification Procedures

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

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

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

13.5.2.2.7 Material Control Procedures

The QAPD, as discussed in Section 17.5, provides a description of procedural requirements for material control.

13.5.2.2.8 Security Procedures

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

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

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

13.5.2.2.9 Special Nuclear Material Material Control and Accounting Procedures

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

13.5.3 Combined License Information Item

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

13.5.4 References

1. Not used.

2. Not used.

3. Not used.

4. Not used.

5. Not used.

6. Not used.

7. WCAP-13864, “Rod Control System Evaluation Program,” Revision 1-A, November 1994.

8. USNRC Generic Letter 96-01, “Testing of Safety-Related Logic Circuits,” January 10, 1996.

9. Not used.

10. APP-GW-GLR-040, “Plant Operations Maintenance and Surveillance Procedures,” Westinghouse Electric Company LLC.

201. ANSI/ANS 3.2-1988, “Administrative Control and Quality Assurance for the Operational Phase of Nuclear Power Plants.”

202. ANSI B30.2 (Chapter 2-3), “Overhead and Gantry Cranes.”

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

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

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

13.6 Security

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

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

The Cyber Security Plan is submitted to the Nuclear Regulatory Commission as a separate licensing document to fulfill the requirements contained in 10 CFR 52.79(a)(36) and 10 CFR 73.54. 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 implementation.

13.6.1 Combined License Information Item

Information for the Security Plan is addressed in Section 13.6.

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

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

13.6.2 References

1. Not used.

2. APP-GW-GLR-067, "AP1000 Interim Compensatory Measures Report," Westinghouse Electric Company LLC.

3. APP-GW-GLR-062, "AP1000 Enhancement Report," Westinghouse Electric Company LLC.

4. APP-GW-GLR-066, "AP1000 Safeguards Assessment Report," Westinghouse Electric Company LLC.

201. Not used.

202. Not used.

13.7 Fitness for Duty

The Fitness for Duty (FFD) Program 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 outlined 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 Duke-approved construction FFD program (elements Subpart K) will be reviewed and revised, as necessary, should substantial revisions occur to NEI 06-06 following NRC endorsement of 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 control of the Primary Site Contractor. The 10 CFR Part 26 requirements are implemented for the construction site area based on the description provided in Table 13.4-201.

- Construction Workers and First Line Supervisors (Primary Site Contractor employees and subcontractors) are covered by a Duke-approved Construction FFD Program (elements Subpart K).

- Duke employees and Duke subcontractor's construction management and oversight personnel are covered by a Duke Operations FFD Program and the Primary Site Contractor's employees and the Primary Site Contractor's subcontractors, construction management, and oversight personnel are covered by a Duke-approved FFD Program (elements Subpart A-H, N, and O).

- Duke security personnel are covered by a Duke Operations FFD Program and the Primary Site Contractor's security personnel are covered by a Duke-approved 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.

- The Duke FFD Program personnel are covered by a Duke Operations FFD program and the Primary Site Contractor's FFD Program personnel are covered by a Duke-approved FFD Program (elements Subpart A, B, D-H, N, O, and C per licensee's discretion).

- Duke security personnel protecting fuel assemblies are covered by a Duke 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 a Duke 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).

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

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

13AA.1.1.1.1.1 Principal Site-Related Engineering Work

The principal site engineering activities accomplished 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. Onsite meteorological measurements are obtained by station personnel to produce data for the purpose of making atmospheric dispersion estimates for postulated accidental and expected routine airborne releases of effluents. Maintenance procedures are established for surveillance, calibration, and repair of instruments. Meteorological information is summarized 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 groundwater 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 procedures 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 is 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 manager in charge of engineering for review. As systems are tested and approved for turnover and operation, control of design is turned over to plant staff. The manager in charge of engineering, 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 manager in charge of engineering 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 (HFE) evaluation addressed within Chapter 18. See organization charts, Figure 13.1-201 and 13AA-201 for reporting relationships.

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

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

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

13AA.1.1.1.1.5 Development of Safety Analysis Reports

Information regarding the development of the FSAR is found in Chapter 1.

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

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

13AA.1.1.1.1.7 Procurement of Materials and Equipment

Procurement of materials during construction phase is the responsibility of the reactor technology vendor and constructor. The process is controlled by the construction QA programs of these organizations under the flowdown requirements established by the Duke Energy QA program in effect. Oversight of the inspection and receipt of materials process is the responsibility of the manager in charge of nuclear QA and oversight.

13AA.1.1.1.1.8 Management and Review of Construction Activities

Overall management and responsibility for construction activities is assigned to the site executive in charge of plant management. The project director of the engineering, procurement, and construction (EPC) contractor is accountable to the site executive in charge of plant management for construction activities. See organization chart Figure 13AA-201. Construction management personnel are sufficient in number to provide effective oversight in the areas of cost, schedule, and other functions as deemed necessary by the manager in charge of construction. Table 13.1-201 provides additional information regarding the number of station personnel. 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 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.

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 plant manager reports to the site executive in charge of plant management. The plant manager, with the aid of those managers that report directly to the plant manager, is 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.

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

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 are reviewed per engineering procedures, as required by Section 18.2, to evaluate the impact to plant safety. The manager in charge of engineering is responsible for the HFE design process and for the design commitment to HFE during construction and throughout the life of the plant as noted in Subsection 13.1.1.2.1. The HFE program is established in accordance with the description and commitments in Chapter 18.

13AA.1.1.1.2.2 Preoperational Testing Organization

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

See Figure 13AA-201 for organization chart for preoperational and startup testing.

13AA.1.1.1.3 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 as determined by HFE. See Section 18.6. These plans are developed under the direction and guidance of the site executive in charge of plant management. Staffing plans are completed and 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.

13AA.1.1.1.4 Development of Plant Maintenance Programs

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

13AA.1.1.1.5 Qualification

Qualification and experience requirements for personnel of the PT&O organization are addressed in Subsection 14.2.2.2. Station management and supervisory personnel in the design and construction management organization meet the qualification requirements in education and experience for those described in ANSI/ANS-3.1-1993 (Section 13.1.5 Reference 201) as endorsed and amended by Regulatory Guide 1.8. For positions listed in Table 13.1-201 that do not have a cross-reference section in ANSI/ANS-3.1 the most comparable section of ANSI/ANS-3.1 is used for guidance in establishing experience and education requirements.

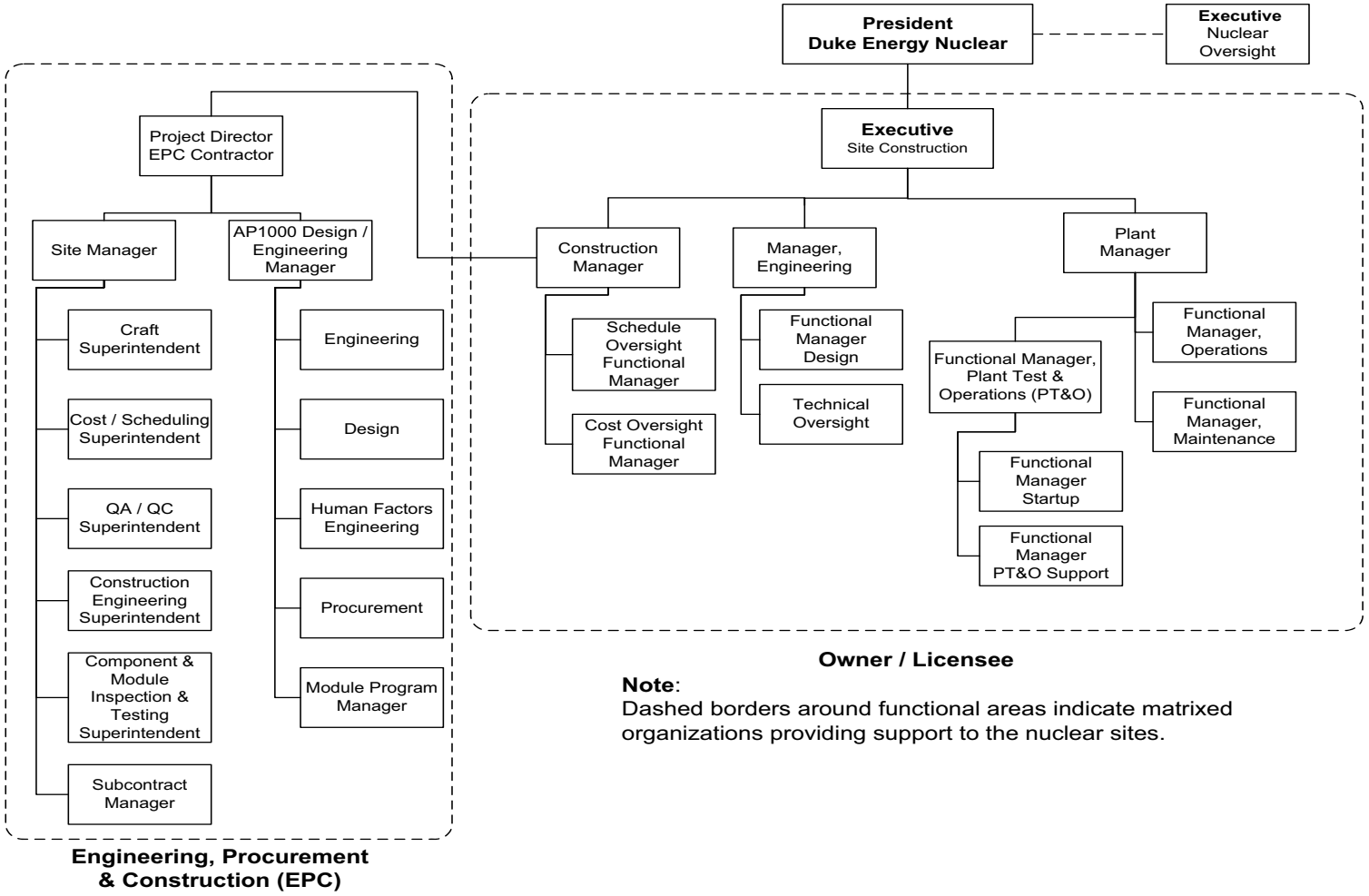


Figure 13AA-201
Construction Management Organization

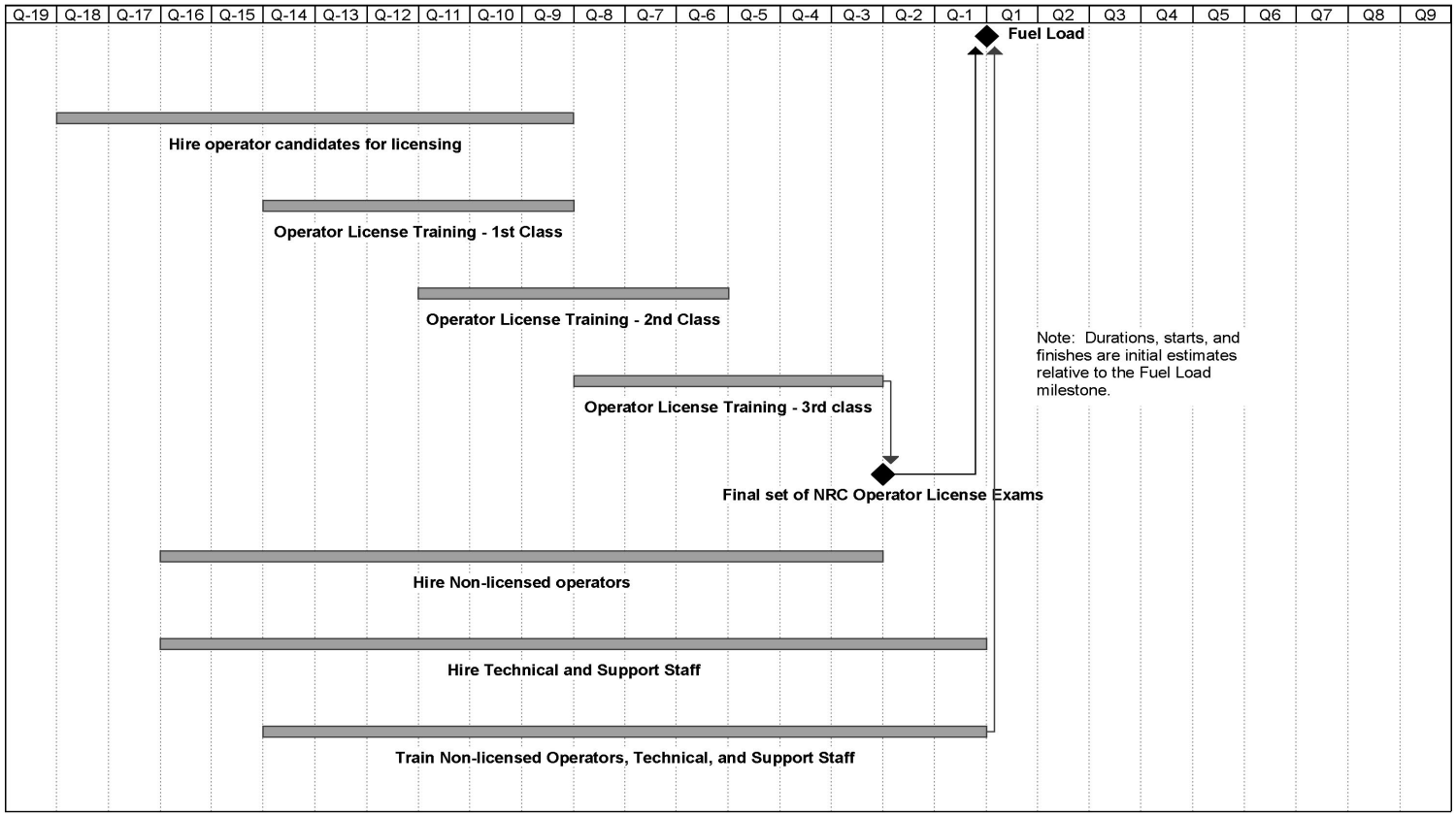


Figure 13AA-202
Hiring Schedule for Plant Staff