Chapter 13 Conduct of Operations

This chapter provides information relating to the operational plans for the ESBWR. The purpose of this chapter is to provide reasonable assurance that the Combined License (COL) Holder's organization will be able to operate the ESBWR in a manner that protects the public health and safety.

13.1 Organizational Structure of COL Holder

This section describes the organization of Fermi 3. The organizational structure is described in this section and is consistent with the Human System Interface (HSI) design assumptions used in the design of the ESBWR as described in Chapter 18. The organizational structure is consistent with the ESBWR Human Factors Engineering (HFE) design requirements and complies with the requirements of 10 CFR 50.54(i) through (m).

13.1.1 Management and Technical Support Organization

Detroit Edison has over 35 years of experience in the operation of nuclear generating stations. Detroit Edison currently operates Fermi 2.

Corporate offices provide support for Fermi site including executive level management to provide strategic and financial support for plant initiatives, and coordination of functional efforts.

Section 17.5 provides high-level illustrations of the corporate organization. More detailed charts and position descriptions, including qualification requirements and staffing numbers for corporate support staff, are maintained in corporate offices.

13.1.1.1 Design, Construction, and Operating Responsibilities

The chief nuclear officer (CNO) has overall responsibility for functions involving planning, design, construction, and operation of Detroit Edison's current and future nuclear units. The Executive Vice President - Major Enterprise Projects is responsible for establishing new nuclear generation. Line responsibilities for planning, design, construction and operation are passed to the executives in charge of nuclear operations, engineering and technical services, planning, development, and oversight, who maintain direct control of nuclear plant activities.

At the appropriate time after construction, the CNO accepts responsibility for Fermi 3 from the Executive Vice President - Major Enterprise Projects and then maintains direct control of nuclear plant operation through the site executive (see Appendix 17AA).

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 and communication clearly and unambiguously are established to enable the understanding of the various project members, including contractors, that utility management is in charge of and directs the project.

At key project milestones, including beginning of construction, fuel load, and commercial operation, senior management determines if there are sufficient numbers of qualified personnel available to move the project forward.

Key executive and corporate management positions, functions, and responsibilities are discussed in Section 17.5. The construction management organization is addressed in Appendix 17AA; Appendix 13AA; and Appendix 14AA and is shown in Figure 13.1-201. The operating organization is addressed in Appendix 17AA; Subsection 13.1.2.1; and Subsection 13.1.1.2 and is shown in Appendix 17AA, Figure 13.1-204; and Figure 13.1-205.

13.1.1.1.1 Design and Construction Responsibilities

This section is included in Appendix 13AA for future designation as historical information.

13.1.1.2 Technical Support for Plant Operations

This section describes the functional groups that become activated before fuel load. The site executive establishes 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
- Plant chemistry
- Radiation protection
- Fueling and refueling operations support
- Maintenance support
- Operations support
- Quality assurance
- Training
- Safety review
- Fire protection
- Emergency 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 outside consultants are engaged. Figures incorporated into Section 17.5 illustrate the management and technical organizations supporting operation of the plant. See Subsection 13.1.2.1.1.2 through Subsection 13.1.2.1.1.4 for description of 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.

13.1.1.2.1 Engineering

The engineering department consists of system engineering, design engineering, engineering programs, engineering projects, safety and engineering analysis, and reactor engineering. These groups are responsible for performing the classical design activities as well as providing engineering expertise for programs, such as reactor engineering, inservice inspection (ISI), inservice testing (IST), snubbers, and maintenance rule. Engineering is also responsible for probabilistic safety assessment and other safety issues, plant system reliability analysis, performance and technical support, core management, and periodic reactor testing.

Each of the engineering groups has a functional manager who reports to the director in charge of engineering.

The engineering organization is responsible for:

- Support of plant operations in the engineering areas of mechanical, structural, electrical, thermal-hydraulic, metallurgical, materials, electronic, and instrument and control. Priorities for support activities are established based on input from the plant manager with emphasis on issues affecting safe operation of the plant.
- Engineering Projects.
- 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.
- Maintaining the design basis by updating the record copy of design documents as necessary to reflect the actual as-built configuration of the plant.
- Accident and transient analyses.
- Human Factors Engineering design process.

Reactor engineering, led by the functional manager in charge of reactor engineering, provides technical assistance in the areas of core operations, core thermal limits, and core thermal hydraulics.

Engineering work may be contracted to and performed by outside companies in accordance with Section 17.5.

13.1.1.2.2 Plant Chemistry

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

The functional manager in charge of chemistry is responsible 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 chemistry.

13.1.1.2.3 Radiation Protection

A radiation protection (RP) program is established to protect the health and welfare of the surrounding public and personnel working at the plant. The RP program is described in Chapter 12.

The RP department is staffed by radiation protection technicians, support personnel, and supervisors who report to the radiation protection manager.

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

13.1.1.2.4 Fueling and Refueling Operations Support

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

Personnel resources of the outage support organization are shared between units. A single management organization oversees outage support work for all site units.

13.1.1.2.5 Maintenance Support

The maintenance department includes mechanical maintenance, electrical maintenance, and instrumentation and control (I&C) groups. Each group includes supervisors, foremen, and technicians in sufficient numbers to provide for the safe and efficient operation of the plant during all phases of plant life.

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. The maintenance department establishes and maintains the operational measuring and test equipment (M&TE) program required by Appendix 17AA. The maintenance manger reports to the plant manager.

13.1.1.2.6 Operations Support

The operations support function is provided under the direction of the operations manager, and includes the following programs:

- Operations procedures
- Operations surveillances
- Equipment tagging preparation
- Fuel handling

13.1.1.2.7 Quality Assurance

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

- Maintaining the QAPD
- Coordinating the development of audit schedules
- Auditing, performing surveillances and evaluating suppliers
- Supporting general QA indoctrination training for the operating and technical support personnel
- Quality Control

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

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

13.1.1.2.8 Training

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, emergency response, and other areas. The training department's responsibilities encompass operator initial license training, requalification training, and operating and technical support staff training as well as the plant access training (general employee training) course and radiation worker training. To maintain independence from operating pressures, the manager of training reports to the director

responsible for facility safety and licensing. Nuclear plant training programs are described in Section 13.2.

To the extent practicable given the differences between plant designs, personnel resources of the training department are shared between units. A single management organization provides oversight of station training activities.

13.1.1.2.9 Safety Review

Review and audit activities are addressed in Chapter 17.

Oversight of station programs, procedures, and activities is performed by the Onsite Safety Review Organization (OSRO) and an Independent Review Body (IRB), which is responsible for review of corrective actions for significant conditions adverse to quality and the audit program. The supervisor in charge of the IRB ultimately reports to the site executive.

In the event of an unplanned reactor trip or significant power reduction, it is the responsibility of the OSRO to determine the circumstances, analyze the cause, and determine that operations can proceed safely before the reactor is returned to power.

Personnel resources of the IRB organization are shared between units. A single management organization oversees the site IRB organization.

13.1.1.2.10 Fire Protection

The station is committed to maintaining a fire protection program as described in Subsection 9.5.1.15. Fire protection for the facility is organized and administered by the functional manager in charge of fire protection. The functional manager in charge of fire protection is responsible for development and implementation of the fire protection program including development of fire protection procedures, site personnel and fire brigade training, and inspections of fire protection systems and functions. Functional descriptions for all responsible positions are included in appropriate procedures. Station personnel are responsible for adhering to the fire protection/prevention requirements detailed in Subsection 9.5.1. The EPC executive will have the lead responsibility for overall construction of site fire protection. The fire brigade is described in Subsection 13.1.2.1.5.

13.1.1.2.11 Emergency Organization

The emergency preparedness 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 to positions in the emergency organization are responsible for supporting the emergency preparedness organization and the emergency plan as required. The staff members of the emergency planning organization administer and orchestrate drills and training to maintain qualification of station staff members, and develop procedures to guide and direct the emergency organization during an emergency. The

functional manager in charge of emergency preparedness reports to the director responsible for facility safety and licensing. The site emergency plan organization is described in the Emergency Plan.

13.1.1.2.12 Supply Chain

The supply chain organization provides procurement, material handling, storage, and logistics support. The supply chain organization maintains control of procurement records generated and executed in the performance of its duties. In addition, the supply chain organization perform the necessary functions to contract vendors of special services to perform tasks for which the utility does not have experience or the equipment required. The functional manager in charge of materials, procurement, and contracts reports to the site support director and has a functional relationship with Director of Corporate Services (see also Appendix 17AA).

Resources and management of the materials, procurement, and contracts organization are shared between units. A single management organization oversees the materials, purchasing and contracts groups for all site units.

13.1.1.3 Organizational Arrangement

Organizational arrangement for corporate offices and site organizations reporting directly to corporate offices is presented in Section 17.5.

13.1.1.4 Qualifications of Technical Support Personnel

Personnel of the technical support organization meet the education and experience qualifications for those described in ANSI/ANS-3.1 (Reference 13.1-201) as endorsed and amended by RG 1.8.

13.1.2 Operating Organization

13.1.2.1 Plant Organization

The plant management, technical support, and plant operating organizations are incorporated into Section 17.5. The overall site organization is shown in Appendix 17AA, the operating organization is shown in, and the technical support organization is shown in Figure 13.1-205. 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 Section 17.5.

Rules of practice are met through administrative controls as described in Section 17.5. These controls include:

- Establishment of a quality assurance program for the operational phase.

- Preparation of procedures necessary to carry out an effective quality assurance program (see Section 13.5 for description of the plant procedure program).
- A program for review and audit of activities affecting plant safety (see Section 17.5 for description of plant review and audit programs).
- Programs and procedures for rules of practice.

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:

- Interfacing directly with radiation protection staff to integrate radiation protection measures into plant procedures and design documents into the planning, scheduling, conduct, and assessment of operations and work.
- Notifying radiation protection personnel promptly when radiation protection problems occur or are identified, taking corrective actions, and resolving deficiencies associated with operations, procedures, systems, equipment, and work practices.
- Training site personnel on radiation protection and providing periodic retraining in accordance with 10 CFR 19 so that personnel are properly instructed and briefed for entry into restricted areas.
- Periodically observing and correcting, as necessary, radiation worker practices.
- Supporting radiation protection management in implementing the radiation protection program
- Maintaining exposures to site personnel As Low As Reasonably Achievable (ALARA).

13.1.2.1.1 Site Executive

The site executive reports to the Executive Vice President, Major Enterprise Projects (see Appendix 17AA) until construction completion. Following construction completion, the site executive reports to the chief nuclear officer (see Appendix 17AA). The site executive is directly responsible for management and direction of activities associated with the efficient, safe, and reliable operation of the nuclear station. The site executive is assisted in management and technical support activities by the plant manager, the plant safety and licensing (S&L) director, the site support director and the engineering director. 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.

Additionally, the site executive has overall responsibility for occupational and public radiation safety. Radiation protection responsibilities of the site executive are consistent with the guidance in RG 8.8 and RG 8.10, including the following:

- Providing management radiation protection policy throughout the plant organization.
- Providing an overall commitment to radiation protection by the plant organization.
- Interacting with and supporting the radiation protection manager on implementation of the radiation protection program.
- Supporting identification and implementation of cost-effective modifications to plant equipment, facilities, procedures and processes to improve radiation protection controls and reduce exposures.
- Establishing plant goals and objectives for radiation protection.
- Maintaining exposures to site personnel ALARA.
- Supporting timely identification, analysis, and resolution of radiation protection problems (e.g., through the plant corrective action program).
- Providing training to site personnel on radiation protection in accordance with 10 CFR 19.
- Establishing an ALARA Committee with delegated authority from the site that includes 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 succession of responsibility for overall plant instructions or special orders in the event of absences, incapacitation of personnel, or other emergencies is as follows, unless otherwise designated in writing:

- The site executive
- The plant manager
- The operations manager

The succession of authority includes the authority to issue standing or special orders as required.

13.1.2.1.1.1 Plant Manager

The plant manager reports to the site executive, is responsible for safe operation of the plant, and has control over onsite activities necessary for safe operation and maintenance of the plant including the following:

- Operations
- Maintenance and modification
- Outage management

13.1.2.1.1.2 Plant Safety & Licensing (S&L) Director

The plant S&L director reports to the site executive, is responsible for safe operation of the plant, and has control over onsite activities necessary for safe operation and maintenance of the plant including the following:

- Training
- Licensing and emergency preparedness
- Corrective action program and non-conformance process

13.1.2.1.1.3 Engineering Director

The engineering director reports to the site executive, is responsible for safe operation of the plant, and has control over onsite activities necessary for safe operation and maintenance of the plant including the following:

- Design engineering
- Systems engineering
- Program engineering
- Reactor engineering
- Procurement engineering

13.1.2.1.1.3.1 Design Engineering Manager

The Design Engineering Manager reports to the Engineering Director, serves as key design lead for the nuclear plant and functions as the primary interface with Major Enterprise Projects (see Appendix 17AA) during construction and startup testing.

The Design Engineering Manager facilitates design change package development and implementation. The Design Engineering Manager also has the following responsibilities:

- Provide technical oversight and approval of design products generated by the Design Engineering department.
- Ensure changes to plant design are technically adequate.
- Maintain administrative control of design calculations.
- Establish administrative control for technical software.
- Interface with the EPC contractor, reactor technology vendor, A/E and other engineering firms providing design or design input.
- Interface with Fire Protection and Environmental Qualification groups and provide necessary design support.
- Ensure training and qualification of design department personnel.

13.1.2.1.1.3.2 Systems Engineering Supervisor

The System Engineering Manager reports to the Engineering Director, provides oversight of the systems engineers. The System Engineering Supervisor also has the following responsibilities:

- Provide technical direction to other departments regarding the safe, efficient and reliable operation of systems.
- Complete assigned technical surveillance testing in accordance with frequencies in the Technical Specifications.
- Ensure proper design configuration control of systems, structures and components (SSCs).
- Ensure training and qualification of system engineers.

13.1.2.1.1.3.3 Programs Engineering Manager

The Programs Engineering Manager reports to the Engineering Director and provides oversight of engineering programs (e.g. Environmental Qualification, In-Service Inspection, etc.).

13.1.2.1.1.3.4 Projects Engineering Manager

The Projects Engineering Manager is responsible for the project management of large plant modifications and engineering support functions associated with modifications to plant structures, systems, and equipment. This responsibility includes the planning and management of the engineering scope and specification, detailed design, procurement, installation and testing phases of the project. In this capacity, the Projects Engineering Manager has the responsibility and authority to utilize engineering personnel or retain qualified contract architects/engineers or consultants to implement the design development.

13.1.2.1.1.4 Site Support Director

The site support director reports to the site executive, is responsible for safe operation of the plant, and has control over onsite activities necessary for safe operation and maintenance of the plant including the following:

- Fire protection
- Physical security
- Procedures and document control
- Information systems interface
- Supply chain interface

13.1.2.1.1.5 Maintenance Manager

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 Maintenance Manager is responsible for the development of maintenance programs. The manager in charge of plant 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 maintenance manager reports to the plant manager and provides direction and guidance to the maintenance discipline functional managers and maintenance support staff.

13.1.2.1.1.6 Maintenance Discipline Functional Managers

The functional managers of each maintenance discipline (mechanical, electrical, instrumentation and control, and support) 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 operating and technical support staff organizations to facilitate safe operation of the station. These functional managers report to the maintenance manager.

13.1.2.1.1.7 Maintenance Discipline Supervisors

The maintenance discipline supervisors and assistant 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.

13.1.2.1.1.8 Maintenance Mechanics, Electricians, and Instrumentation and Control Technicians

The discipline craft perform electrical and mechanical maintenance and I&C tasks as assigned by the discipline supervisors. They troubleshoot, inspect, repair, maintain, and modify plant equipment and perform Technical Specification surveillances on equipment for which they have cognizance. They perform these tasks in accordance with approved procedures and work packages.

13.1.2.1.1.9 Outage and Planning Manager

The outage and planning manager is responsible for the support functions described in Subsection 13.1.1.2.5. This manager safely fulfills the responsibilities of planning and scheduling all plant work through a staff which includes a functional manager in each area of planning, scheduling, and outages. The outage and planning manager reports to the plant manager.

13.1.2.1.1.10 Radiation Protection Manager

The radiation protection manager has the direct responsibility for providing adequate protection of the health and safety of personnel working at the plant and members of the public during activities

covered within the scope and extent of the license. This manager's radiation protection responsibilities are consistent with the guidance in RG 8.8 and RG 8.10. They include:

- Managing the radiation protection organization.
- Establishing, implementing, and enforcing the radiation protection program.
- Providing radiation protection input to facility design and work planning.
- Tracking and analyzing trends in radiation work performance and taking necessary actions to correct adverse trends.
- Supporting the plant emergency preparedness program and assigning emergency duties and responsibilities within the radiation protection organization.
- Delegating authority to appropriate radiation protection staff to stop work or order an area evacuated (in accordance with approved procedures) when, in his or her judgment, the radiation conditions warrant such an action and such actions are consistent with plant safety.
- Managing the radioactive waste programs.
- Managing programs that address radioactive liquid and gaseous effluent releases and associated offsite doses.

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

13.1.2.1.1.11 Radiation Protection Supervisors

The 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 13.1.1.2.3, to promote safe, legal, and efficient plant operation.

Radiation protection supervisors report to the radiation protection manager.

13.1.2.1.1.12 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.

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

- In accordance with authority delegated by the 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, including radioactive wastes destined for offsite processing storage, and disposal.
- 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.
- Manage radioactive liquid and gaseous effluent releases and conduct radiological environmental monitoring in assessing offsite doses to members of the public.

13.1.2.1.1.13 Functional Manager in Charge of Chemistry

The functional manager in charge of chemistry is responsible for development, implementation, and direction and coordination of the chemistry, radiochemistry, and non-radiological environmental monitoring programs. This area includes 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 via the radiation protection manager and directly supervises the chemistry supervisors.

The functional manager in charge of chemistry is responsible for assuring that a chemistry technician is on site whenever the unit is in modes other than cold shutdown or refueling.

13.1.2.1.1.14 Functional Manager in Charge of Fire Protection

The functional manager in charge of fire protection is responsible for the following:

- Fire protection program requirements, including consideration of potential hazards associated with postulated fires, knowledge of building layout, and system design.
- Post-fire shutdown capability.
- Design, maintenance, surveillance, and quality assurance of fire protection features (e.g., detection systems, suppression systems, barriers, dampers, doors, penetration seals, and fire brigade equipment).

- Fire prevention activities (administrative controls and training).
- Fire brigade organization and training.
- Pre-fire planning, including review and updating of pre-fire plans at least every two years.

The functional manager in charge of fire protection reports to the director responsible for site support. Additionally, the functional manager in charge of fire protection works with the operations and engineering departments to coordinate activities and program requirements with the those organizations. In accordance with RG 1.189, the functional manager in charge of fire protection is an individual who has been delegated authority commensurate with the responsibilities of the position and who has available staff personnel knowledgeable in both fire protection and nuclear safety. The functional manager in charge of fire protection, will meet the requirements of the Fire Protection Engineer as described in Subsection 9.5.1.15.4.3.

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 loading
- 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 authority of the manager in charge of operations who, through the supervisor in charge of shift operations, directs the day-to-day operation of the plant.

Specific duties, functions, and responsibilities of key shift members are discussed in Subsection 13.1.2.1.2.4 through Subsection 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.

For activities that do not require an operator's license, resources of the operations organization may be shared between units. These activities may include administrative functions and tagging. 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. See Table 13.1-201 for expected staffing of the operations department, and Table 13.1-202 for minimum shift staffing.

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 Operations Manager

The operations manager has overall responsibility for the day-to-day operation of the plant. The operations manager reports to the plant manager and is assisted by the supervisors of shift operations, operations support, and operations maintenance advisor. Either the operations manager or the supervisor of shift operations is SRO licensed.

13.1.2.1.2.2 Supervisor of Shift Operations

The supervisor of shift operations, under the direction of the operations manager, 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 fire fighting teams.
- Coordinating with the supervisor of operations support and other operating and technical support groups.
- Verifying that nuclear plant operating records and logs are properly prepared, reviewed, evaluated and turned over to the assistant manager in charge of operations support.

The supervisor of shift operations is assisted in these areas by the on-shift operations manager who directs the operating shift personnel. The supervisor of shift operations may assume the duties of the operations manager in the event of an absence.

13.1.2.1.2.3 Supervisor of Operations Support

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

- Directing and guiding plant operations support activities in accordance with the operating license, Technical Specifications, and written procedures.
- Providing supervision of operating support personnel and 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 quality records.

The supervisor of operations support is assisted by the supervisors of work management, radwaste operations, operations procedures group, and other support personnel. In the absence of the operations manager, the supervisor of operations support may assume the duties and responsibilities of this position.

13.1.2.1.2.4 Operations Shift Manager

The operations shift manager is a licensed senior reactor operator (SRO) responsible for the control room command function, and is the plant manager's direct management representative for the

conduct of operations. The operations shift manager 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
- Prevent damage to site equipment and structures
- Comply with the operating license

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

- Directing nuclear plant employees to report to the plant for response to potential and real emergencies.
- Seeking the advice and guidance of the shift technical advisor and others in executing his duties 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 operations shift manager is assisted in carrying out the above duties by the on-shift unit supervisors and the operating shift personnel. The shift operations manager reports to the supervisor of shift operations.

13.1.2.1.2.5 On-Shift Unit Supervisor

The on-shift unit supervisor is a licensed SRO. The main functions of the on-shift unit supervisor are to administratively support the operations shift manager 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 operations shift manager. Other duties and responsibilities include:

- Being aware of maintenance and testing performed during the shift.
- Directing reactor shutdown if conditions warrant this action.
- Informing the operations shift manager 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 operations shift manager in any upset situation until assistance, if required, arrives.
- Participating in operator training, retraining, and requalification activities from the standpoint of providing guidance, direction, and instruction to shift personnel.
- Responding conservatively to instrument indications unless they are proved to be incorrect.

- Adhering to the plant's technical specifications.
- Reviewing routine operating data to assure safe operation.

The on-shift unit supervisor reports directly to the operations shift manager.

13.1.2.1.2.6 Reactor Operator

Reactor operators (RO) are licensed personnel and normally report to the on-shift unit supervisor. They are responsible for routine plant operations and performance of major evolutions at the direction of the on-shift unit supervisor. The RO duties and responsibilities 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.
- Responding conservatively to instrument indications unless they are proved to be incorrect.
- Adhering to the plant's technical specifications.
- Reviewing routine operating data to assure safe operation.
- Initiating plant shutdowns or scrams or other compensatory actions when:
    - Observation of plant conditions indicates a nuclear safety hazard exists.
    - Approved procedures so direct.
    - The operator determines that the safety of the reactor is in jeopardy.
    - Operating parameters exceed any of the reactor protection system setpoints and automatic shutdown does not occur.

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 (OATC) and conducts monitoring and operating activities in accordance with the guidance set forth in RG 1.114, which is further described in Subsection 13.1.2.1.3.

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 RO.

- 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 improving and upgrading their own performance by participating in the applicable sections of the training program.

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 (STAs). The STA reports directly to the shift manager 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:

- Monitoring core power distribution and critical parameters
- Assisting the operating shift with technical expertise during normal and emergency conditions
- Evaluating technical specifications, special reports, and procedural issues

The STA contributes to operations safety 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.

An SRO on shift who meets the qualifications for the combined SRO/STA position specified for Option 1 of Generic Letter 86-04 (Reference 13.1-202) may also serve as the STA. If this option is used for a shift, the separate STA position may be eliminated for that shift.

13.1.2.1.2.9 Nuclear Operations Maintenance Advisor

The nuclear operations maintenance advisor is a licensed SRO. The primary function of this position is to directly supervise activities by non-licensed personnel outside the control room that could affect safe operation of the plant. These activities include, but are not limited to:

- Valve lineups
- Equipment tagging
- Surveillances or other testing activities
- Building rounds
- Maintenance activities

The nuclear operations maintenance advisor reports directly to the manager of nuclear operations.

13.1.2.1.2.10 Nuclear Operations Support Supervisor

The nuclear operations support supervisor is a licensed SRO. The primary function of the nuclear operations support supervisor is to review and authorize maintenance, surveillance, or other work or testing activities being performed in the plant. The responsibilities of the nuclear operations support supervisor include keeping the operations shift manager and other operations personnel informed of activities for which they need to be cognizant, verifying that work and testing is safe and appropriate for the existing conditions of the plant, and tracking the work and testing to provide assurance that any LCOs or other requirements will not be exceeded. The nuclear operations support supervisor reports directly to the manager of nuclear operations.

13.1.2.1.3 Conduct of Operations

Station operations are controlled and 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 authority of senior control room personnel. The rules of practice for control room activities, as described by administrative procedures, which are based on RG 1.114, address the following:

- Position/placement of the workstation for the operator at the controls and the expected area of the control room where the supervisor/manager in charge on shift should spend the majority of on-shift time.
- 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 (i), (j), (k), (l), and (m):

- Reactivity controls may be manipulated only by licensed operators and senior operators except as allowed for training under 10 CFR 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.
- An operator or senior operator shall be present at the controls at all times during the operation of the facility.
- For each shift, operations management designates one or more SROs to be responsible for directing the licensed activities of licensed operators.
- An SRO shall be present at the facility or readily available on call at all times during its operation, and shall be present at the facility during initial start-up and approach to power, recovery from an unplanned or unscheduled shut-down or significant reduction in power, and refueling, or as otherwise prescribed in the facility license.

- Minimum shift staffing for operations personnel is shown in Table 13.1-202.
- With the unit in modes other than cold shutdown or refueling, there shall be one SRO in the control room at all times. In addition, there shall be one RO or one SRO at the controls whenever there is fuel in the reactor vessel.

13.1.2.1.4 Operating Shift Crews

Plant administrative procedures implement the required shift staffing. These provisions 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 operating and technical support staff who perform safety-related functions. Work hour limitations and shift manning requirements defined by TMI Action Plan I.A.1.3 are addressed in station procedures. Shift crew staffing plans may be modified during refueling outages to accommodate safe and efficient completion of outage work in accordance with work hour limitations established in administrative procedures.

The minimum composition of an operating shift depends on the operational mode, as shown in Table 13.1-202. Reporting relationships for these positions are shown in Figure 13.1-203 Shift Operations.

13.1.2.1.5 Fire Brigade

The plant is designed, and the fire brigade organized, to be self-sufficient with respect to fire fighting 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 do not include the operations shift manager nor any other members of the minimum shift operating crew necessary for safe shutdown of the unit, nor do they 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. The fire brigade for Fermi 3 does not include personnel assigned to Fermi 2.

The brigade leader and at least two brigade members have sufficient training in, or knowledge of, plant systems to understand the effects of fire and fire suppressants on safe-shutdown capability. The brigade leader has training or experience necessary to assess the potential safety consequences of a fire and advise control room personnel, as evidenced by possession of an operator’s license or equivalent knowledge of plant systems. The qualification of fire brigade

members includes an annual physical examination to determine their ability to perform strenuous firefighting activities.

13.1.3 Qualification Requirements of Nuclear Plant Personnel

13.1.3.1 Minimum Qualification Requirements

Qualifications of managers, supervisors, operators, and technicians of the operating organization meet the requirements for education and experience described in ANSI/ANS-3.1 (Reference 13.1-201), as endorsed and amended by RG 1.8. For operators and SROs, these requirements are modified in Section 13.2.

13.1.3.2 Qualification Documentation

Resumes and 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 COL Information

13.1-1-A Organizational Structure

This COL item is addressed in Subsection 9.5.1.15.3, Subsection 13.1.1 through Subsection 13.1.3, and Appendix 13AA.

13.1.5 References

13.1-201 American Nuclear Society, “American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plant,” ANSI/ANS -3.1.

13.1-202 U.S. Nuclear Regulatory Commission, “Generic Letter 86-04, Policy Letter, Engineering Expertise on Shift.”

Table 13.1-201 Generic Position/Site Specific Position Cross Reference (Sheet 1 of 6)

Nuclear Function	Function Position (ANS-3.1-1993 section)		Nuclear Plant Position (Site-Specific)	Estimated Numbers of Full Time Equivalents*			
				Design Review Phase	Construction Phase	Pre-op Phase	Operational Phase
Executive management	chief nuclear officer & senior executive, nuclear operations	(n/a)	Chief Nuclear Officer	1**	1**	1**	1**
	senior executive	(n/a)	Site Executive	1**	1**	1**	1**
Nuclear support	executive, construction	(n/a)	Executive Vice President, Major Enterprise Projects	1**	1**	1**	
Plant management	plant manager	(4.2.1)	Plant Manager			1	1
Operations	manager	(4.2.2)	Manager, Operations			1	1
operations, plant	functional manager	(4.3.8)	Operations – Shift Supervisor			1	1
operations, admin	functional manager	(4.3.8)	Operations – Support Supervisor			1	1
operations, (on-shift)	functional manager	(4.4.1)	Shift Manager			6	6
	supervisor	(4.4.2)	Unit Supervisor			5	5
	supervisor	(4.4.2)	Supervisor, Work Control			5	5
	supervisor	(4.6.2)	STA****			5	5
	licensed operator	(4.5.1)	Control Room Operator			15	24
	non-licensed operator	(4.5.2)	Non-licensed Operator		6	24	30
	rad waste operator	(4.5.2)	Rad Waste Operator			1	2
Engineering	manager	(4.2.4)	Director, Engineering	1	1	1	1
projects	functional manager	(4.3.9)	Manager, Projects Engineering		1	1	1
system engineering	functional manager	(4.3.9)	Supervisor, System Engineering		1	4	4

Table 13.1-201 Generic Position/Site Specific Position Cross Reference (Sheet 2 of 6)

Nuclear Function	Function Position (ANS-3.1-1993 section)		Nuclear Plant Position (Site-Specific)	Estimated Numbers of Full Time Equivalents*			
				Design Review Phase	Construction Phase	Pre-op Phase	Operational Phase
	system engineer	(4.6.1)	System Engineer	1	4	16	16
design engineering	functional manager	(4.3.9)	Manager, Design Engineering	1	1	1	1
	design engineer	(4.6 – staff engineer)	Design Engineer	3	5	10	15
engineering programs	functional manager	(4.3.9)	Manager, Engineering Programs		1	1	1
	programs engineer	(4.6–staff engineer)	Programs Engineer		6	12	12
reactor engineering	functional manager	(4.3.9)	Supervisor, Reactor Engineering			1	1
	reactor engineer	(4.6–staff engineer)	Reactor Engineer		1	3	3
Chemistry	functional manager	(4.3.2)	Manager, Chemistry		1***	1***	1***
	supervisor	(4.4.5)	Chemistry Supervisor		1	1	2
	technician	(4.5.3.1)	Chemistry Technician		2	6	10
Radiation Protection	functional manager	(4.3.3)	Manager, Radiation Protection		1***	1***	1***
	supervisor	(4.4.6)	Radiation Protection Supervisor		2	6	8
	technician	(4.5.3.2)	Radiation Protection Technician		4	12	18
Maintenance	manager	(4.2.3)	Manager, Maintenance			1	1
instrumentation and control	supervisor	(4.4.7)	Supervisor, Instrumentation and Control		1	1	1

Table 13.1-201 Generic Position/Site Specific Position Cross Reference (Sheet 3 of 6)

Nuclear Function	Function Position (ANS-3.1-1993 section)		Nuclear Plant Position (Site-Specific)	Estimated Numbers of Full Time Equivalents* Design Review Phase	Construction Phase	Pre-op Phase	Operational Phase
	supervisor	(4.4.7)	Assistant Supervisor, Instrumentation and Control		2	2	2
	technician	(4.5.3.3)	Instrumentation and Control Technician		4	20	30
mechanical	supervisor	(4.4.9)	Supervisor, Mechanical		1	1	1
	supervisor	(4.4.9)	Assistant Supervisor, Mechanical		2	2	2
	technician	(4.5.7.2)	Mechanic		4	20	30
electrical	supervisor	(4.4.8)	Supervisor, Electrical		1	1	1
	supervisor	(4.4.8)	Assistant Supervisor, Electrical		2	2	2
	technician	(4.5.7.1)	Electrician		4	20	30
Planning and scheduling and outage	manager	(4.2)	Manager, Outage & Planning			1***	1***
	functional manager	(4.3)	Supervisor, Outage & Planning			1	1
	functional manager	(4.3)	Supervisor, Scheduling			1	1
	functional manager	(4.3)	Supervisor, Planning		1	1	1
Purchasing, and contracts	functional manager	(4.3)	Manager, Supply Chain Services		1***	1***	1***
Quality assurance	functional manager	(QAPD)	Director, Quality Management	1***	1***	1***	1***
	functional manager	(QAPD)	QA Manager	1	1	1	1
	QA lead auditor	(QAPD)	QA Auditor	1	1	1	1

Table 13.1-201 Generic Position/Site Specific Position Cross Reference (Sheet 4 of 6)

Nuclear Function	Function Position (ANS-3.1-1993 section)		Nuclear Plant Position (Site-Specific)	Estimated Numbers of Full Time Equivalents*			
				Design Review Phase	Construction Phase	Pre-op Phase	Operational Phase
	QA internal auditor	(QAPD)	QA Auditor		2	2	8***
	QC inspector	(QAPD)	QC Inspector		6	6	4
	supplier auditor	(QAPD)	Nuclear Quality Auditor		2	2	1***
	vendor surveillance QC inspector	(QAPD)	Vendor Surveillance QC Inspector	2	6	4	4***
	nuclear fuel inspector	(QAPD)	Nuclear Fuel Inspector		3***	3***	3***
Training	functional manager	(4.3.1)	Manager, Training		1***	1***	1***
	supervisor operations training	(4.4.4)	Supervisor, Operations Training		1	1	1
	supervisor, simulator	(4.4.4)	Supervisor, Simulator & Training Support		1	1	1
	operations training instructor	(4.5.4)	Operations Training Instructor		10	10	10
	supervisor tech staff training	(4.4.4)	Supervisor, Tech Training		1	1	1
	supervisor maintenance training	(4.4.4)	Supervisor, Maintenance Training		1	1	1
	tech staff/maintenance instructor	(4.5.4)	Tech Staff/Maintenance Instructor		7	7	7
Nuclear safety assurance	manager	(4.2)	Director, Plant Safety & Licensing		1***	1***	1***
licensing	functional manager	(4.3)	Supervisor, Licensing	1	1	1	1
	licensing engineer	(n/a)	Licensing Engineer	4	4	4	2

Table 13.1-201 Generic Position/Site Specific Position Cross Reference (Sheet 5 of 6)

Nuclear Function	Function Position (ANS-3.1-1993 section)		Nuclear Plant Position (Site-Specific)	Estimated Numbers of Full Time Equivalents*			
				Design Review Phase	Construction Phase	Pre-op Phase	Operational Phase
corrective action	functional manager	(4.3)	Performance Improvement Manager		1***	1***	1***
	corrective action engineer	(n/a)	Station Nuclear Safety Engineer		1	1	1
Nuclear protection services							
fire protection	supervisor	(4.4)	Manager, Fire Protection		1***	1***	1***
emergency preparedness	functional manager	(4.3)	Manager, Emergency Preparedness		1**	1**	1**
	EP planner	(n/a)	EP Specialist		2***	2***	2***
security	functional manager	(4.3)	Manager, Security		1***	1***	1***
	first line supervisor	(4.4)	Supervisor, Nuclear Security		10***	10***	10***
	security officer	(n/a)	Security Officer		100***	100***	100***
Startup testing	supervisor	(4.4.12)	Manager, Startup Group		1	1	0
	startup test engineer		Startup Test Engineer		24	10	4
	supervisor	(4.4.11)	Preop Testing Supervisor		2	2	-
	preop test engineer	(n/a)	Preop Test Engineer		8	8	-

Notes:

* Unless otherwise noted, the number in each block represents the estimated number of full time equivalents dedicated to the project.

** The number in this block indicates total positions in the nuclear organization.

Table 13.1-201 Generic Position/Site Specific Position Cross Reference (Sheet 6 of 6)

Nuclear Function	Function Position (ANS-3.1-1993 section)	Nuclear Plant Position (Site-Specific)	Estimated Numbers of Full Time Equivalents*			
			Design Review Phase	Construction Phase	Pre-op Phase	Operational Phase

*** Shared positions with Fermi Unit 2. Functional manager positions are expected to allocate time evenly between Fermi 2 and Fermi 3 responsibilities proportionate with related activities. For all other positions, the estimated number of full time equivalents represents an estimate of staff personnel working a full time work schedule for one year on Fermi 3 activities.

**** A senior reactor operator on shift who meets the qualifications for the combined SRO/STA position specified for Option 1 of Generic Letter 86-04 (Reference 13.1-202) may also serve as the STA. If this option is used for a shift, the separate STA position may be eliminated for that shift.

Table 13.1-202 Minimum Shift Staffing for Unit 3

Unit Shutdown	1 SM (SRO)
	1 RO
	1 NLO
Unit Operating*	1 SM (SRO)
	1 SRO
	2 RO
	2 NLO
SM – Shift Manager	RO – Licensed Reactor Operator
SRO – Licensed Senior Reactor Operator	NLO – Non-Licensed Operator

Notes:

In addition, one Shift Technical Advisor (STA) is assigned during plant operation in modes other than cold shutdown or refueling. A shift manager or another SRO on shift, who meets the qualifications for the combined Senior Reactor Operator/Shift Technical Advisor (SRO/STA) position, as specified for option 1 of Generic Letter 86-04 (Reference 13.1-202), 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. 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.

A shift manager/supervisor (licensed SRO), is on site at all times when fuel is in the reactor.

A radiation protection technician is on site at all times when there is fuel in the reactor.

A chemistry technician is on site during plant operation in modes other than cold shutdown or refueling.

* Operating modes other than cold shutdown or refueling.

Figure 13.1-201 Design and Construction Organization

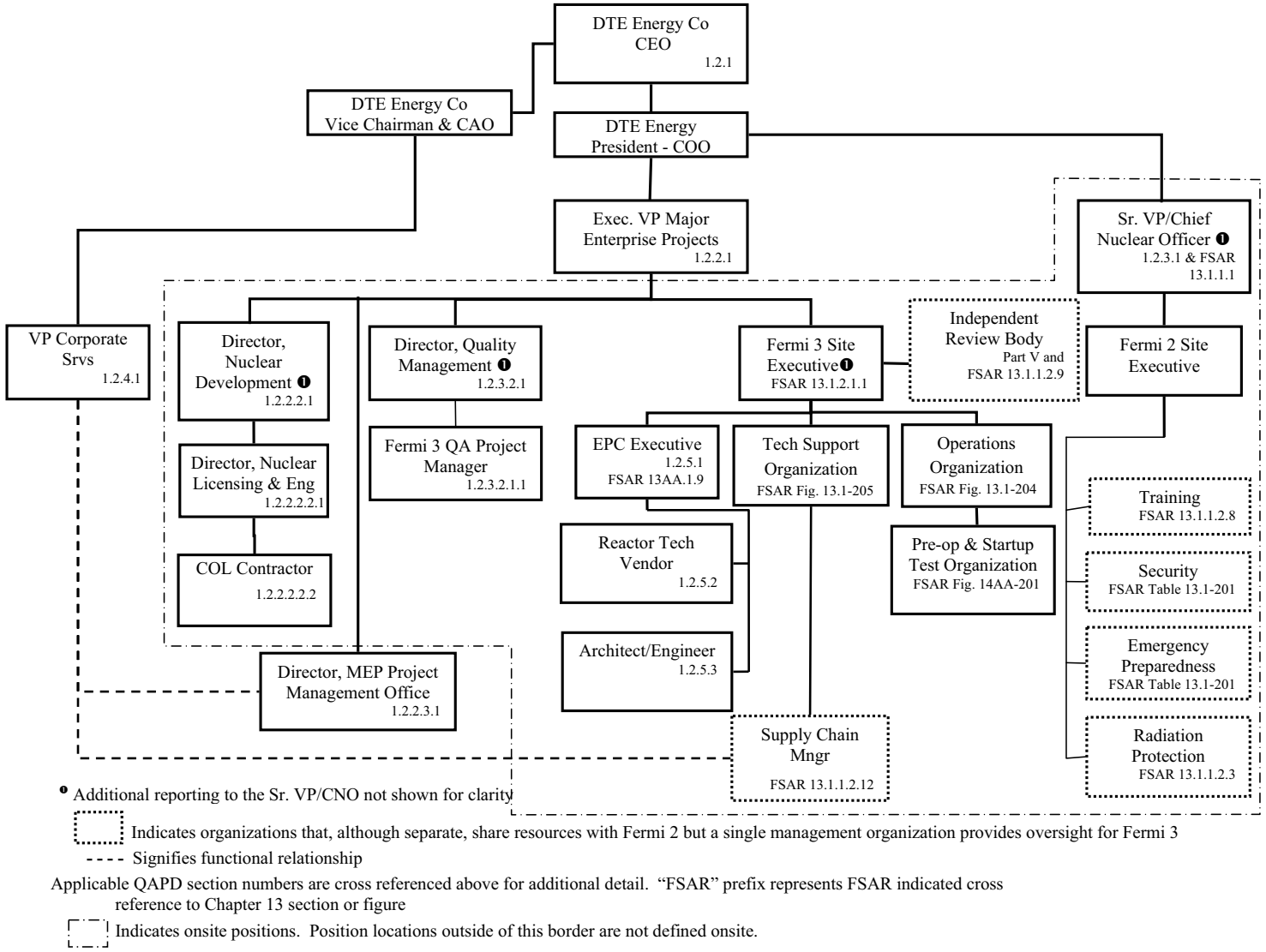


Figure 13.1-202 Nominal Plant Staff Hiring and Training Schedule

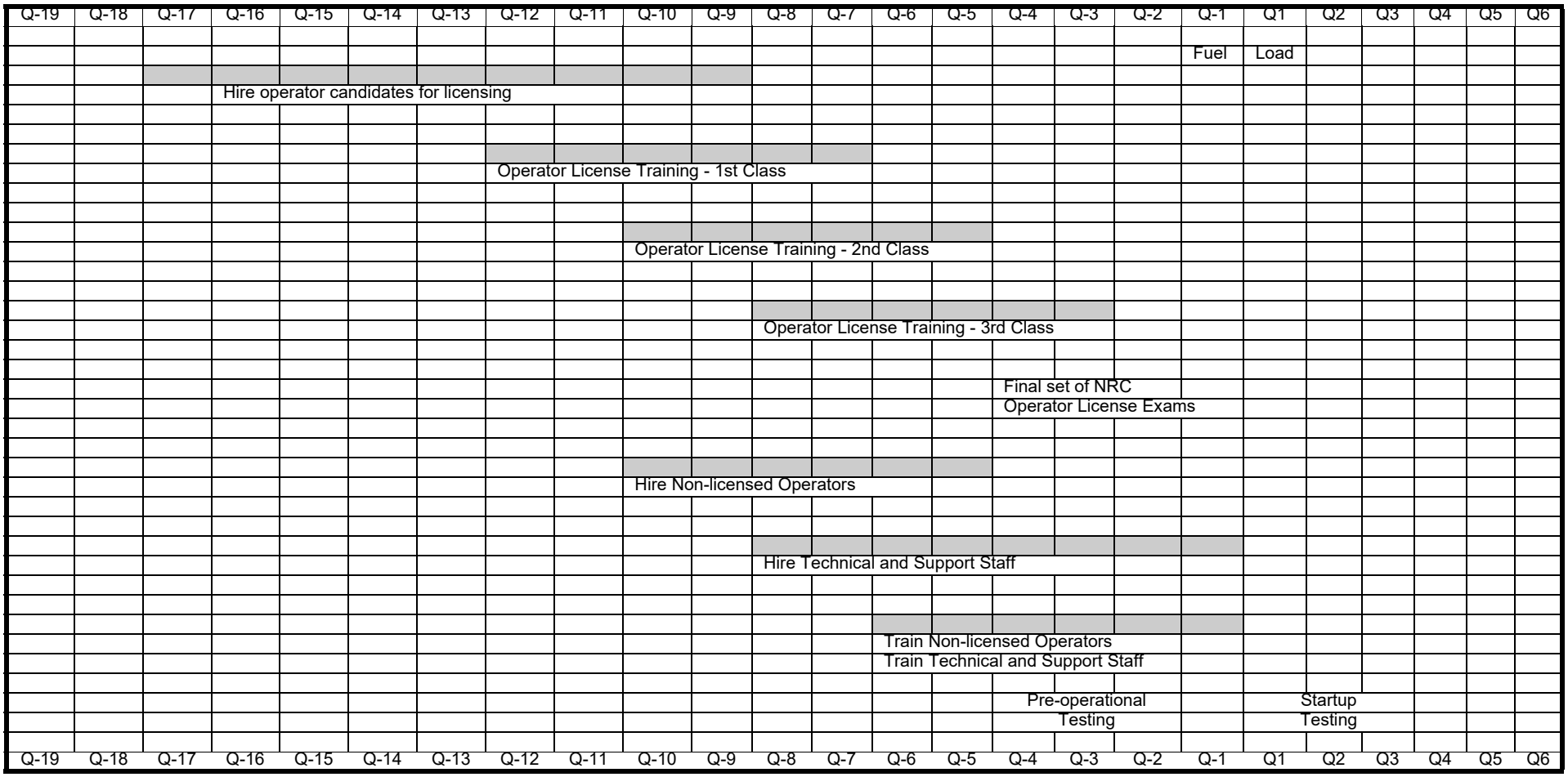
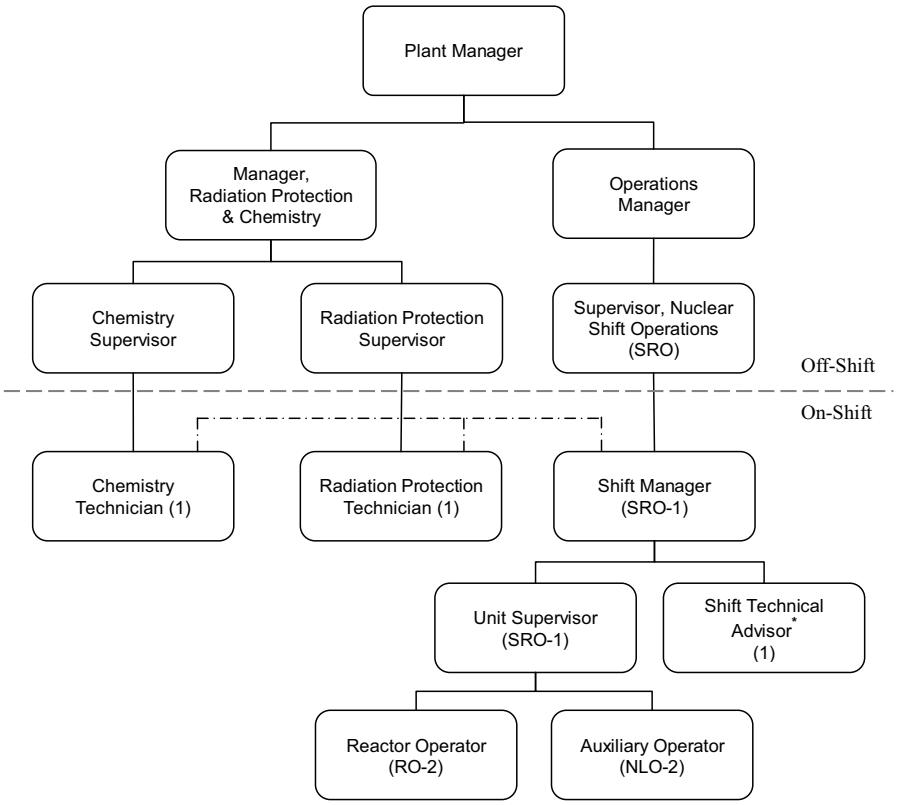


Figure 13.1-203 Shift Operations

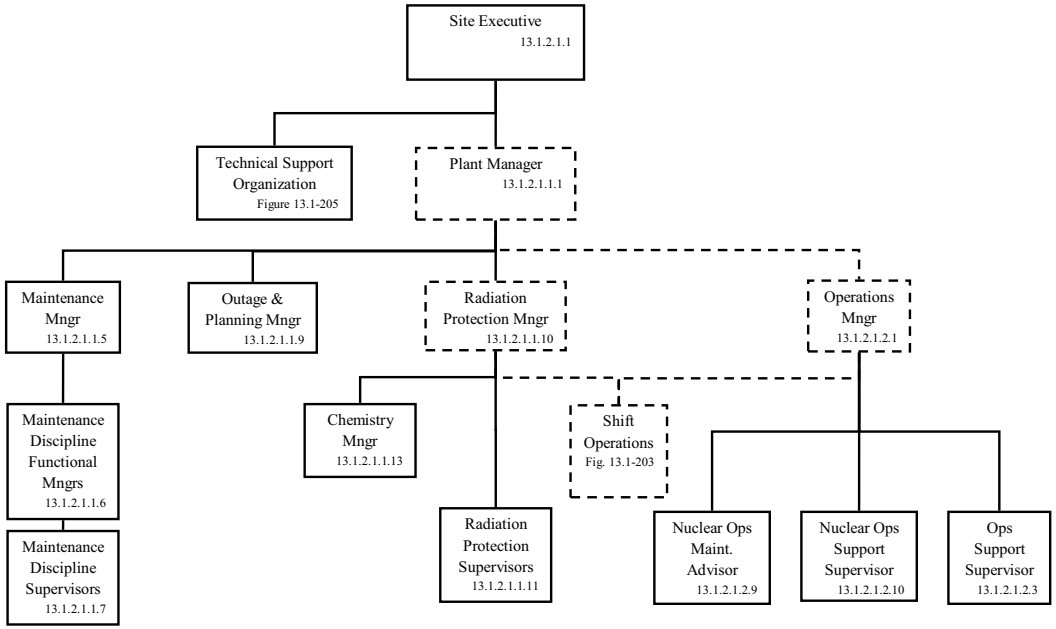


*may be met by on-shift combined SRO/STA
SRO – licensed senior reactor operator
RO – licensed reactor operator
NLO – non-licensed operator

Shift Manning – 5 shifts (minimum)

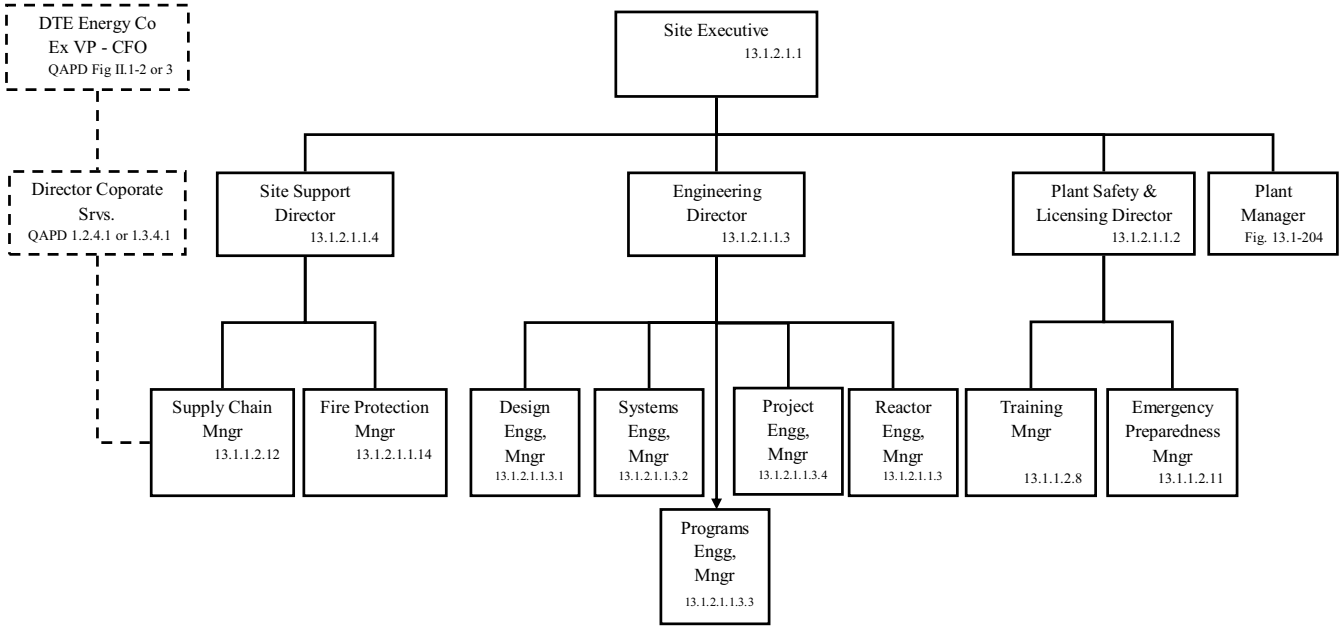
(No.) – indicates number of positions per shift

Figure 13.1-204 Fermi 3 Site Organization (Operations)



Applicable FSAR section numbers are cross referenced above for additional detail.

Figure 13.1-205 Fermi 3 Site Organization (Technical Support)



Applicable FSAR section numbers are cross referenced above for additional detail. "QAPD" prefix indicates cross reference to Appendix 17AA section or figure

13.2 Training

Training programs are addressed in Appendix 13BB. Implementation milestones are addressed in Section 13.4.

13.2.1 Reactor Operator Training

The Training Program Development for Reactor Operator Training is described in Section 18.10. The Implementation of Licensed Operator Training Program validation of baseline training documentation in the full-scope simulator is described in Section 18.12. The Monitoring of Licensed Operator Training Program validation over the operating cycle (and after changes to the plant, staffing, and training program) by analyzing and trending full-scope simulator performance is described in Section 18.13.

Reactor operator training is an operational issue. Descriptions of the training program and licensed operator requalification program for reactor operators and senior reactor operators are addressed in Appendix 13BB. A schedule showing approximate timing of initial licensed operator training relative to fuel loading is addressed in Section 13.1. Requalification training is implemented in accordance with Section 13.4.

13.2.2 Training for Non-Licensed Plant Staff

Non-licensed Operator training is described in Section 18.10, Training Program Development. The Monitoring of Non-Licensed Operator Training Program validation over the operating cycle (and after changes to the plant, staffing, and training program) by analyzing and trending plant human performance data is described in Section 18.13.

Training for non-licensed plant staff is an operational issue. A description of the training program for non-licensed plant staff is addressed in Appendix 13BB. A schedule showing approximate timing of initial training for non-licensed plant staff relative to fuel load is addressed in Section 13.1.

13.2.3 Incorporation of Operating Experience

The results of reviews of operating experience are incorporated into training and retraining programs in accordance with the provisions of Three Mile Island (TMI) Action Item I.C.5, NUREG-0737 (Reference 13.2-1). The organizational responsibilities for accomplishing this are clearly identified. The Operator Experience Review input to the Training Program is described in Section 18.3.

13.2.4 Training Requirements for Preoperational and Low-Power Testing

A training program for the plant staff is developed. The program includes all phases of plant operation including preoperational testing and low-power operation in accordance with the provisions of TMI Action Item I.G.1, NUREG-0737 (Reference 13.2-1). The Plant Staff Training Program Development is described in Section 18.10.

13.2.5 COL Information

13.2-1-A Reactor Operator Training

This COL item is addressed in Subsection 13.2.1 and Appendix 13BB.

13.2-2-A Training for Non-Licensed Plant Staff

This COL item is addressed in Subsection 13.2.2 and Appendix 13BB.

13.2.6 References

13.2-1 NUREG-0737, “Clarification of TMI Action Plan Requirements,” November 1980.

13.3 Emergency Planning

Emergency planning is not within the scope of the ESBWR design. However, design features, facilities, functions, and equipment necessary for emergency planning are considered in the design bases of the standard plant.

The ESBWR Standard Plant complies with all the Technical Support Center (TSC) design requirements. Specifically, a TSC of sufficient size to support 26 people consistent with Section 2 of NUREG-0696 (Reference 13.3-2), is located in the electrical building. Display capability in the TSC includes a workstation that at a minimum is capable of displaying the parameters that are required of a Safety Parameter Display System (SPDS). The SPDS function is described in GE Report NEDE-33217P (Reference 13.3-1).

The TSC is environmentally controlled to provide room air temperature, humidity and cleanliness appropriate for personnel and equipment.

The room is provided with radiological protection and monitoring equipment necessary to ensure that radiation exposure to any person working in the TSC would not exceed 0.05 Sv (5 rem) Total Effective Dose Equivalent (TEDE) as defined in 10 CFR 50.2 for the duration of the accident. The level of protection is similar to the Main Control Room (MCR).

As addressed in the emergency plan, the TSC is provided with reliable voice and data communication with the MCR and Emergency Operations Facility (EOF) and reliable voice communications with the Operational Support Center (OSC), NRC, and state and local operations centers.

The OSC communications system has at least one dedicated telephone extension to the control room, and one dedicated telephone extension to the TSC, and one telephone capable of reaching on-site and off-site locations, as a minimum.

In a building adjacent to the main change rooms, decontamination facilities and supplies for use by onsite individuals are provided. Supplies are provided in the service building adjacent to the main change rooms for decontamination of on-site individuals. Showers and waste collection equipment are used to ensure spread of contamination is controlled and disposal cost of waste material is minimized. The central location is convenient to health physics support personnel who supervise their activity.

13.3.1 **Preliminary Planning**

Not required.

13.3.2 Emergency Plan

The emergency plan, prepared in accordance with 10 CFR 52.79(d), is maintained as a separate document.

13.3.3 COL Information

13.3-1-A Identification of OSC and Communication Interfaces with Control Room and TSC

This COL Item is addressed in Section 13.3 and in Emergency Plan Sections II-F and II-H.

13.3-2-A Identification of EOF and Communication Interfaces with Control Room and TSC

This COL item is addressed in Section 13.3 and in Emergency Plan Sections II-F and II-H.

13.3-3-A Decontamination Facilities

This COL item is addressed in Section 13.3 and in Emergency Plan Section II-J.

13.3.4 References

13.3-1 GE Hitachi Nuclear Energy, "ESBWR Man-Machine Interface System and Human Factors Engineering Implementation Plan," NEDE-33217P, Class III (Proprietary), Revision 6, February 2010, and NEDO-33217, Class I (Non-Proprietary), Revision 6, February 2010.

13.3-2 NUREG-0696, "Functional Criteria for Emergency Response Facilities," December 1980.

13.4 Operational Program Implementation

Table 13.4-201 lists each operational program, the regulatory source for the program, the associated implementation milestone(s), and the section of the UFSAR in which the operational program is fully described as required by RG 1.206, Combined License Applications for Nuclear Power Plants (LWR edition).

13.4.1 COL Information

13.4-1-A Operation Programs

This COL item is addressed in Section 13.4.

13.4-2-A Implementation Milestones

This COL item is addressed in Section 13.4.

13.4.2 References

13.4-1 SECY-05-0197, “Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria,” October 2005.

13.4-2 Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants,” June 2007.

13.4-201 American Society of Mechanical Engineers (ASME), “Boiler and Pressure Vessel Code (B&PVC), Rules for Inservice Inspection of Nuclear Power Plant Components,” BPVC Section XI.

13.4-202 American Society of Mechanical Engineers (ASME), “Code for the Operation and Maintenance of Nuclear Power Plants,” OM Code.

Table 13.4-201 Operational Programs Required by NRC Regulations (Sheet 1 of 9)

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
1.	Inservice Inspection Program Flow-Accelerated Corrosion Program10 CFR 50.55a(g)(6)(ii) 6.6.7 Prior to commercial service License Condition	10 CFR 50.55a(g) 10 CFR 50.55a(b)(3)(v)	5.2.4 6.6 3.8.1.7.3	Prior to commercial service	10 CFR 50.55a(g) ASME XI IWA 2430(b) (Reference 13.4-201) **[COM 13.4-024]**
2.	Inservice Testing Program	10 CFR 50.55a(f)	3.9.6	After generator online on nuclear heat	10 CFR 50.55a(f) ASME OM Code (Reference 13.4-202) **[COM 13.4-025]**
3.	Environmental Qualification Program	10 CFR 50.49(a)	3.11	Prior to fuel load	License Condition **[COM 13.4-001]**
4.	Preservice Inspection Program	10 CFR 50.55a(g)	5.2.4 6.6 3.8.1.7.3	Completion prior to initial plant startup	10 CFR 50.55a(g) ASME Code Section XI IWB/IWC/IWD/IWF-2200(a) (Reference 13.4-201) **[COM 13.4-026]**
5.	Reactor Vessel Material Surveillance Program	10 CFR 50.60 10 CFR 50, Appendix H	5.3.1	Prior to fuel load	License Condition **[COM 13.4-002]**
6.	Preservice Testing Program	10 CFR 50.55a(f)	3.9.6	Prior to fuel load	License Condition **[COM 13.4-003]**
7.	Containment Leakage Rate Testing Program	10 CFR 50.54(o) 10 CFR 50, Appendix J	6.2.6	Prior to fuel load	10 CFR 50, Appendix J Option B – Section III.a **[COM 13.4-004]**

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
8.	Fire Protection Program	10 CFR 50.48	9.5.1.15	Prior to fuel receipt for elements of the Fire Protection Program necessary to support receipt and storage of fuel onsite. Prior to fuel load for elements of the Fire Protection Program necessary to support fuel load and plant operation.	License Condition **[COM 13.4-005]** **[COM 13.4-006]**
	(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) **[COM 13.4-027]**
9.	Process and Effluent Monitoring and Sampling Program:				
	Radiological Effluent	10 CFR 20.1301 and 20.1302	11.5.4.6	Prior to fuel load	License Condition **[COM 13.4-007]**
	Technical	10 CFR 50.34a			
	Specifications/Standard	10 CFR 50.36a			
	Radiological Effluent Controls	10 CFR 50, Appendix I, Section II and IV			
	Offsite Dose Calculation Manual	Same as above	11.5.4.5 11.5.4.8	Prior to fuel load	License Condition **[COM 13.4-009]**
	Radiological Environmental Monitoring Program	Same as above	11.5.4.5	Prior to fuel load	License Condition **[COM 13.4-010]**

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
	Process Control Program	10 CFR 20.1301 and 20.1302 10 CFR 50.34a 10 CFR 61.55 and 61.56 10 CFR 71	11.4.2.3	Prior to fuel load	License Condition **[COM 13.4-011]**
10.	Radiation Protection Program	10 CFR 20.1101	12.5	Prior to initial receipt of by-product, source, special nuclear materials (excluding Exempt Quantities as described in 10 CFR 30.18) for those elements of the Radiation Protection (RP) Program necessary to support such receipt	License Condition **[COM 13.4-012]**
				Prior to fuel receipt for those elements of the RP Program necessary to support receipt and storage of fuel onsite	**[COM 13.4-013]**
				Prior to fuel load for those elements of the RP Program necessary to support fuel load and plant operation	**[COM 13.4-014]**
				Prior to first shipment of radioactive waste for those elements of the RP Program necessary to support shipment of radioactive waste	**[COM 13.4-015]**
11.	Non Licensed Plant Staff Training Program	10 CFR 50.120	13.2.2	18 months prior to scheduled 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) **[COM 13.4-028]**

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	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	13.2.1	18 months prior to scheduled fuel load	License Condition **[COM 13.4-016]**
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 issuance of an operating license or 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 prior to 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 prior to the schedule date for initial loading of fuel	10 CFR 50, Appendix E, Section IV.F.2.a(ii)
				Licensee's detailed implementing procedures for its emergency plan submitted at least 180 days prior to scheduled date for initial loading of fuel	10 CFR 50, Appendix E, Section V

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	**Requirement**
				The licensee shall submit a fully developed set of site-specific Emergency Action Levels (EALs) to the NRC in accordance with the NRC-endorsed version of NEI 07-01, Rev. 0, with no deviations. The EAL scheme shall have been discussed and agreed upon with State and local officials. The fully developed site-specific EAL scheme shall be submitted to the NRC at least 180 days before the date scheduled for initial fuel load as set forth in the notification submitted in accordance with 10 CFR 52.103(a).	License Condition **[COM 13.4-031]**
15.	Security Program:	10 CFR 52.79(a)(35) 10 CFR 52.79(a)(36)	13.6		
	Physical Security Program	10 CFR 73.55		Prior to fuel onsite (Protected Area)	10 CFR 73.55(a)(4) **[COM 13.4-017]**
		10 CFR 73.56			
		10 CFR 73.57			
	Safeguards Contingency Program	10 CFR 52.79(a)(36) 10 CFR 73.55 10 CFR 73, Appendix C	13.6	Prior to fuel onsite (Protected Area)	10 CFR 73.55(a)(4) **[COM 13.4-017]**
	Training and Qualification Program	10 CFR 73, Appendix B	13.6	Prior to fuel onsite (Protected Area)	10 CFR 73.55(a)(4) **[COM 13.4-017]**
	Cyber Security Plan LCR375	10 CFR 73.54 10 CFR 73.55 10 CFR 52.79(a)(36)	13.6	Prior to fuel onsite (Protected Area)	10 CFR 73.55(a)(4) **[COM 13.4-032]**

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
	Physical Security Program (applicable to SNM)	10 CFR 73.1 10 CFR 73.67	13.6	Prior to receipt of SNM	10 CFR 73.1 (a) 10 CFR 73.67(f) [**COM13.4-030]**
	FFD Program for Construction (Workers and First Line Supervisors)	10 CFR 26.4(f)	13.7	Prior to initiating 10 CFR 26 construction activities	10 CFR 26, Subpart K **[COM 13.4-018]**
	FFD Program for Construction (Management and Oversight Personnel)	10 CFR 26.4(e)	13.7	Prior to initiating 10 CFR 26 construction activities	10 CFR 26, Subparts A through H, N and O **[COM 13.4-018]**
	FFD Program for Security Personnel	10 CFR 26.4(e)(1)	13.7	Prior to initiating 10 CFR 26 construction activities	10 CFR 26, Subparts A through H, N and O **[COM 13.4-018]**
		10 CFR 26.4(a)(5)		Prior to the earlier of: a. Receipt of SNM in the form of fuel assemblies, b. Establishment of a PA, or c. 10 CFR 52.103(g) finding	10 CFR 26, Subparts A through I, N and O **[COM 13.4-019]**
	FFD Program for FFD Program Personnel	10 CFR 26.4(g)	13.7	Prior to initiating 10 CFR 26 construction activities	10 CFR 26, Subparts A, B, D through H, N, O and C per licensee's discretion **[COM 13.4-018]**
	FFD Program for Individuals Required to Physically Report to the TSC or EOF	10 CFR 26.4(c)	13.7	Prior to the conduct of the first full participation emergency preparedness exercise under 10 CFR 50, Appendix E, Section F.2.a	10 CFR 26, Subparts A through I, N and O, except for 10 CFR 26.205 through 10 CFR 26.209 **[COM 13.4-041]**

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
	FFD Program for Operation	10 CFR 26.4(a) and 10 CFR 26.4(b)	13.7	Prior to the earlier of: a. Reciept of SNM in the form of fuel assemblies, b Establishment of a PA, or c 10 CFR 52.103(g) finding	10 CFR 26, Subparts A through I, N and O, except for individuals listed in 10 CFR 26.4(b) who are not subject to 10 CFR 26.205 through 10 CFR 26.209 **[COM 13.4-019]**
16.	Quality Assurance Program – Operation	10 CFR 50.54(a) 10 CFR 50, Appendix A (GDC 1) 10 CFR 50, Appendix B	17.5	30 days prior to scheduled date for initial loading of fuel	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) **[COM 13.4-008]**
18.	Motor-Operated Valve Testing	10 CFR 50.55a(b)(3)(ii)	N/A	There are no safety-related MOVs	
19.	Initial Test Program	10 CFR 50.34 10 CFR 52.79(a)(28)	14.2		License Condition **[COM 13.4-021]**
				60 days prior to the scheduled date of the first preoperational test for the Preoperational Test Program	**[COM 13.4-022]**
				60 days prior to the scheduled date of initial fuel loading for the Startup Test Program	**[COM 13.4-023]**
20.	Snubber Testing and Inspection Program				
	Preservice Inspection Program	10 CFR 50.55a(g) 10CFR 50.55a(b)(3)(v)	3.9.3.7.1(3)e	Completion prior to intial plant startup	10 CFR 50.55a(g)

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
	Inservice Inspection Program	10 CFR 50.55a(g) 10CFR 50.55a(b)(3)(v)	3.9.3.7.1(3)e	Prior to commerical service(1)	10 CFR 50.55a(g) ASME OM Code, ISTD (Reference 13.4-202)
	Inservice Testing Program	10 CFR 50.55a(g) 10CFR 50.55a(b)(3)(v)	3.9.3.7.1(3)e	After generation online on nuclear heat(1)	10 CFR 50.55a(g) ASME OM Code, ISTD (Reference 13.4-202)

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

Item	Program Title	Program Source (Required by)	Section	Implementation	
				Milestone	Requirement
	Preservice Thermal Movement Inspection	10 CFR 50.55a(g) 10CFR 50.55a(b)(3)(v)	3.9.3.7.1(3)e	During intial heatup and cooldown	10 CFR 50.55a(g) ASME OM Code, ISTD (Reference 13.4-202)
	Preservice Testing Program	10 CFR 50.55a(g) 10CFR 50.55a(b)(3)(v)	3.9.3.7.1(3)e	Prior to fuel load	License condition **[COM 13.4-042]**
Note: 1. Snubber inservice examination is intially performed not less than two months after attaining 5% reactor power operation and will be completed within 12 calendar months after attaining 5% reactor power.					
21.	Mitigative Strategies Description and Plans	10 CFR 50.54(hh)(2) 10CFR 52.80	19.6	Prior to fuel load authorization per 10 CFR 52.103(g)	License Condition **[COM 13.4-033]**
22.	Lifecycle Minimization of Contamination	10 CFR 20.1406	12.3	Prior to fuel load	License Condition **[COM13.4-034]**
23.	SNM Material Control and Accounting Program	10 CFR 74 Part B (74.11-74.19, excl. 74.17)	13.5.2.2.11	Prior to receipt of SNM	License Condition **[COM13.4-043]**

13.5 Plant Procedures

Plant procedures are developed to provide control for activities that are important for safe operation of the facility. The applicable portions of Regulatory Guide 1.33 Rev. 2 (Reference 13.5-5) concerning plant procedures shall be followed.

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

The QAPD 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.

[START COM 13.5-001] Procedures are developed prior to fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. **[END COM 13.5-001]**

Industry guidance for the appropriate format, content, and typical activities delineated in written procedures is implemented, as appropriate. Guidance is based on ASME NQA-1, “Quality Assurance Requirements for Nuclear Facility Applications” (Reference 13.5-202).

The format and content of procedures are controlled by administrative procedure(s). Procedures are organized to include the following components, as necessary:

- Title Page
- Table of Contents
- Scope and Applicability
- Responsibilities
- Prerequisites
- Precautions and Limitations
- Main Body
- Acceptance Criteria
- Check-off Lists
- References
- Attachments and Data Sheets

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.

The bases for procedure development include:

- Plant design bases.
- System-based technical requirements and specifications.
- Task analyses results.
- Risk-important human actions identified in the HRA/PRA.
- Initiating events considered in the Emergency Operating Procedures (EOPs), including those events in the design bases.
- Generic Technical Guidelines (GTGs) for EOPs.

Procedure verification and validation includes the following activities, as appropriate:

- A review to verify they are correct and can be carried out.
- A final validation in a simulation of the integrated system as part of the verification and validation activities as described in Section 18.11, Human Factors Verification and Validation.
- A verification of modified procedures for adequate content, format, and integration. The procedures are assessed through validation if a modification substantially changes personnel tasks that are significant to plant safety. The validation verifies that the procedures correctly reflect the characteristics of the modified plant and can be performed effectively to restore the plant.

Procedures for shutdown management are developed consistent with the guidance described in NUMARC 91-06, “Guidelines for Industry Actions to Assess Shutdown Management,” to reduce the potential for loss of reactor coolant system (RCS) boundary and inventory during shutdown conditions. (Reference 13.5-203)

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. These procedures include those which provide the administrative controls with respect to procedures, and those which define and provide controls for operational activities of the plant staff.

Administrative procedures are developed in accordance with the nominal schedule presented in Table 13.5-202.

Procedures outline the essential elements of the administrative programs and controls as described in ASME NQA-1 and Section 17.5. These procedures are organized such that the program elements are prescribed in documents normally referred to as administrative procedures.

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.

Procedure control is discussed in the QAPD. Type and content of procedures are discussed throughout Section 13.5.

A procedure style (writer's) guide promotes the standardization and application of human factors engineering principles to procedures. The writer's guide establishes the process for developing procedures that are complete, accurate, consistent, and easy to understand and follow. The guide provides objective criteria so that procedures are consistent in organization, style, and content. The writer's guide 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.

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).

13.5.1.1 Administrative Procedures-General

This section describes those procedures that provide administrative controls with respect to procedures, including those that define and provide controls for operational activities of the plant staff.

Plant administrative procedures provide procedural instructions for the following:

- Procedures review and approval.
- Procedure adherence.
- Scheduling for surveillance tests and calibration.
- Log entries.
- Record retention.
- Containment access.
- Bypass of safety function and jumper control.
- Communication systems.
- 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.
- Fire Protection Program procedures.
- 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 13.5-201).
- 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, 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.

13.5.2 **Operating and Maintenance Procedures**

The development of Operating Procedures is generally described in Section 18.9 (Procedure Development).

A Plant Operating Procedures Development Plan shall be generated and have the following attributes:

- That the scope encompassed by the procedures development process includes those operating procedures defined in Subsection 13.5.2, which direct operator actions during normal, abnormal and emergency operations. The procedure development process will also include consideration of plant operations during periods when plant systems/equipment are undergoing test, maintenance or inspection.

- The procedure development process will address methods and criteria for the development, verification and validation, implementation, maintenance and revision of procedures. The methods and criteria shall be in accordance with TMI I.C.1, NUREG-0737 (Reference 13.5-3).

Operating Procedures are developed in accordance with Subsection 13.5.2.1 and Maintenance Procedures are developed in accordance with Subsection 13.5.2.2.6.1.

Implementation of the Plant Operating Procedures Development Plan shall establish:

- Procedures that are consistent with the requirements of 10 CFR Part 50 and the TMI requirements described in NUREG-0737 (Reference 13.5-3) and Supplement 1 to NUREG-0737 (Reference 13.5-7).
- Requirements that the procedures developed shall include, as necessary, the elements described in American National Standards Institute (ANSI)/American Nuclear Society (ANS)-3.2-1994; R1999 (Reference 13.5-2). Elements of ANSI/ANS-3.2-1994; R1999 addressing water hammer and gas binding shall be applied in the development of procedures for RTNSS systems.
- That the operator basis for plant operating procedures shall use actions identified in the operational task analysis and Probabilistic Risk Assessment (PRA) efforts in support of the Standardized Design certification, Standardized Plant Design Emergency Procedure Guidelines and consideration of plant-specific equipment selection and site-specific elements such as the service water intake structure.
- That the definition of the methods through which specific operator skills and training needs, as may be considered necessary for reliable execution of the procedures, will be identified and documented.
- That the procedures specified above shall be made available for the purposes of the Human Factors Verification and Validation (V&V) described in GE Report NEDE-33217P (Reference 13.5-1) provided under separate cover.
- Procedures for the incorporation of the results of operating experience and the feedback of pertinent information into plant procedures in accordance with the provisions of TMI I.C.5, NUREG-0737 (Reference 13.5-3).

A Plant Operations Procedures Development Plan is established in accordance with Subsection 13.5.2.1.

The following procedures shall be included in the scope of the Plant Operating Procedures Development Plan described above:

System Procedures

Procedures as delineated in Section A3 of ANSI/ANS-3.2-1994; R1999 (Reference 13.5-2) shall be prepared as appropriate.

Procedures For Off-Normal Or Alarm Conditions

Procedures for off-normal or alarm conditions that require operator action in the MCR and Remote Shutdown System (RSS) shall be prepared as appropriate.

General Plant Operating Procedures

As discussed in Section A5 of ANSI/ANS-3.2-1994; R1999 (Reference 13.5-2), procedures shall be prepared for the integrated operations of the plant.

Procedures for Combating Emergencies and Other Significant Events

As discussed in Section A10 of ANSI/ANS-3.2-1994; R1999 (Reference 13.5-2), procedures shall be provided to guide operations in emergencies and other significant events.

Procedures for Maintenance and Modification

All maintenance and modification procedures including those that require operator actions in the MCR or RSS shall be prepared as appropriate.

Procedures for Radiation Control

Procedures for the control of radioactive releases as discussed in Section A7 (d) of ANSI/ANS-3.2-1994; R1999 (Reference 13.5-2) shall be prepared as appropriate.

Procedures for Calibration, Inspection and Testing

Calibration, inspection and testing procedures that require operator actions to be taken in the MCR or RSS shall be prepared as appropriate.

Procedures for calibration, inspection, and testing are included in the Plant Operating Procedures Development Plan.

These procedures will ensure that all portions of the safety-related logic circuitry are adequately covered as described in Generic Letter 96-01 (Reference 13.5-6).

Procedures for Radiation Monitoring

Procedures for the monitoring of radioactive releases as discussed in Subsection 5.3.7.4 of ANSI/ANS-3.2-1994; R1999 (Reference 13.5-2), shall be prepared as appropriate.

Procedures for Handling of Heavy Loads

Procedures for load handling and load handling equipment shall be prepared as appropriate using the guidance of Section 5.1 of NUREG-0612 (Reference 13.5-4).

Procedures Related to Refueling Cavity Integrity

Procedures for monitoring refueling cavity seal leakage, responding to refueling cavity and buffer pool drain down events, and performing periodic maintenance and inspection of the refueling cavity seal and the Main Steam and Isolation Condenser System plugs shall be prepared in accordance with vendor recommendations.

The scope of procedures in the Plant Operating Procedures Development Plan is addressed in Subsection 13.5.2.1.

Emergency Procedures

A writer's guide shall be developed and implemented which defines the process for developing emergency procedures. The writer's guide will contain objective criteria that require that the emergency procedures developed are consistent in organization, style, content and usage of terms.

The documentation describing the emergency procedure development activity results shall include, but is not limited to:

- The objectives of the emergency procedure development process.
- The methods employed during emergency procedure development.
- Deviations from generic technical guidelines approved by the NRC.
- Discussion of any design change recommendations or negative implications that the current design may have on safe operation as a result of emergency procedures development plan implementation.

Emergency Procedures are developed in accordance with Subsection 13.5.2.1.4.

13.5.2.1 Operating and Emergency Operating Procedures

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

[START COM 13.5-002] Operating procedures are developed at least six months prior to fuel load to allow sufficient time for plant staff familiarization and to allow NRC staff adequate time to review the procedures and to develop operator licensing examinations. **[END COM 13.5-002]**

The classifications of operating procedures are:

- System Operating Procedures
- General Operating Procedures
- Abnormal (Off-Normal) Operating Procedures
- Emergency Operating Procedures
- Alarm Response Procedures

The Plant Operating Procedures Development Plan establishes:

- A scope that includes those operating procedures defined below, which direct operator actions during normal, abnormal, and emergency operations, and considers plant operations during periods when plant systems/equipment are undergoing test, maintenance, or inspection.
- The methods and criteria for the development, verification and validation, implementation, maintenance, and revision of procedures. The methods and criteria are in accordance with NUREG-0737 TMI Items I.C.1 and I.C.9.

The following procedures are included in the scope of the Plant Operating Procedures Development Plan:

- System operating procedures
- General operating procedures
- Abnormal (off-normal) or alarm response procedures
- Procedures for combating emergencies and other significant events
- Procedures for maintenance and modification
- Procedures for radiation monitoring and control
- Fuel handling procedures
- Temporary procedures
- Procedures for handling of heavy loads
- Procedure Related to Refueling Cavity Integrity
- Procedures for calibration, inspection, and testing

Implementation of the Plant Operating Procedures Development Plan establishes:

- Procedures that are consistent with the requirements of 10 CFR 50 and the TMI requirements in NUREG-0737 and Supplement 1 to NUREG-0737.
- Requirements that the procedures developed include, as necessary, the elements described in the QAPD.
- Bases for specifying plant operating procedures including:
    - Operator actions identified in the vendor's task analysis and PRA efforts in support of the design certification.
    - Standardized plant emergency procedure guidelines.
    - Consideration of plant-specific equipment selection and site specific elements such as the station water intake structure and the ultimate heat sink.
- The definition of the methods through which specific operator skills and training needs, as may be considered necessary for reliable execution of the procedures, are identified and documented.

- Requirements that the procedures specified above are made available for the purposes of the Human Factors V&V Implementation Plan described in GE Report NEDO-33276, ESBWR Verification & Validation Implementation Plan (Reference 18.11-2).
- Procedures for the incorporation of the results of operating experience and the feedback of pertinent information into plant procedures in accordance with the provisions of TMI Item I.C.5 (NUREG-0737).

13.5.2.1.1 System Operating Procedures

Instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation, returning to service following testing or maintenance (if not contained in the applicable procedure), and other instructions appropriate for operation of systems are delineated in system procedures.

System procedures contain check-off lists, where appropriate, which are prepared in sufficient detail to provide an adequate verification of the status of the system.

13.5.2.1.2 General Operating Procedures

General operating procedures provide instructions for performing integrated plant operations involving multiple systems such as plant startup and shutdown. These procedures provide a coordinated means of integrating procedures together to change the mode of plant operation or achieve a major plant evolution. Check-off lists are used for the purpose of confirming completion of major steps in proper sequence.

Typical types of general operating procedures are described as follows:

- Startup procedures provide instruction for starting the reactor from cold or hot conditions, establishing power operation, and recovery from reactor trips.
- Shutdown procedures guide operations during and following controlled shutdown or reactor trips, and include instructions for establishing or maintaining hot standby and safe or cold shutdown conditions, as applicable.
- Power operation and load changing procedures provide instruction for steady-state power operation and load changing.

13.5.2.1.3 Abnormal (Off-Normal) Operating Procedures

Abnormal operating procedures for correcting abnormal conditions are developed for those events where system complexity might lead to operator uncertainty. Abnormal operating procedures describe actions to be taken during other than routine operations, which if continued, could lead to either material failure, personnel harm, or other unsafe conditions.

Abnormal procedures are written so that a trained operator knows in advance the expected course of events or indications that identify an abnormal situation and the immediate action to be taken.

13.5.2.1.4 Emergency Operating Procedures

EOPs are procedures that direct actions necessary for the operators to mitigate the consequences of transients and accidents that cause plant parameters to exceed reactor protection system or ESF actuation setpoints.

Emergency operating procedures include appropriate guidance for the operation of plant post-72-hour equipment, and are developed as appropriate per the guidance of:

- NUREG-0737, “Clarification of TMI Action Plan Requirements,” Items I.C.1 and I.C.9
- The QAPD

The emergency operating procedure program (e.g., the procedures generation package (PGP)) describes the objectives of the emergency procedure development process, the program for developing EOPs and the required content of the EOPs.

[START COM 13.5-003] The procedure development program, as described in the PGP for EOPs, is submitted to the NRC at least three months prior to the planned date to begin formal operator training on the EOPs. **[END COM 13.5-003]** The PGP includes:

- GTGs, which are guidelines based on analysis of transients and accidents that are specific to the plant design and operating philosophy. The submitted documentation includes: a) a description of the process used to develop plant-specific technical guidelines (P-STGs) from the GTGs, b) identification of significant deviations from the generic guidelines (including identification of additional equipment beyond that identified in the generic guidelines), along with necessary engineering evaluations or analyses to support the adequacy of each deviation, and c) a description of the process used for identifying operator information and control requirements.
- A plant-specific writer’s guide (P-SWG) that details the specific methods used in preparing EOPs based on P-STGs. The writer’s guide contains objective criteria that require that the emergency procedures developed are consistent in organization, style, content, and usage of terms.
- A description of the program for verification and validation (V&V) of EOPs.
- A description of the program for training operators on EOPs.
- The objectives of the emergency procedure development.
- Discussion of any design change recommendations and/or negative implications that the current design may have on safe operation as noted during implementation of the emergency procedures development plan.

13.5.2.1.5 Alarm Response Procedures

Procedures are provided for annunciators (alarm signals) identifying the proper operator response actions to be taken. Each of these procedures normally contains: a) the meaning of the annunciator

or alarm, b) the source of the signal, c) any automatic plant responses, d) any immediate operator action, and e) the long range actions. When corrective actions are very detailed and/or lengthy, the alarm response may refer to another procedure.

13.5.2.1.6 Temporary Procedures

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

Temporary operating procedures are developed under established administrative guidelines. They include designation of the period of time during which they may be used and adhere to the QAPD and Technical Specifications, as applicable.

13.5.2.1.7 Fuel Handling Procedures

Fuel handling operations, including fuel receipt, identification, movement, storage, and shipment, are performed in accordance with written procedures. Fuel handling procedures address, for example, the status of plant systems required for refueling; inspection of replacement fuel and control rods; designation of proper tools; proper conditions for spent fuel movement and storage; proper conditions to prevent inadvertent criticality; proper conditions for fuel cask loading and movement; and status of interlocks, reactor trip circuits, and mode switches. These procedures provide instructions for use of refueling equipment, actions for core alterations, monitoring core criticality status, accountability of fuel, and partial or complete refueling operations.

13.5.2.2 Maintenance and Other Operating Procedures

The QAPD provides guidance for procedural adherence.

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; performing routine radiation surveys; performing environmental monitoring in the vicinity of the plant; monitoring radiation levels during maintenance and special work activities; evaluating radiation protection implications of proposed modifications; management of radioactive wastes for offsite shipment, disposal, and treatment; 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. A list of implementing procedures is maintained in the Emergency Plan.

13.5.2.2.3 Instrument Calibration and Test Procedures

The QAPD 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. These procedures are addressed in Subsection 13.5.2.1.1, System Operating Procedures.

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.

Where appropriate sections of related documents, such as vendor manuals, equipment operating and maintenance instructions, or approved drawings with acceptance criteria, provide adequate

instructions to provide the required quality of work, the applicable sections of the related documents are referenced in the procedure, or may, in some cases, constitute adequate procedures in themselves. Such documents receive the same level of review and approval as maintenance documents.

The preventive maintenance program, including preventive and predictive procedures, as appropriate, prescribes the frequency and type of maintenance to be performed. **[START COM 13.5-004]** An initial program based on service conditions, experience with comparable equipment and vendor recommendations is developed prior to fuel loading. **[END COM 13.5-004]** The program is revised and updated as experience is gained with the equipment. To facilitate this, equipment history files are created and maintained. The files are organized to provide complete and easily retrievable equipment history.

13.5.2.2.6.2 Inspection Procedures

The QAPD provides a description of procedural requirements for inspections.

13.5.2.2.6.3 Surveillance Testing Procedures

The QAPD provides a description of procedural requirements for surveillance testing. Surveillance testing procedures are written in a manner that adequately tests all portions of safety-related logic circuitry as described in Generic Letter 96-01, “Testing of Safety Related Logic Circuits.”

13.5.2.2.6.4 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 modifications that involve a license amendment or a change to Technical Specifications are processed as proposed license amendment request.

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

13.5.2.2.6.5 Heavy Load Handling Procedures

This topic is discussed in Subsection 9.1.5.8.

13.5.2.2.7 Material Control Procedures

The QAPD 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 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. Refueling and Outage Planning Procedures

Procedures provide guidance for the development of refueling and outage plans, and 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 and 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 safety-significant changes to schedule.
- Provisions that activities receive adequate resources.
- Provisions that defense-in-depth during shutdown and margins are not reduced or provisions that an alternate or backup system must be available if a safety system or a defense-in-depth system is removed from service.
- Provisions that personnel involved in outage activities are adequately trained including operator simulator training to the extent practicable, and training of other plant personnel, including temporary personnel, commensurate with the outage tasks they are to perform.
- The guidance described in NUMARC 91-06, “Guidelines for Industry Actions to Assess Shutdown Management,” to reduce the potential for loss of reactor coolant system boundary and inventory during shutdown conditions (Reference 13.5-203).

13.5.2.2.10 Procedure related to Refueling Cavity Integrity

Procedures will be established and implemented for:

- Monitoring refueling cavity seal leakage,
- Responding to refueling cavity and buffer pool drain down events, and
- Performing periodic maintenance and inspection of the refueling cavity seal and the Main Steam and Isolation Condenser System plugs in accordance with vendor recommendations.

13.5.2.2.11 Special Nuclear Material (SNM) Material Control and Accounting Procedures

A material control and accounting system consisting of special nuclear material accounting procedures is utilized to delineate the requirements, responsibilities, and methods of special nuclear material control from the time special nuclear material is received until it is shipped from the plant. These procedures provide detailed steps for SNM shipping and receiving, inventory, accounting, and preparing records and reports. The Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program description is provided in Appendix 13CC.

13.5.3 COL Information

13.5-1-A Administrative Procedures Development Plan

This COL item is addressed in Subsection 13.5.1.

13.5-2-A Plant Operating Procedures Development Plan

This COL item is addressed in Subsection 13.5.2.

13.5-3-A Emergency Procedures Development

This COL item is addressed in Subsection 13.5.2.

13.5-4-A Implementation of the Plant Procedures Plan

This COL item is addressed in Section 13.5 and Subsection 13.5.2.

13.5-5-A Procedures Included in Scope of Plan

This COL item is addressed in Subsection 13.5.2.

13.5-6-A Procedures for Calibration, Inspection, and Testing

This COL item is addressed in Subsection 13.5.2.

13.5.4 References

13.5-1 GE Hitachi Nuclear Energy, "ESBWR Man-Machine Interface System and Human Factors Engineering Implementation Plan," NEDE-33217P, Class III (Proprietary), Revision 6, February 2010, and NEDO-33217, Class I (Non-Proprietary), Revision 6, February 2010.

13.5-2 ANSI/ANS-3.2-1994; R1999, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants."

13.5-3 NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980.

13.5-4 NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980.

13.5-5 Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, February 1978.

13.5-6 Generic Letter Number 96-01, "Testing of Safety-Related Logic Circuits," January 1996.

13.5-7 NUREG-0737 Supplement 1, “Clarification of TMI Action Plan Requirements,” December 1982.

13.5-201 American National Standards Institute, Overhead and Gantry Cranes, ANSI B30.2-2001.

13.5-202 American Society of Mechanical Engineers, Quality Assurance Requirements for Nuclear Facility Applications, NQA-1-1994.

13.5-203 Nuclear Utilities Management and Resources Council, Guidelines for Industry Actions to Assess Shutdown Management, NUMARC 91-06, December 1991.

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 21 Program
Construction License Fitness for Duty Programs, 10 CFR 26
Design Reliability Assurance Program

Table 13.5-202 Nominal Procedure Development Schedule

This table is included for future designation as historical information.

Category A: Controls

Group	Procedure Type	Preparation Milestone
1	Procedures review and approval	6 months before first license class
2	Equipment control procedures	18 months before fuel load
3	Control of maintenance and modifications	18 months before fuel load
4	Fire Protection procedures	1. 6 months before fuel receipt for elements of the program supporting fuel onsite 2. 6 months before fuel load for elements supporting fuel load and plant operation
5	Crane operation procedures	6 months before fuel receipt
6	Temporary changes to procedures	6 months before first license class
7	Temporary procedures	6 months before first license class
8	Special orders of a transient or self-canceling character	6 months before first license class

Category B: Specific Procedures

Group	Procedure Type	Preparation Milestone
1	Standing orders to shift personnel including the authority and responsibility of the shift supervisor, licensed senior reactor operator in the control room, control room operator, and shift technical advisor	6 months before first license class
2	Assignment of shift personnel to duty stations and definition of “surveillance area”	6 months before first license class
3	Shift relief and turnover	6 months before fuel load
4	Fitness for duty	1. Construction FFD program: 6 months before on-site construction of safety- or security-related SSCs 2. Operational FFD program: 6 months before fuel load
5	Control room access	6 months before fuel load
6	Limitations on work hours	6 months before fuel load
7	Feedback of design, construction, and applicable important industry and operating experience	6 months before fuel load
8	Shift supervisor administrative duties	6 months before fuel load
9	Verification of correct performance of operating activities	6 months before first license class

13.6 Physical Security

13.6.1 Preliminary Planning

The ESBWR design supports compliance with portions of 10 CFR 73 in that all vital equipment is located in vital areas to which access is monitored and controlled. Additionally, all vital areas are located within the Protected Area (PA), providing a second physical barrier and means of access control. The “defense in depth” design concepts of redundancy and physical separation of redundant systems further support the physical security of the plant in that multiple vital Structures, Systems or Components (SSC) must be compromised in order to realize effective radiological sabotage. All vital systems and components are housed within robust reinforced concrete structures that are accessed only through a minimal number of normally locked access points that are controlled and monitored by the site security system. Many of the components of vital systems are located below site grade, thereby minimizing exposure to external threats.

The ESBWR Safeguards Assessment Report (Reference 13.6-6) provides details on those SSC(s) that have been determined to require protection as vital equipment as defined in 10 CFR 73.2. This assessment is submitted under separate cover in accordance with the requirements of 10 CFR 73.21.

13.6.1.1 Site Physical Security

Site physical protection is provided through a combination of a Security Organization including armed personnel, physical barriers, controlled access to the PA, controlled access to vital areas located within the PA, and administrative policies and procedures for screening and monitoring personnel and material allowed access to the site.

13.6.1.1.1 Physical Barriers

Physical barriers for sites referencing the ESBWR standard design include the following features:

- An Isolation Zone that is covered by an intrusion detection system to detect penetration or attempted penetration of the protected area barrier and which allows observation on either side of the barrier.
- A PA surrounded by a physical barrier such as a fence. Emergency exit provisions through the PA barrier are alarmed. The PA barrier at a minimum, encloses the following structures:
    - Reactor Building
    - Control Building
    - Fuel Building
    - Turbine Building
    - Electrical Building
    - Radwaste Building

- Service Building.

- Controlled access points for passage of personnel, vehicles and materials into the PA. An access control system that identifies and verifies entering personnel are authorized to enter the protected area is provided at the controlled access points. The security force is able to detect firearms, explosives, incendiary devices, or other items which could be used to commit radiological sabotage. Detection of firearms, explosives, incendiary devices, or other items is accomplished by equipment capable of detecting these items, or through visual and physical searches, or both. Provisions for physical and visual searches of vehicles, personnel, and material, which could be used to commit radiological sabotage, are also provided.{{{ Contains Security-Related Information - Withheld Under 10 CFR Part 2.390}}}
- A vehicle barrier system (VBS), either constructed or natural terrain, sufficient to prevent forcible entry into the PA by Design Basis Threat (DBT) vehicles. The VBS will be located at the necessary stand-off distance to protect against the DBT bombs.
- Locked, controlled access portals to vital areas within the PA.
- Bullet / blast resistant barriers at certain vital areas.
- Strategically placed armored defensive positions.

13.6.1.1.2 **Vital Areas**

There are four (4) buildings within the PA that contain SSCs that are considered to be vital. The combination of the PA barrier and the vital area boundaries provide the required minimum two (2) physical barriers. The PA barrier is separate from the barriers that make up the vital area boundaries. {{{ Contains Security-Related Information - Withheld Under 10 CFR Part 2.390}}}

Access to the vital areas is via controlled access portals. Portals to vital areas that are not occupied are locked and provided with an active intrusion detection system. Attempts to gain unauthorized access (intrusion) to the vital areas are detected and alarmed at the continuously manned alarm stations (Central Alarm Station [CAS] and Secondary Alarm Station). The electronic or mechanical locks used for securing these portals are of a design that is resistant to manipulation.

In addition, the MCR and CAS are located within buildings located inside the PA and are treated as independent vital areas. {{{ Contains Security-Related Information - Withheld Under 10 CFR Part 2.390}}}

Emergency exit doors to {{{ Contains Security-Related Information - Withheld Under 10 CFR Part 2.390}}} Buildings are alarmed at the continuously manned alarm stations.

13.6.1.1.3 **Detection Aids**

Detection aids capable of detecting and alarming attempted unauthorized entry into the PA or any vital area are provided. The alarm devices are tamper indicating and self-checking, including the

transmission line to annunciators (e.g., an automatic indication is provided when failure of the alarm system or a component occurs, or when on standby power).

Security alarms are annunciated in two separate, continuously manned alarm stations, each of which is equipped with the means to perform immediate alarm assessment and provide alarm response command and control. Equipment to record onsite alarm annunciation including the location of each alarm, false alarm, alarm check, and tamper indication and the type of alarm, location, alarm circuit, date, and time is provided.

With respect to Main Control Room alarms, applicable operating alarm response procedures include steps to determine if an alarm might be an indication of unauthorized access to specific vital equipment that the ESBWR Safeguards Assessment Report (Reference 13.6-6) and the plant security strategy have identified as being particularly important. These alarm response procedures include a step to notify the appropriate plant personnel of such an alarm for further investigation. Operating alarm response procedures will be developed and implemented in accordance with milestone defined in Subsection 13.5.2.1.

Security alarm response procedures include steps for responding to unexpected indication of the opening or attempted opening of the rooms or cabinets listed in Table 4-1 of the ESBWR Safeguards Assessment Report (Reference 13.6-6). This action will be completed prior to the milestone for Physical Security Plan implementation (Table 13.4-201).

13.6.1.1.4 **Communications**

Communications systems are provided enabling continuous communication between the continuously manned alarm stations, on-duty guard force personnel, and the MCR. Additional conventional communications provide communication between the continuously manned alarm stations and local law enforcement agencies.

13.6.1.1.5 **Access Controls**

Means to control access of personnel, vehicles and materials into the PA are provided. Access control measures ensure the positive identification and authorization of personnel and search of personnel, vehicles and materials prior to entry. This includes the use of numbered picture badges.

Additional controls, limit access to vital areas to authorized personnel only.

A key control program will be developed and implemented prior to the milestone for Physical Security Plan implementation (Table 13.4-201). The following categories of keys are included in the key control program:

1. Keys required to provide plant personnel ingress to vital areas in the event of an emergency.
2. Keys required to access vital areas or cabinets which are identified in the ESBWR Safeguards Assessment Report (Reference 13.6-6) as needing additional protection against unauthorized access as part of the overall security strategy.

Administrative procedures control work being performed in cabinets containing the control circuitry (contact elements) on the systems listed in Table 4-1 of Reference 13.6-6. These administrative procedures will require either:

1. Two persons, each of whom are qualified to perform the intended work, be present during the performance of any work in the specified cabinets; or
2. A comprehensive surveillance of the logic circuits contained in the cabinet, which would include the exercise of the individual contacts in the circuit.

Administrative procedures will be developed prior to the milestone for Physical Security Plan implementation (Table 13.4-201) to control work being performed in cabinets containing the control circuitry (contact elements) for the systems listed in Table 4-1 of NEDE-33391 (Reference 13.6-6).

Administrative procedures require two persons, each of whom are qualified to perform the intended work, be present during the performance of any work on the systems listed in Table 4-1 of Reference 13.6-6. Administrative procedures will be developed prior to the milestone for Physical Security Plan implementation (Table 13.4-201) that will require two persons, each of whom are qualified to perform the intended work, to be present during the performance of any work on systems listed in Table 4-1 of NEDE-33391.

13.6.1.1.6 **Security Lighting**

All outdoor areas within the PA and isolation zones are provided with lighting providing sufficient illumination to permit observation of abnormal presence or activity of persons or vehicles. The design will comply with the lighting levels with a minimum illumination level of 0.2 foot candles measured horizontally at ground level as required by 10 CFR 73.55(i)(6) or alternate low light technologies permitted under the provisions of 10 CFR 73.55(i)(6). The guidance provided in IEEE-692 (Reference 13.6-5) will be used as appropriate to the security requirements.

13.6.1.1.7 **Security Power Supply**

Site security systems are powered from a reliable power supply meeting the requirements of IEEE-692 (Reference 13.6-5). {{{ Contains Security-Related Information - Withheld Under 10 CFR Part 2.390}}}

13.6.1.1.8 **Testing**

Surveillance test procedures and frequencies are established for portions of Safety-Related Distributed Control and Information System (Q-DCIS) controlling specific vital equipment that the ESBWR Safeguards Assessment Report (Reference 13.6-6) and the plant security strategy have identified as being particularly important. These surveillance test procedures and frequencies include both the frequencies needed for self-check of the Q-DCIS as well as less frequent but more comprehensive surveillance tests. The establishment of these surveillance test procedures and

frequencies will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201).

Other testing and maintenance procedures are established for security systems, including physical barriers. The establishment of these testing and maintenance milestones will be completed in accordance with the milestone for Physical Security Plan implementation (Table 13.4-201).

13.6.2 **Security Plan**

The Security Plans consist of the Physical Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Cyber Security Plan. The Security Plans are submitted to the Nuclear Regulatory Commission as separate licensing documents in order to fulfill the requirements of 10 CFR 52.79(a)(35) and (36). The Security Plans meet the requirements contained in 10 CFR 26 and 10 CFR 73 and will be maintained in accordance with the requirements of 10 CFR 52.98. Implementation of the Security Program required by 10 CFR 73.55(a)(4) meets the requirements for physical protection of Special Nuclear Material of low strategic significance as required by 10 CFR 73.67(f). The Security Plans, except for the Cyber Security Plan, are categorized as Security Safeguards Information and are withheld from public disclosure pursuant to 10 CFR 73.21. The Cyber Security Plan is categorized as Security-Related Information and is withheld from public disclosure pursuant to 10 CFR 2.390.

As part of the Security Plan, the licensee will develop an integrated response strategy to a confirmed security event that provides for manual actuation of plant systems by the operators to an evolving scenario necessitating escalating operator response. This action will be completed prior to the milestone for Physical Security Plan implementation (Table 13.4-201).

The design of the security system precludes any single postulated security event resulting in an unacceptable degradation of the site security staff's ability to monitor and direct the response to a security event from either the CAS or Secondary Alarm Station.

A description of the design of the CAS and Secondary Alarm Station (SAS) and analysis of single act security events is contained in Appendix 8C of Part 8.

- A site arrangement drawing that shows the location of the external Bullet Resisting Enclosures and indicates the fields of fire from these locations is provided in the Physical Security Plan.
- A description of the level of protection provided to security personnel stationed in Bullet Resisting Enclosures (BREs) from the effects of the equipment available to the adversaries utilizing the Design Basis Threat (DBT) toolkit (defined in Reference 13.6-8) is contained in the Physical Security Plan.
- A site arrangement drawing that shows the location of the Protected Area (PA) fence, the isolation zone on either side of the PA fence, the Vehicle Barrier System (VBS), any Red Zone or Delay Fences, and any buildings or structures inside the PA that are not part of the Certified Design is provided in the Physical Security Plan.

- Prior to the milestone for Physical Security Plan implementation (Table 13.4-201), a demonstration that the security strategy described in the ESBWR Safeguards Assessment Report (Reference 13.6-6) remains valid will be conducted.

Prior to the milestone for Physical Security Plan implementation (Table 13.4-201), the security plan will be updated with an analysis to determine if armed responders require ammunition greater than the amount normally carried to provide reasonable assurance of successful engagement of adversaries from various engagement positions, including the development of necessary procedures to assure adequate ammunition is available.

Prior to the milestone for Physical Security Plan implementation (Table 13.4-201), the security plan will be updated with an analysis of the ESBWR Safeguards Assessment Report (Reference 13.6-6) reflecting site-specific locations of engagement positions including fields of fire. This applies for the external Bullet Resisting Enclosures as well as any internal positions that have external engagement responsibilities. This will include an implementation analysis of the Security Strategy described in the report, focusing on the effectiveness of neutralization of adversaries before significant radiological sabotage can occur.

Features of the physical security system are covered, in part, by the standard ESBWR design, while other features are plant and site specific. Accordingly, the ESBWR standard ITAAC cover the physical plant security system and address those features that are part of the standard design. NRC guidance provides suggested ITAAC that cover both the standard design and the plant and site specific features. The plant and site-specific Physical Security ITAAC not covered by the ESBWR Tier 1, Section 2.19, are contained in Part 10, "ITAAC", Section 2.2.1 "Site-Specific Physical Security ITAAC."

[START COM 13.6-002] Administrative procedures have been implemented that meet the requirements of 10 CFR 73.58 for managing the safety/security interface. **[END COM 13.6-002]**These procedures are in effect at the time of issuance of the combined license and were developed using NRC endorsed industry guidance.

13.6.3 COL Information

13.6-1-A **(Deleted)**

13.6-2-A **(Deleted)**

13.6-3-A **(Deleted)**

13.6-4-A **(Deleted)**

13.6-5-A **(Deleted)**

13.6-6-A **Key Control**

This COL item is addressed in Subsection 13.6.1.1.5.

13.6-7-A **Redundancy and Equivalency of the CAS and Secondary Alarm Station**

This COL item is addressed in the Physical Security Plan.

13.6-8-A **No Single Act Requirement for CAS and Secondary Alarm Station**

This COL item is addressed in Subsection 13.6.2.

13.6-9-A **Operational Alarm Response Procedures**

This COL item is addressed in Subsection 13.6.1.1.3.

13.6-10-A **Operational Surveillance Test Procedures**

This COL item is addressed in Subsection 13.6.1.1.8.

13.6-11-A **Maintenance Test Procedures**

This COL item is addressed in Subsection 13.6.1.1.8.

13.6-12-A **Operational Response Procedures to Security Events**

This COL item is addressed in Subsection 13.6.2.

13.6-13-A **Operational Alarm Response Procedures**

This COL item is addressed in Subsection 13.6.1.1.3.

13.6-14-A **Administrative Controls to Sensitive Cabinets**

This COL item is addressed in Subsection 13.6.1.1.5.

13.6-15-A **Administrative Controls to Sensitive Equipment**

This COL item is addressed in Subsection 13.6.1.1.5.

13.6-16-A **External Bullet Resisting Enclosures**

This COL item is addressed in Subsection 13.6.2.

13.6-17-A **Site-Specific Locations of Security Barriers**

This COL item is addressed in Subsection 13.6.2.

13.6-18-A **Ammunition for Armed Responders**

This COL item is addressed in Subsection 13.6.2.

13.6-19-A **Site-Specific Update of the ESBWR Safeguards Assessment Report**

This COL item is addressed in Subsection 13.6.2.

13.6-20-A **Physical Security ITAAC**

This COL item is addressed in Subsection 13.6.2.

13.6.4 References

13.6-1 10 CFR 73, “Physical Protection of Plants and Materials.”

13.6-2 10 CFR 11, “Criteria and Procedures for Determining Eligibility for Access to or Control Over Special Nuclear Material.”

13.6-3 10 CFR 26, “Fitness for Duty Programs.”

13.6-4 10 CFR 75, “Safeguards On Nuclear Material--Implementation of US/IAEA Agreement.”

13.6-5 IEEE 692-1997, “Standard Criteria for Security Systems for Nuclear Power Generating Stations.”

13.6-6 GE Hitachi Nuclear Energy, “ESBWR Safeguards Assessment Report,” NEDE-33391, Revision 3, March 2010, Safeguards Information.

13.6-7 Underwriters Laboratories, Underwriter Laboratories Standard Number 752 (UL 752), “Standard for Bullet-Resisting Equipment,” 11th Edition, 2005 (with revisions up to and including December 21, 2006).

13.6-8 Regulatory Guide 5.69, “Guidance for the Application of the Radiological Sabotage Design-Basis Threat in the Design, Development, and Implementation of a Physical Security Program that meets 10 CFR 73.55 Requirements,” August 2007.

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 phase FFD program and an operating phase FFD program. The construction and operating phase programs are implemented as identified in Table 13.4-201.

The construction phase FFD program is consistent with NEI 06-06 (Reference 13.7-201). 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 operating phase FFD program that meets the requirements of 10 CFR Part 26, Subparts A through H, N, and O. Following the receipt of special nuclear material onsite in the form of fuel assemblies, security personnel as described in 10 CFR 26.4(a)(5) will meet the requirements of an operating phase FFD program. **[START COM 13.7-001]** Prior to the issuance of a Combined License for Fermi 3, Detroit Edison will review and revise, as necessary, the Fermi 3 construction phase FFD program, should substantial revisions occur to either NEI 06-06 following NRC endorsement, or to the requirements of 10 CFR Part 26 **[END COM 13.7-001].**

The following site-specific information is provided:

- The construction site area will be defined in the Construction Security Plan and will be under the control of the Engineering, Procurement and Construction (EPC) Contractor. The 10 CFR Part 26 requirements will be implemented for the construction site area based on the descriptions provided in Table 13.4-201.
- Construction Workers & First Line Supervisors (EPC Contractor employees and subcontractors) are covered by a Detroit Edison approved EPC Contractor FFD Program (elements Subpart K).
- Detroit Edison employees and Detroit Edison subcontractor's construction management and oversight personnel are covered by a Detroit Edison Operations FFD Program and EPC Contractor employees and subcontractors, construction management, and oversight personnel will be covered by a Detroit Edison approved EPC Contractor FFD Program (elements Subpart A through H, N and O).
- Detroit Edison security personnel are covered by a Detroit Edison Operations FFD Program and the EPC Contractor security personnel are covered by a Detroit Edison approved EPC Contractor FFD Program (elements Subpart A through H, N and O). This coverage is applicable from the start of construction activities to the earlier of (1) the receipt of Special Nuclear Material (SNM) in the form of fuel assemblies, or (2) the establishment of a Protected Area (PA), or (3) the 10 CFR 52.103(g) finding.

- Detroit Edison FFD Program personnel are covered by a Detroit Edison Operations FFD Program and the EPC Contractor's FFD Program personnel will be covered by a Detroit Edison approved EPC Contractor FFD Program (elements Subpart A through H, 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 Detroit Edison Operations FFD Program.

The operations phase FFD program is consistent with all applicable subparts of 10 CFR Part 26.

References

13.7-201 Nuclear Energy Institute (NEI) "Fitness for Duty Program Guidance for New Nuclear Power Plant Construction Sites," NEI 06-06.

Appendix 13AA Design and Construction Responsibilities

13AA.1 Design and Construction Activities

Detroit Edison has substantial experience in the design, construction, and operation of nuclear power plants and substantial experience in activities of similar scope and complexity. Detroit Edison was responsible for the design and construction activities associated with Fermi 2. Detroit Edison oversaw the activities of a number of engineering, design and construction companies, including General Electric Company, Sargent & Lundy, Stone & Webster, Parsons Company and Daniels Construction Company.

In addition, Detroit Edison has been responsible for the design, construction, and operation of several large fossil stations, activities of similar scope and complexity. With an 11,000 megawatt system capacity, the company has been associated with the construction and generation of power facilities such as coal, nuclear, natural gas and hydroelectric pumped storage. An example is the Belle River coal facility which generates in excess of 1000 MW.

Detroit Edison's management, engineering, and technical support organization for the construction and operation of Fermi 3 are described in Chapter 17 and Chapter 13, respectively. As described in Subsection 1.4.1, Detroit Edison has selected General Electric Hitachi (GEH) as the reactor technology vendor for the design of Fermi 3. The EPC contractor responsible for site engineering, and construction of the nuclear and turbine islands, has not yet been selected.

Other design and construction activities will be contracted to qualified suppliers of such services. Implementation or delegation of design and construction responsibilities is described in the sections below. Quality Assurance aspects are described in Chapter 17.

13AA.1.1 Principal Site-Related Engineering Work

The principal site engineering activities accomplished towards the construction and operation of the plant are:

Meteorology

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

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 safety of the plant. Items of interest include geologic structure, seismicity, geological history, and ground water conditions. The excavation for safety-related structures are geologically mapped and photographed by experienced geologists. Unforeseen geologic features that are encountered are evaluated. Section 2.5 provides details of these investigations.

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.

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.

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.

Environmental Effects

Monitoring programs are developed to enable the collection of data necessary to determine possible impact on the environment due to construction, startup, and operational activities and to establish a baseline from which to evaluate future environmental monitoring. This program is described in the separately submitted Environmental Report.

13AA.1.2 Design of Plant and Ancillary Systems

Design and construction of systems outside the power block such as circulating water, service water, switchyard, and secondary fire protection systems are performed by Detroit Edison or qualified contractors, as assigned.

13AA.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 Chapter 17. 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 A/E within the EPC organization for review. As systems are tested and approved for turnover and operation, control of design is turned over to the Operating Organization (see Subsection 13.1.2) or Technical Support (see Subsection 13.1.1.2). The Engineering Director (see Subsection 13.1.2.1.1.3), 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 Chapter 17. Design control becomes the responsibility of the Engineering Director prior to loading fuel. During construction, startup, and operation, changes to human-system interfaces of control room design are approved using a Human Factors Engineering evaluation addressed within Chapter 18. See Figure 13.1-201, Construction Organization, Subsection 13AA.1.9, Subsection 13AA.2.2, and the QAPD (incorporated into Section 17.5) for reporting relationships.

13AA.1.4 Environmental Effects

Impact to the surrounding environment from construction and operating activities is fully addressed in the separately submitted Environmental Report.

13AA.1.5 Security Provisions

The Physical Security Plan is designed with provisions that meet the applicable NRC regulations. See Section 13.6 and the Security Plan, which was submitted under separate transmittal.

13AA.1.6 Development of Safety Analysis Reports

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

13AA.1.7 Review and Approval of Material and Component Specifications

Safety-related material and component specifications of SSCs designed by the reactor technology vendor are reviewed and approved in accordance with the reactor technology vendor quality assurance program and Section 17.1. Review and approval of items not designed by the reactor technology vendor are controlled for review and approval by Section 17.5 and the QAPD (incorporated into Section 17.5).

13AA.1.8 Procurement of Materials and Equipment

Procurement of materials during the construction phase is the responsibility of the reactor technology vendor and the EPC organization. The process is controlled by the construction QA

programs of these organizations. Oversight of the inspection and receipt of materials process is the responsibility of the Fermi 3 Quality Assurance Project Manager (Appendix 17AA).

13AA.1.9 Management and Review of Construction Activities

Overall management and responsibility for construction activities is assigned to the site executive. The site executive is accountable to the Executive VP, Major Enterprise Projects. See Figure 13.1-201, Construction Organization.

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 the contractors are in compliance with contractual obligations for quality, schedule, and cost. To maintain independence from the construction organization, the oversight organization has functional access to the Senior VP, Major Enterprise Projects.

Monitoring and review of construction activities is divided functionally across the various disciplines of the Major Enterprise Projects, i.e. electrical, mechanical, instrument and control, etc., and tracked by schedule based on system and major plant components/areas.

Fermi 3 Site Executive and the Fermi 2 Site Executive have reporting responsibilities to the Sr. VP / CNO as shown on Figure 13.1-201, “Design and Construction Organization.” Fermi 2 and Fermi 3 organizations coordinate construction plans and Fermi 2 impact assessments. Communications and interactions ensure organizational coordination and authorization for construction activities with potential Fermi 2 impacts as needed, as well as implementation plans for mitigation controls identified. Periodic assessment involving both the Fermi 3 and Fermi 2 organizations identify Fermi 2 SSCs that could reasonably be expected to be impacted by scheduled construction activities. Appropriate administrative and managerial controls are then established as necessary. Assessments are performed to facilitate an implementation schedule for the administrative and managerial controls which corresponds with scheduled construction activities. Specific hazards, impacted SSCs, and managerial and administrative controls are reviewed on a recurring basis and, if necessary, controls are developed, revised, implemented, and maintained current as work progresses on the Fermi 3 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.

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

13AA.2 Preoperational Activities

This section describes 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, test procedure development, fuel load, integrated startup testing, and turnover of systems to operating and technical support staff.

The plant manager, with the aid of those managers that report to the plant manager (see), the technical support staff (see Figure 13.1-205), and the aid of the manager in charge of the Startup group (see Figure 14AA-201), is responsible for the activities related to the transition from the construction phase to the operational phase. These activities include preoperational testing, schedule management, procedure development for tests, fuel load, integrated startup testing, and turnover of systems to the operations staff.

During construction initial testing, the Engineering, Procurement and Construction (EPC) contractor is responsible for equipment maintenance. To ensure equipment operability and reliability, plant maintenance programs such as preventative and corrective maintenance are developed prior to system turnover and become effective as each systemis turned over from the EPC contractor to the operating and technical staff with approved administrative procedures under the direction of the manager in charge of maintenance, the Engineering Director, and work control.

13AA.2.1 Development of Human Factors Engineering Design Objectives and Design Phase Review of Proposed Control Room Layouts

Human Factors Engineering (HFE) design objectives are initially developed by the reactor technology vendor in accordance with Chapter 18. As a collaborative team, personnel from the reactor technology vendor design staff and personnel, including licensed operators, engineers, and instrumentation and control technicians from owner and other organizations in the nuclear industry, assess the design of the control room and man-machine interfaces to attain safe and efficient operation of the plant. See Section 18.2 for additional details of HFE program management.

Modifications to the certified design of the control room or man-machine interface described in the UFSAR are reviewed per engineering procedures, as required by Section 18.2, to evaluate the impact to plant safety. The Engineering Director is responsible for the HFE design process and for the design commitment to HFE during construction and throughout the life of the plant. The HFE program is established in accordance with the description and commitments in Chapter 18.

13AA.2.2 Preoperational and Startup Testing

Functional managers reporting to the plant manager are assigned responsibility for organizing and developing the preoperational testing and startup testing organizations. These organizations prepare procedures and schedules and conduct preoperational and startup testing necessary to transition the unit from the construction phase to the operational phase. The preoperational and startup testing organizations are staffed by testing engineers, procedure writers, and

planner/schedulers. The qualification requirements of testing engineers in the preoperational and startup testing organizations meet those established in ANSI/ANS-3.1 (Reference 13.1-201).

Test engineers are responsible for integrated testing of systems to prove functionality of system design requirements. They provide guidance and supervision to procedure writers and communicate closely with operations personnel and other supporting staff to facilitate safe and efficient performance of preoperational and startup tests. The scope of testing to be accomplished is presented in Chapter 14. As systems are turned over from the constructor they are tested by component then by integrated system preoperational test. 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. The startup test program provides data and experience useful during the operational phase.

During the preoperational and startup testing phases, the constructor and reactor technology vendor staff support, as necessary, the testing performed by the nuclear plant preoperational and startup testing staffs. The functional managers in charge of preoperational and startup testing are assisted by other station organizations including operations, plant maintenance, and engineering. These assisting organizations provide support in developing test procedures, conducting the test program, and in reviewing test results.

Procedures are written to describe organizational responsibilities and interfaces between staff, constructor, and reactor technology vendor, and to establish direction in writing, reviewing, and performing tests. The construction organization, depicted in Figure 13.1-201, includes the preoperational and startup testing functional groups.

13AA.2.3 Development and Implementation of Staff Recruiting and Training Programs

Staffing plans are developed with input from the reactor technology vendor for safe operation of the plant as determined by HFE. See Section 18.6. These plans are developed under the direction and guidance of the Senior Vice President, Major Enterprise Projects.**[START COM 13AA-001]** Staffing plans will be completed and manager level positions 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 13.1-202 for hiring and training requirements for operator and technical staff relative to fuel load. **[END COM 13AA-001]**

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. Table 13.1-201 includes the initial estimated number of staff for selected positions that will be filled at the time of initial fuel load. 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.2.4 Transition to Operating Phase

The Senior Vice President, Major Enterprise Projects is responsible for developing and implementing a plan for the organizational transition from the construction phase to the operating phase. The plan is fully ilmplemented and transition completed prior to commencement of commercial operations with operational responsibility then fully under the direction of the Fermi 3 Site Executive (see Appendix 17AA).

As the construction of systems, or portions thereof, are completed, control and authority, including oversight, configuration and operations, is transferred from the contractor to the cognizant department in the site organization (see Subsection 13AA.2).

During the transition, responsibilities will be clearly defined in instructions and procedures to ensure appropriate authority is maintained for each system, structure and component.

It is anticipated that even after fuel load, construction activities will be ongoing. Those positions required to support these activities will retain their applicable construction or preoperational responsibilities until it is deemed that they are no longer necessary.

Appendix 13BB Training Program

NEI 06-13A (Reference 13BB-201), Technical Report on a Template for an Industry Training Program Description, is incorporated by reference.

13.BB References

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

Appendix 13CC Special Nuclear Material (SNM) Control and Accounting Program Description

13CC.1 Scope

The Special Nuclear Material (SNM) Material Control and Accounting Program establishes guidelines concerning control of and accounting for SNM at the Detroit Edison Company (DTE) Fermi Unit 3.

The criteria prescribed in the SNM Material Control and Accounting Program are applicable to SNM and various material mixtures containing SNM. Generally, the SNM involved is plutonium, ^{233}U or uranium enriched in the isotope ^{235}U. The 235U content will vary depending on various reactor parameters. SNM is typically in the form of pellets encapsulated in fuel rods. Criteria are established for the SNM control and accounting system, including criteria for the receipt, internal control, physical inventory, and shipment of SNM.

In addition to the information provided in this program description, the following Fermi Unit 3 licensing basis documents provide the regulatory basis that describes how the applicable requirements for material control and accounting under 10 CFR 74 will be met:

- Information related to amounts of SNM as reactor fuel required for reactor operation is provided in UFSAR Section 4.1.
- Information related to storage of SNM as reactor fuel is provided in UFSAR Section 9.1.
- Information related to the organizational structure of the COL Holder, including those responsible for SNM material control and accounting, is provided in UFSAR Section 13.1.
- Information related to training of personnel, including those responsible for SNM material control and accounting, is provided in UFSAR Section Section 13.2.
- Information related to implementation of this SNM MC&A Program is provided in UFSAR Table 13.4-201.
- Information related to plant procedures, including those used to control special nuclear material, is provided in UFSAR Section 13.5.

13CC.2 Definitions

In this program description, the following definitions shall apply:

13CC.2.1 Book Inventory (inventory of record)

A master database or listing of all SNM currently possessed, reflecting the input of all material control records.

13CC.2.2 Dry Storage Canister

The smallest structurally discrete item containing fuel assemblies or fuel components, which is stored on an ISFSI pad within the area controlled by the owner.

13CC.2.3 Fuel Assembly

The grouping of fuel components combined as an integral unit for use in a nuclear reactor.

13CC.2.4 Fuel Component

The smallest structurally discrete part of a fuel assembly that contains SNM. This is normally a fuel rod for intact components, but includes rod fragments, or pellets (or significant fraction thereof) if the rod structural integrity is not maintained.

13CC.2.5 Fuel Component Container

A container that provides protection to fuel components comparable to that afforded by an intact fuel assembly and that is held to the same accounting standards as a fuel assembly, in that the container has the following attributes:

- The container is specifically designed to contain rods/rod fragments.
- The container is stored in the fuel storage racks or as authorized in dry fuel storage containers.
- The use of specialized handling tools and equipment is required to access the SNM stored in the container.

13CC.2.6 Independent Spent Fuel Storage Installation (ISFSI)

A complex designed and constructed for dry interim storage of spent nuclear fuel.

13CC.2.7 Item

Fuel assembly, fuel component container, non-fuel SNM container, sealed container, reassembled reactor vessel, dry storage canister, or a discrete piece of SNM (fuel or non-fuel) that is not stored in a container.

13CC.2.8 Item Control Area (ICA)

A defined area within the owner controlled area for which the SNM (fuel assemblies, fuel components, or non-fuel SNM) is maintained in such a way that, at any time, an item count and related SNM quantities can be obtained from the records for the SNM located within the area. ICAs have defined physical boundaries; these generally comprise fresh and irradiated fuel storage areas, including ISFSIs, reactor vessels, spent fuel pools, and non-fuel SNM storage areas.

13CC.2.9 Item Count (piece count)

Visual verification that an item is in the location documented in the material control records. Verification of an item's identification number is not necessary for a piece count.

13CC.2.10 Material Control Records

Records of SNM receipt, internal transfer, reconstitution, acquisition, inventory, and shipment (including disposal).

13CC.2.11 Non-Fuel SNM

Items containing SNM that are not intended for use as fuel, e.g., fission detectors.

13CC.2.12 Non-Fuel SNM Container

A container used to store non-fuel SNM items, which has the following attributes:

- The container is specifically designed or evaluated for storage of SNM.
- The container is stored in an area with controlled access.
- The use of specialized handling tools and equipment is required to access the SNM stored in the container.

13CC.2.13 Physical Inventory

Determination on a measured basis of the quantity of SNM on hand at a given time; a complete check of all material on hand. The methods of physical inventory and associated measurements will vary depending on the material to be inventoried and the process involved. The typical physical inventory at a power reactor plant consists of an item count (piece count) of SNM in each ICA.

13CC.2.14 Sealed Container

Container storing SNM that has been sealed with a tamper-safing device or other mechanical means, e.g., welding.

13CC.2.15 Special Nuclear Material (SNM)

Plutonium, uranium-233, uranium enriched in the isotope ^{233}U or in the isotope ^{235}U, and any other material which the Nuclear Regulatory Commission (NRC), pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, determines to be SNM.

13CC.2.16 Tamper-Safing

The use of a device on a container in a manner and at a time that ensures a clear indication of any violation of the integrity of the contents of the container.

13CC.3 Organizational Requirements

13CC.3.1 Delegation of Responsibilities and Authority

Material control functional and organizational relationships are set forth in writing in organizational directives, instructions, procedures, manuals, and other documents. Documentation includes position qualification requirements and definitions of authority, responsibilities, and duties. The assignment of SNM material control and accounting functions is such that the activities of one

person or unit serve as a control over and a check of the activities of other persons or units. Activities involving handling, accounting, or control of SNM are verified by a second person. Specific assignments of responsibilities are prescribed for all facets of the SNM control system. Delegation of material control responsibilities and authority are in writing. Material control functions are assigned in accordance with 3.1.1 through 3.1.3.

Titles assigned to the positions are intended to be descriptive only. Organizations, specific titles, and related functions may vary.

13CC.3.1.1 Site VP

The site VP has overall physical control and physical inventory responsibilities for SNM at the plant site.

13CC.3.1.2 Plant Manager

The plant manager has overall responsibility for implementation of the SNM control and accounting function.

13CC.3.1.3 SNM Custodian

The SNM custodian is responsible for the performance of the functions that relate to the control of SNM.

13CC.3.2 Experience or Training

Personnel responsible for SNM control and accounting have experience or training applicable to their functions.

13CC.3.3 Accounting Group

The SNM accounting group maintains records for the SNM in the plant's possession as required in 10 CFR 74.19(b).

13CC.3.4 Vendor/Contractor Oversight

A program is established to provide adequate oversight of vendors/contractors conducting activities involving handling, accounting, and control of SNM.

13CC.4 Material Control and Accounting Program

13CC.4.1 Procedures

Written procedures are prepared and maintained covering the SNM control and accounting system, as required in 10 CFR 74.19(b). These procedures shall address, as a minimum, the following topics:

1. Organization and personnel responsibilities and authorities.
2. Designation and description of ICAs.

3. Material control records and reporting.
4. Notification for events concerning SNM.
5. Receiving and shipping SNM.
6. Internal transfer of SNM.
7. Physical inventory of SNM.
8. SNM element and isotopic calculation method.
9. Characterization and identification of items as SNM or non-SNM to preclude loss of control of SNM items.

13CC.4.2 Configuration Control

Provisions are made for written approval of revisions to the contents of the SNM material control and accounting procedures by the appropriate plant personnel, such as the plant manager.

13CC.4.3 Corrective Action Program

Discrepancies or program deficiencies are documented, investigated, reported, as required in 10 CFR 74.11 and 10 CFR 20.2201, and resolved using the plant corrective action program.

13CC.5 Input Control

13CC.5.1 Review of Fuel Supplier's Values

Nuclear Fuel Services reviews the adequacy of the fuel supplier's material control and accounting system used in establishing the quantities and assays of SNM. In the event of a significant discrepancy between the fuel supplier's values for SNM quantities and assays and those determined by DTE, the cause of such discrepancies are investigated with the fuel supplier and the differences are resolved and reconciled expeditiously.

13CC.5.2 Receipt of SNM

For SNM received at the plant site, DTE:

1. Contacts the shipping vendor in the event the SNM does not arrive as scheduled; initiates an investigation and resolves, as required in 10 CFR 73.67 and 10 CFR 74.11.
2. Verifies the integrity of the shipping container and tamper-safing devices and resolves any problems identified, as required in 10 CFR 73.67 and 10 CFR 74.11.
3. Verifies that the quantity (item count) and unique identification numbers are in agreement with those indicated on the shipper's documents.
4. Takes appropriate steps to resolve and reconcile any differences in quantities or identification numbers, as required in 10 CFR 73.67 and 10 CFR 74.11.
5. Notifies the regulatory body, as required in 10 CFR 73.67 and 10 CFR 74.11.

13CC.5.3 Documentation

The SNM custodian reports the receipt of each item containing SNM, by serial number or other unique identifier, to the accounting group. The receipt of SNM is documented in the material control records and the book inventory updated for the applicable ICA, as required in 10 CFR 74.19(a). A Nuclear Material Transaction Report is completed, as required in 10 CFR 74.15.

13CC.6 Internal Control

13CC.6.1 Unit of Control

Units of SNM that require control are the items defined in paragraph 2.7. Each of these units are identified in the material control records by its serial number or other unique identifier (e.g., a physical description of the item) and location, as required in 10 CFR 74.19(a).

13CC.6.2 Item Control Areas

ICAs are established for physical and administrative control of SNM. The number of ICAs is sufficient to establish control.

13CC.6.3 Internal Transfers

Transfers of SNM into, out of, or within an ICA are accomplished only upon written authorization of the SNM custodian or other individual(s) at the plant site responsible for the SNM program. Written authorization is obtained prior to the movement. All transfers of SNM are documented using a material control record by the responsible person involved in each operation, and the book inventory is updated for the applicable ICA.

13CC.6.4 Non-SNM Items

Non-SNM items stored with items containing SNM are clearly identified as such to preclude SNM items from being mistaken for non-SNM items.

13CC.6.5 Sealed Containers

A container with a tamper-safing device can be treated as a single item for inventory purposes; however, before the container is closed and the tamper-safing device is installed, the contents are physically inventoried. If the contents of a sealed container are accessed, the contents will be physically reinventoried or administrative procedures will be in place to establish the integrity of the contents before it can be treated as a single item for inventory purposes.

13CC.6.6 Damaged Cladding

Severe damage to cladding, where rod structural integrity has not been maintained, has the potential to result in inadvertent physical separation and dispersal of fuel components from the fuel rod. Upon visual identification of inadvertent physical separation, an estimate of the SNM quantity and an engineering judgment concerning the origin of the SNM will be made and documented. The

amount of irretrievable or inadvertent loss will be reported, if the quantity is reportable, as required in 10 CFR 74.13. Methods used to estimate SNM quantities include, for example, engineering calculation, engineering judgment, physical measurement of length, destructive or non-destructive measurement, and count of the number of pellets retrieved or missing.

13CC.7 Physical Inventory

13CC.7.1 Conduct

Physical inventory is taken at intervals not to exceed 12 months, as required in 10 CFR 74.19(c). Physical inventory is conducted according to written inventory procedures, as required in 10 CFR 74.19(b).

13CC.7.2 Coverage

Physical inventory includes all SNM possessed under license and is conducted in all ICAs, including:

1. New fuel storage areas
2. Irradiated fuel storage areas
3. Reactors
4. ISFSIs
5. Areas containing non-fuel SNM

13CC.7.3 Inventory Method

An item count is conducted of all SNM, as required in 10 CFR 74.19(c).

13CC.7.3.1 Assemblies and Fuel Component Containers

For fuel assemblies and fuel component containers, an item count is sufficient. If the contents of an assembly or a fuel component container are accessed, the contents are physically reinventoried before the assembly or container can be treated as a single item for inventory purposes.

13CC.7.3.2 Fuel Components

For fuel components that are not part of an intact assembly, physically captured in an assembly, stored in a sealed container, or stored in a fuel component container, each component is inventoried.

13CC.7.3.3 Sealed Containers

For sealed containers, verification of the integrity of the tamper-safing device is sufficient.

13CC.7.3.4 Reactor

Whenever fuel assemblies are loaded into a reactor, the unique identifier and location of each item is visually verified. When the reactor vessel is reassembled, the reactor is considered one item for inventory purposes.

13CC.7.3.5 Non-Fuel SNM

For non-fuel SNM, the method of physical inventory depends on the method of storage and use:

- For installed components, verification is performed at the time of installation, and administrative procedures and controls are established so that records concerning the location and unique identity are accurate.
- For non-installed components stored in primary containment, administrative procedures and controls are established so that records concerning the location and unique identity are accurate when the reactor is at power, and verification is performed during refueling outages.
- For non-fuel SNM containers, item count of the containers is sufficient. If the contents of the container are accessed, the contents are physically re-inventoried or administrative procedures are in place to ensure the integrity of the contents before the container can be treated as a single item for inventory purposes.

13CC.7.4 Reconciliation and Resolution

The physical inventory is reconciled to the book inventory. Discrepancies between the physical inventory and the book inventory are investigated and addressed expeditiously. The book inventory shall be adjusted to agree with the result of the physical inventory.

13CC.7.5 Documentation

The results of the physical inventory of SNM are documented in the material control records of the applicable ICA and utilized as input to the isotopic calculations. A Material Balance Report and Physical Inventory Listing Report are completed, as required in 10 CFR 74.13.

13CC.8 SNM Calculations

13CC.8.1 Element and Isotopic Computations

Methods of computation are established and utilized for determining the total element and isotopic composition of SNM in irradiated nuclear fuel assemblies and fuel components. The computed values are the basis for shipment documents, as required in 10 CFR 74.15, and material status reports, as required in 10 CFR 74.13.

13CC.8.2 Analysis of Results

Refinement of the element and isotopic computations used in determining the SNM content of irradiated fuel are considered as new technologies evolve. For reprocessed fuel, this may include a

collection and comparison of reprocessing plant measurement data with computed data for fuel assemblies.

13CC.9 Output Control

13CC.9.1 Shipment

Procedures are established, as required by 10 CFR 74.19(b), to provide for:

1. Verification and recording of the serial number or unique identifier of each item containing SNM.
2. Recording of the quantities of SNM contained in each item.
3. Reporting the quantity of SNM shipped, if the quantity is reportable, as required in 10 CFR 74.15.
4. Verification of compliance with regulations, including licensing, transportation, and security requirements for shipment.
5. Reporting the completion of each shipment to the accounting group.

Care is taken to assure that SNM contained in fuel is not shipped inadvertently with shipments of' nonfuel SNM waste.

13CC.9.2 Documentation

The shipment of fuel assemblies, fuel components, or non-fuel SNM is documented in the material control records and the book inventory updated for the applicable ICA. Nuclear Material Transaction Reports are completed, as required in 10 CFR 74.15.

13CC.9.3 Review and Audit of Reprocessing (Recycling) Measurements

For SNM being reprocessed, DTE or its representative:

1. Reviews the adequacy of the reprocessor's material control system used in establishing the quantities and assays of SNM, including written procedures.
2. Audits the implementation of the reprocessor's material control system used in establishing the quantities and assays of SNM, including observation of measurement and material control activities.
3. Audits the reprocessor's accounting activities, measurements, analyses, computations, and records affecting the determination of SNM quantities and assays.
4. In the event of a significant discrepancy between the reprocessor's values for SNM quantities and assays and those determined by audit, investigates and reconciles any differences expeditiously.

13CC.10 Records and Reports

Records are created and retained, as required in 10 CFR 74.19(a). The accounting records are the basis for the material control and accounting program. Quantitative data generated by DTE's calculations of changes in quantities and isotopic composition due to irradiation and decay are recorded and reported in accordance with DTE's standard recording and reporting procedures. The records and reports system include:

1. An accounting system for maintaining the book inventory.
2. Material control records maintained for each ICA.
3. Reconciliation of the results of physical inventories to the book inventory.
4. Recording the transfer of SNM into or out of each ICA.
5. Recording movement of SNM between locations within an ICA, for ICAs where locations have been established.
6. Recording the creation of items containing SNM, such as creation of a rod fragment.
7. Recording the estimated quantity and origin of SNM which has been inadvertently separated from fuel upon the discovery of the separation.
8. Reporting to the accounting group the transfer of SNM into, within, or out of an ICA, if applicable.
9. Perpetual inventory records of each ICA, including the serial number or other unique identifier and location of each item in the ICA that contains SNM.
10. Historical data of SNM in each nuclear fuel assembly, fuel component, or non-fuel SNM item while in DTE's possession.
11. Retention as required in 10 CFR 72 and 74.

13CC.11 System Review and Assessment

Reviews of the SNM program are conducted periodically. The results of the review of the reviews are documented and reported in accordance with the requirements of the quality assurance or self assessment program.

13CC.12 Physical Security

Protection of SNM is in accordance with the requirements of 10 CFR 73.67 and DTE's Physical Security Plan.

Appendix 13DD New Fuel Shipping Plan

13DD.1 Scope of New Fuel Shipping Plan

The reactor licensee on occasion may have to arrange for shipment of new fuel assemblies to the fuel manufacturer. Such shipments are infrequent and would require the reactor licensee to be subject to the regulations in 10 CFR 73.67 (Reference 13DD.5.1), as clarified by guidance provided in NRC Regulatory Issue Summary (RIS) 2005-22 (Reference 13DD.5.2). In lieu of the reactor licensee developing and submitting its own transportation security plan, arrangements may be made for a special nuclear material (SNM) qualified licensee to accept delivery of the fuel at the reactor licensee's site and for the SNM qualified licensee to perform the return shipment under its transportation security plan (TSP).

This New Fuel Shipping Plan summarizes the procedures and the written agreement the reactor licensee shall have in place prior to a shipment of new fuel back to the fuel manufacturer. A written agreement acknowledges the responsibility of the reactor licensee and the SNM qualified licensee.

13DD.2 Definitions

In this plan the following definitions apply:

13DD.2.1 New Fuel Assembly

A group of fuel rods containing pellets of fissionable material that has not been irradiated in the nuclear reactor core.

13DD.2.2 In-Transit Physical Protection

Protection provided by a licensee in accordance with a transportation security plan for special nuclear material that meets the requirements of 10 CFR 73.67(g)(3).

13DD.2.3 SNM Qualified Licensee

An entity that is licensed pursuant to the regulations in 10 CFR Part 70 to transport, deliver to a carrier, or take delivery of a single shipment and has received NRC approval of a Transportation Security Plan (TSP) addressing the physical protection of special nuclear material in transit pursuant to 10 CFR 73.67(c).

13DD.2.4 Receiver

The SNM qualified licensee that receives delivery of new fuel assemblies returned from the reactor licensee.

13DD.3 Reactor Licensee Responsibility

13DD.3.1 The reactor licensee shall have a written agreement in place that arranges for the physical protection of special nuclear material in transit to and from the reactor licensee's facility that meets the requirements of 10 CFR 73.67(g)(3).

The in-transit physical protection starts at the free on board (F.O.B.) point at which the new fuel is delivered to a carrier for transport. The agreement shall include acknowledgement by the SNM qualified licensee that its TSP includes in-transit physical protection from the reactor licensee's site to the receiver's facility.

13DD.3.2 Reactor licensee procedures shall provide guidance regarding advance notification to the receiver of the new fuel shipment, confirmation the receiver is ready to accept shipment, performance of container integrity checks, and placement of tamper-safing devices prior to the commencement of planned shipment in accordance with 10 CFR 73.67(g)(1).

13DD.3.3 When the reactor licensee receives SNM from a shipper, procedures shall include inspections for the container integrity and tamper-safing devices and notifications to the shipper as required by 10 CFR 73.67(g)(2).

13DD.4 Documentation

The records created as a result of this plan activity shall be retained in accordance with reactor licensee records administration and applicable requirements of 10 CFR 73.67(g). Records that would be created and retained under this plan, in the event of new fuel return shipments, include:

- Written agreements between the reactor licensee and the shipper/receiver for in-transit physical protection of the new fuel shipment.
- Documentation of advance notifications and receipt.
- Documentation of container integrity and tamper-safing device checks.
- Copies of superseded response procedure materials.

13DD.5 References

13DD.5.1 10 CFR 73.67 – Licensee fixed site and in-transit requirements for the physical protection of special nuclear material of moderate and low strategic significance

13DD.5.2 NRC Regulatory Issue Summary (RIS) 2005-22 Requirements for the Transportation of Special Nuclear Material of Moderate and Low Strategic Significance: 10 CFR Part 73 vs. Regulatory Guide 5.59 (1983)