Chapter 13: CONDUCT OF OPERATIONS

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

Chapter 13: CONDUCT OF OPERATIONS

TABLE OF CONTENTS
(Continued)

Chapter 13: CONDUCT OF OPERATIONS

LIST OF TABLES

Chapter 13: CONDUCT OF OPERATIONS

LIST OF FIGURES

Chapter 13

CONDUCT OF OPERATIONS

13.1 ORGANIZATIONAL STRUCTURE OF DUANE ARNOLD ENERGY CENTER

NextEra Energy Duane Arnold, LLC is responsible for all station operations and for using properly licensed personnel to operate the plant. Technical assistance and direction during the preoperational testing, initial core loading, startup, and precommercial testing was provided by Bechtel Corporation (Bechtel) and the General Electric Company (GE). Technical assistance is made available as required during plant operation.

2017-002 The Site Director, NextEra Energy Duane Arnold (hereafter referred to as Site Director) is responsible for the safe, reliable, and efficient operation of the facility. He has a staff of trained and properly licensed personnel to accomplish all of the various plant functions and disciplines. All phases of plant operation are performed in accordance with written and approved operation, maintenance, radiation protection, and emergency procedures. These procedures factor in all available experience encountered in the startup and operation of earlier boiling-water reactor (BWR) plants. Significant operations, tests, and pertinent information are recorded and a file of these records is maintained.

A training program to qualify the staff to satisfy the then existing Atomic Energy Commission (AEC) license requirements for the initial fuel loading, preliminary testing, and commercial operation was carried out. Training, retraining, and licensing has continued after startup to ensure an adequate number of licensed operators and properly trained replacement personnel for all disciplines.

2017-002 An On-site Review Group consisting of plant supervisory personnel makes recommendations to the DAEC Site Director, reviews plant operations in detail, and approves procedure changes involving nuclear safety. Records of the proceedings are maintained.

DAEC Document Control is responsible for archiving, storing, protecting, retrieving and for the reproduction of records related to operation of the DAEC, at both on-site and off-site records storage facilities in accordance with QATR FPL-1.

13.1.1 MANAGEMENT AND TECHNICAL SUPPORT ORGANIZATION

13.1.1.1 Design and Operating Responsibilities

13.1.1.1.1 Design and Operating Responsibilities - Project Phase

The Design and Operating responsibilities for the DAEC during the project phase were described in Section 1.1.2.1 of the original FSAR.

13.1.1.1.2 Technical Support for Operations

Management and technical responsibility for the operation of the DAEC resides with NextEra Energy Duane Arnold, LLC. NextEra Energy Duane Arnold, LLC is responsible for the integration of licensing, engineering and technical support, and operation of the DAEC. The Engineering Department within NextEra Energy Duane Arnold, LLC is responsible for providing engineering and technical support for the DAEC.

2017-002 DAEC depends on consultant assistance from specialized consulting companies. Work activities are authorized by the Site Director or his designated alternate. Purchase order or letter may authorize work.

Offsite senior management resources are readily available via NextEra Energy Resources, LLC corporate headquarters in Juno Beach, Florida.

13.1.1.2 Organizational Arrangement

13.1.1.2.1 Corporate Organization

NextEra Energy Duane Arnold, LLC is a wholly owned subsidiary of NextEra Energy Resources, LLC. NextEra Energy Resources, LLC is organized into divisions, departments, groups, and committees, which are unique entities that have been assigned specific responsibilities. The corporate organizational arrangement is contained in the QATR.

13.1.1.2.2 DAEC Site Organization

2017-002 Site Director

2017-002 The primary responsibility of the Site Director is the safe operation of the DAEC. Other responsibilities include, but are not limited to, the following:

1. Managing the DAEC Site Organization, which is responsible for:

   a. Operation and maintenance of the DAEC,

   b. Regulatory agency interfaces and relations,

   c. Licensing activities,

   d. Emergency planning activities,

   e. Nuclear fuel management activities,

f. Nuclear facility engineering activities, including consultative or special engineering requirements and the special consultant support that may be necessary to ensure the most effective operation,

g. Training of nuclear personnel,

h. Outage planning, scheduling, and

i. Overall effectiveness of the Quality Assurance Program.

Specific quality program responsibilities include:

2013-004
2017-002

- supporting the Supervisor, Nuclear Assurance in the resolution of issues regarding quality matters,

2013-004
2017-002

- Nuclear Assurance maintains independence through a separate reporting structure to the Chief Nuclear Officer. Separately, the Site Director has the responsibility and authority to review any activity at any time to determine compliance to the Quality Assurance Topical Report.

2. Maintaining relationships and integration with the co-owners of the nuclear facilities.

13.1.1.2.2.1 Duane Arnold Energy Center

To achieve the objective of safe operation of the DAEC, the DAEC Site Organization has been given specific assignments for operation, engineering, licensing, and emergency planning. The DAEC organizational arrangement can be found by contacting NextEra Energy Resources, LLC Headquarters in Juno Beach, Florida. DAEC departments that have responsibilities that are germane to the safe operation of the DAEC are discussed below.

Engineering Department

2015-009

The mission of the engineering organization is to provide high quality technical services to ensure the safe and reliable operation of the DAEC within its design and licensing bases. This is accomplished through corporate engineering services and Site Engineering.

A description of organizational responsibilities is contained in corporate and DAEC Procedures.

Licensing Department

The Manager Licensing and the Licensing Department have responsibility for regulatory activities. Responsibilities include, but are not limited to the following:

1. Managing nuclear licensing activities regarding the DAEC to ensure compliance with regulatory requirements.

2. Maintaining the Updated Final Safety Analysis Report and preparing the periodic submittal of revisions in accordance with 10 CFR 50.71(e) requirements.

3. Preparation and submittal of any necessary changes to the DAEC Operating License and/or Technical Specifications in accordance with 10 CFR 50.90, §50.91 and §50.92.

4. Assigning the responsibility for the evaluation of Inspection and Enforcement Bulletins, Generic Letters and Regulatory Guides. Such evaluations will determine applicability to the DAEC and the necessity for establishing a DAEC position.

5. Assist in the determination of the reportability of plant events pursuant to 10 CFR 50.72 and 50.73 requirements and prepare Licensee Event Reports (LERs) in accordance with 10 CFR 50.73 requirements.

6. Performing Post Scram reviews and making recommendations to the On-site Review Group for plant re-start in accordance with NRC Generic Letter 83-28, Item 1.1 requirements.

Performance Improvement Department

The Performance Improvement Manager and the Performance Improvement (PI) department are responsible for the continued improvement of the DAEC Organization in the areas of safety, reliability and cost effectiveness. Responsibilities include, but are not limited to:

1. Maintaining and Implementing the Corrective Actions Program,
2. Coordinating the dissemination and review of Industry Operating Experience on site,
3. Investigating plant incidents to determine root cause and recommend corrective actions to plant management,
4. Coordinating Self Assessments, Benchmarking activities and Human Performance Program to identify areas of improvement.
5. Maintaining plant procedures and procedure programs including the DAEC Surveillance Program, Modifications Acceptance Testing, Special Testing (SpTP), and Biannual Review Program.

Training

The Training Department is headed by the Manager, Training and includes the instructors, the DAEC Simulator and other training facilities needed for carrying out the DAEC training programs for licensed personnel, unlicensed personnel, and general employee training discussed in Section 13.2.2.

2019-003

Security

The Security Manager is responsible for conducting the security program under the direction of the Security Director. The primary responsibility of the security organization is to regulate access to the plant and protect against radiological sabotage. They also are responsible for implementing the DAEC Fitness-for-Duty Program. See Section 13.6.

Emergency Preparedness

2019-003

The Licensing Manager is assigned the primary responsibility for Emergency Preparedness activities for DAEC, both onsite and offsite. The Licensing Manager is

2017-002

authorized direct access to the Regional Vice President in support of maintaining the effectiveness of onsite and offsite emergency plans and corporate management level support. The purpose of the DAEC onsite and offsite plans is to ensure that the public is adequately protected in the event of a radiological emergency at the DAEC. The

2019-003

Licensing Manager is designated as the primary contact with the NRC, State of Iowa and the Federal Emergency Management Agency (FEMA) in matters affecting the emergency plans and implementing procedures.

Nuclear Supply Chain

The Nuclear Supply Chain (NSC) organization is responsible for:

1. The sourcing, negotiation, generation and issuance of procurement documents for required equipment, materials and services to support the operation, licensing, maintenance, modification and inspection of the DAEC, as well as equipment, materials and services to support Nuclear Division staff,
2. Identifying and assigning procurement technical and quality requirements for the purchase of materials, equipment and services,
3. Receipt, control, storage and issue of materials at DAEC.

The NSC reports directly to the Integrated Supply Chain (ISC).

2017-002 | Nuclear Assurance Department

2017-002 2019-003 | The Nuclear Assurance Manager is assigned the primary responsibility for ensuring that quality requirements relative to the safe operation of the DAEC are identified and met. The current description of organizational responsibilities is contained within the Nuclear Assurance Department Procedures.

2017-002 |

2017-002 | The Nuclear Assurance Supervisor is responsible for evaluating the effectiveness of the DAEC Quality Assurance Program and issuing periodic reports to the appropriate levels of management.

13.1.1.3 Qualifications

The Regional Administrator, Region III, U.S. Nuclear Regulatory Commission, will be kept informed of the individuals responsible for providing technical support for operations of the DAEC. Information regarding their individual educational background and related experience will be made available at NextEra Energy Resources, LLC headquarters for NRC review upon request.

13.1.2 OPERATING ORGANIZATION

NextEra Energy Duane Arnold, LLC is responsible for all station operations.

13.1.2.1 Plant Organization

2017-002

The Site Director is responsible for the safe, reliable, and efficient management of the plant and reports to the Regional Vice President. The Site Director may designate personnel to act in his behalf during his absence from the plant, in accordance with ANSI/ANS-3.1-1978, Section 4.2.1. The basic organization of the DAEC consists of departments headed by the Operations Site Director, Work Management Site Director, Maintenance Site Director, Safety and Health Program Manager, Radiation Protection Manager and the Chemistry Manager. The On-site Review Group also reports to the Site Director. The plant organizational arrangement is readily available on-site. This basic group is backed up by technical personnel as required, and it is enlarged during periods of refueling, and major equipment maintenance.

2019-003
2013-004
2017-002

Operations Department

The Operations Department is headed by the Operations Site Director. The Operations Site Director or one of his direct reports holds a Senior Reactor Operator as required by ANSI/ANS 3.1-1978.

Most of the personnel who make up this group are qualified by academic instruction and experience at operating reactor and simulator facilities. The Operations Site Director, Assistant Operations Managers, Operations Shift Managers, Control Room Supervisors, the Nuclear Station Operating Engineers, and the Assistant Nuclear Station Operating Engineers hold appropriate NRC licenses. These persons monitor and operate the plant nuclear, mechanical, and electrical equipment and conduct radiation surveys as required. Fuel handling activities are directed by Fuel Handling Senior Reactor Operators under the direction of the Operations Department.

2013-004

The personnel for these positions were initially assigned their duties by selection from those undergoing training. Their experience and performance during training were evaluated before they were assigned to a position. Most of the initial individuals were chosen from a group of Company personnel who successfully completed a Company-conducted nuclear power orientation course. These individuals were supplemented by personnel who had previous nuclear experience in the Naval Nuclear Power Program.

Since the DAEC has become operational, positions on the staff that become vacant are filled, where possible, by employees who progress through the different positions. They, of course, have to meet all the requirements of the appropriate NRC licenses. Individuals are initially assigned to these positions after a careful evaluation of their qualifications, their progress in the training program, and the proficiency level reached in their last position.

The duties and responsibilities of personnel from the Operations Group on an operating shift are described in Section 13.1.2.3.

Maintenance Department

2013-004
2019-003
The Maintenance Department is headed by the Maintenance Site Director and is divided into five groups: the Mechanical Group, headed by the Mechanical Maintenance Department Head the Electrical Group, headed by the Electrical Maintenance Department Head; the Instrumentation and Controls Group, headed by the Instrumentation and Controls Maintenance Department Head; the Maintenance Support Group, headed by the Maintenance Support Department Head.

2013-004
The Mechanical Maintenance Group is composed of the Department Head, nuclear mechanics, nuclear mechanic machinists, nuclear mechanic welders, and apprentices as required. Their duties consist of day-to-day repairs and adjustments, equipment condition inspections, equipment overhauls, and equipment modifications.

2013-004
The Electrical Maintenance Group is composed of the Department Head, nuclear station and substation electricians, and apprentices as required. Their duties consist of the maintenance, and modification of plant electrical equipment and equipment condition inspections.

2013-004
The Instrumentation and Controls Group is composed of the Department Head, the Metrology Group, Security Technicians, nuclear station control system technicians and apprentices as required. Their duties consist of the maintenance, modification and calibration of instruments and controls.

2013-004
2019-003
The Maintenance Support Group reports to the Department Head. Their function is to provide the administrative support duties for the Maintenance organization, including inspection and testing necessary to support operation, testing, maintenance and modification of the DAEC.

2019-003

The maintenance staff is augmented with qualified personnel from outside sources during refueling and major maintenance periods. The maintenance staff closely coordinates its work with the Operations Department and assisted during the initial core loading and subsequent refueling operations.

2015-009 Radiation Protection Department

2015-009 The Radiation Protection Department is headed by the Radiation Protection Manager. This department is responsible for plant radiation safety and performs contamination and radiation surveys and radiological decontamination activities necessary
2015-009 to ensure plant safety. The Radiation Protection Department is on call at all times.

Health Physics

The Health Physics Technicians within the Radiation Protection/Chemistry Department are responsible for performing the radiation and contamination surveys of the plant, posting of radiological conditions, issuance of Radiation Work Permits and establishing the necessary radiological controls for work performed in the radioactive areas of the plant. The Health Physics Technicians are also responsible for evaluating radiological conditions in the plant, making recommendations on work practices and design changes to ensure doses are ALARA, issuance and analysis of personnel dosimetry, maintenance of records of personnel exposure.

Health Physics Technicians are assigned shift work as required to meet plant operating needs. All members of the plant operating shift crews receive sufficient health physics training to be able to perform self-monitoring activities.

Chemistry Department

2015-009 The Chemistry Department is headed by the Chemistry Manager. The Chemistry Department is responsible for plant chemistry and the environmental monitoring program.

2019-003 Work Management

2013-004
2019-003 The Work Management Site Manager heads the Business Management Department. This department is responsible for planning, scheduling support of on-line work, refueling outages, and operational outages at DAEC.

13.1.2.2 Plant Personnel Responsibilities and Authorities

The job description, requirements, and responsibilities of key plant personnel are included in this section. The responsibilities described are not meant to apply to only one specific position. Supervisors who meet the necessary qualifications may assume the responsibilities of positions other than their own on a temporary basis.

2017-002 13.1.2.2.1 Site Director

2017-002 The Site Director is assigned the primary responsibility for the safe operation of the DAEC. The Site Director has supervisory control over those onsite activities necessary for safe operation and maintenance of the DAEC. The plant organizational arrangement is readily available on-site. The current organizational arrangement and description of organizational responsibilities are contained within the administrative procedures and the Technical Specifications. The license requirements for each position are specified in Table 13.1-2.

2017-002
- The various organizations reporting to the Site Director are responsible for those activities associated with operations, maintenance, repair, refueling, performance evaluation, testing, radiation protection/ALARA, and the environmental survey program.

2017-002
- The On-site Review Group functions to advise the Site Director on all matters related to nuclear safety. The composition, function, and responsibilities of the On-site Review Group are delineated in appropriate DAEC administrative procedures.

2017-002 The Site Director reports to the Regional Vice President. Specific responsibilities include, but are not limited to, the following:

1. Managing the day-to-day activities of the DAEC. These activities include power plant operations, maintenance, radiation protection, chemistry, outage and scheduling and the Safety and Health Program.

2. Planning and coordinating all onsite activities.

13.1.2.2.2 Operations Site Director

The Operations Site Director is responsible for the operation, safety, and security of all plant equipment and the safety and action of all personnel involved in plant operations. The Operations Site Director is responsible for maintaining station operating records in accordance with the facility license.

13.1.2.2.3 Operations Shift Managers

The Operations Shift Managers are in charge of their respective shifts and supervise personnel and equipment operation for the safe, efficient, and reliable operation of the plant. See Section 13.1.2.3.

13.1.2.2.4 Maintenance Site Director

The Maintenance Site Director is responsible for day-to-day maintenance, alteration, overhaul, and repair of electrical, mechanical, and auxiliary equipment 2013-004 associated with the plant. The Mechanical Maintenance Department Head, Electrical Maintenance Department Head, Instrumentation and Controls Maintenance Department Head, Maintenance Support Department Head, and the Facilities Maintenance Department Head report to the Maintenance Site Director.

2013-004 13.1.2.2.5 Mechanical Maintenance Department Head

2013-004 The Mechanical Maintenance Department Head is responsible for supervising the day-to-day maintenance, alteration, overhaul, and repair of mechanical equipment 2013-004 associated with the facility. The Mechanical Maintenance Department Head participates in personnel training and in the review of operating and maintenance manuals for his area of responsibility.

2013-004 13.1.2.2.6 Electrical Maintenance Department Head

2013-004 The Electrical Maintenance Department Head is responsible for supervising the day-to-day maintenance, alteration, overhaul, and repair of electrical equipment associated 2013-004 with the facility. The Electrical Maintenance Department Head participates in personnel training and in the review of operating and maintenance manuals for his area of responsibility.

2013-004 13.1.2.2.7 Instrumentation & Controls (I&C) Maintenance Department Head

2013-004 The I&C Maintenance Department Head is responsible for Metrology functions and for supervising the day-to-day maintenance, alteration, overhaul, calibration, repair and surveillance of instrumentation and control equipment associated with the facility. 2013-004 The I&C Maintenance Department Head participates in personnel training and in the review of operating and maintenance manuals for his area of responsibility.

2013-004 13.1.2.2.8 Maintenance Support Department Head

2013-004 The Maintenance Support Department Head is responsible for supervising the day-to-day administrative duties of the Maintenance Department. This includes Maintenance Planning for the organization.

2019-003

13.1.2.2.9 Work Management Site Director

2019-003 The Work Management heads the Business Management Department. Duties include managing activities required to prepare for and conduct outage and on-line work. Responsibilities include, but are limited to, budget and cost monitoring, planning and scheduling, resource procurement, scope control, and work execution, management and coordination as well as preventive maintenance and surveillance testing coordination.

2013-004 13.1.2.2.10 Radiation Protection Manager and Chemistry Manager

2013-004 The Radiation Protection Manager (RPM) is responsible for plant radiation safety, supervising plant radiological activities and radiological analysis. The RPM maintains a
2017-002 documented record of radiation levels within plant areas as specified by the Site Director, and maintains a documented exposure history on all plant personnel and visitors who are
2013-004 subject to exposure. The RPM provides technical advice to the plant personnel. The RPM is responsible for establishing, and has the authority to enforce, the radiation safety control policies by which the plant operates and with which all plant personnel and visitors must
2013-004 comply. The Chemistry Manager (CM) is responsible for plant chemistry. The CM manages plant chemical activities and manages the laboratory, plant chemical equipment, and chemistry radiological analysis. The CM is responsible for performing the chemical and radio-chemical analyses for the power plant, for maintaining the Plant Water Chemistry and the radiological environmental monitoring program, including regulations on liquid (non-radiological) discharges, water use regulations, and air emission regulations.

13.1.2.2.11 RCRA/HAZMAT Program Owners

The RCRA/HAZMAT Program Owners are responsible for developing and maintaining programs for onsite compliance with environmental regulations. This includes compliance with RCRA hazardous waste regulations and spill regulations.

13.1.2.3 Operating Shift Crews

The normal operating shift crews consists of an Operations Shift Manager (SRO) in charge, a Control Room Supervisor (SRO), a Nuclear Station Operating Engineer (RO), two Assistant Nuclear Station Operating Engineer (RO), two Nuclear Station Plant Equipment Operators, and a Shift Technical Advisor.

The duties and responsibilities of the personnel on an operating shift are as follows:

1. Operations Shift Manager - SRO

   The Operations Shift Manager is in charge of the shift. He supervises personnel to ensure safe, efficient, and proper operation of the DAEC. He is responsible for radiation safety and chemistry, as well as tests and results on his shift. He participates in personnel training and in the review of operating manuals and instructions in the startup, operation, and shutdown of the facility. He participates in and contributes to the planning and scheduling of maintenance and refueling activities.

2. Control Room Supervisor - SRO

   The Control Room Supervisor has the same duties and responsibilities as the Shift Manager except that of being in charge of the shift. He is included in the shift in order to permit the Shift Manager to move about the plant as needed during normal and emergency situations while at the same time fulfilling the NRC requirement that a Senior Licensed Operator be present at all times in the control room when the unit is being operated. The Control Room Supervisor is required for all reactor modes except cold shutdown and refuel mode.

3. Nuclear Station Operating Engineer - RO

   The Operating Engineer, on instructions from the Control Room Supervisor, directs generator loading and electrical switching. He monitors, controls, and directs the operation of the reactor, turbine-generator, auxiliaries, and electrical equipment. He interprets, audits, and reviews instrumentation and chart indications as to the performance, efficiency, radiation, and chemistry of the plant. He assists in the training of personnel in the skills and knowledge required for the safe and efficient operation of the facility. He performs work in reactor-fuel-handling operations involving the preparation, transfer, loading, and unloading of fuel. He may be assigned to the maintenance crew while the reactor plant is not in operation.

4. Assistant Nuclear Station Operating Engineer - RO

   The First Assistant Operating Engineer works under the intermittent supervision of the Operations Shift Manager, Control Room Supervisor, or Operating Engineer. The duties of the First Assistant Operating Engineer are essentially the same as those of the Operating Engineer; thus, the Operating Engineer and First Assistant Operating Engineer are equally qualified to operate either the reactor control board or turbine-generator control board. The First Assistant Operating Engineer may be assigned to the maintenance crew while the reactor plant is not in operation.

5. Nuclear Station Plant Equipment Operators

The Nuclear Station Plant Equipment Operators (NSPEO), under the direction of licensed operators in the plant control room, inspects, services, starts, and stops the turbine-generator, mechanical, electrical, related nuclear equipment, and auxiliaries in the reactor building, turbine building, pump house, intake structure, and cooling towers. The NSPEO observes charts, gauges, instruments and controls, records readings as required and assists in the preparation of station log sheets and reports. The NSPEO is able to conduct radiation surveys and possesses a working knowledge of water treatment equipment. The NSPEO may be assigned to the maintenance crew while the reactor plant is not in operation.

6. Shift Technical Advisor

The Shift Technical Advisor (STA) provides engineering support on-shift in accordance with NUREG-0737, Item I.A.1 requirements.

The requirements and responsibilities of the STA include the following:

a. The Shift Technical Advisor will be stationed onsite and will be present in the control room within 10 minutes of being summoned during plant power operation, in other than cold shutdown or refuel mode.

b. The Shift Technical Advisor serves as an advisor to the Operations Shift Manager during off-normal reactor plant conditions.

c. The Shift Technical Advisor will provide operating experience assessment functions as related to DAEC design, procedures, and practice, and in support of their transient/accident assessment functions.

d. In the performance of these duties, the Shift Technical Advisor will be free of duties associated with the commercial operation of the plant and will report directly to the Operations Shift Manager.

13.1.3 QUALIFICATION OF NUCLEAR PLANT PERSONNEL

13.1.3.1 Qualifications Requirements

The qualifications of individual members of the plant staff meet or exceed the minimum qualification requirements referenced in ANSI/ANS 3.1-1978 for comparable positions.

2017-002 | Either the Site Director or one of his designated principal alternates shall have the experience and training normally required for a Senior Reactor Operator's license examination (ANSI/ANS 3.1-1978).

The Radiation Protection Manager meets or exceeds the qualification requirements of Regulatory Guide 1.8, September 1975.

13.1.3.2 Qualifications of Plant Personnel

Personnel qualifications are set forth in the Technical Specifications. It is the intent of NextEra Energy Duane Arnold, LLC to adhere to these qualifications when obtaining replacements for vacant positions, whether they be current DAEC employees advancing to positions of greater responsibility or newly hired personnel.

The personnel qualifications of key plant managerial and supervisory personnel at the time of DAEC initial fuel loading were included in the original FSAR.

Information regarding qualifications of personnel currently occupying positions in the operating organization of the DAEC is on file and available at the site for NRC inspection.

Table 13.1-1

Deleted

Table 13.1-2

MINIMUM SHIFT CREW PERSONNEL AND LICENSE REQUIREMENTS

		Reactor Mode	
	DAEC Job Title	Other Than Cold Shutdown	Cold Shutdown
2013-006	Operations Shift Manager	1 - SRO[1,4]	1 - SRO[1]
2013-006	Control Room Supervisor	1 - SRO[1,2,4]	
	Nuclear Station Operating Engineer	1 - RO[3]	1 - RO
	Assistant Nuclear Station Operating Engineer	1 - RO[3]	
	Nuclear Station Plant Equipment Operator	2	1
2013-006	Shift Technical Advisor Position	1[2,4]	None Required
2013-006	**Minimum Total Personnel**	**7**[4]	**3**

SRO - Senior Reactor Operator
RO - Reactor Operator

Substitutions - without changing minimum total personnel requirements:

a. Individuals with senior reactor operator license may substitute for reactor operator or nonlicensed position.
b. Individuals with reactor operator license may, if otherwise qualified, substitute for nonlicensed position.

NOTES

1. Does not include the SRO or SRO Limited to Fuel Handling, Supervising Core Alterations
2. Not required while in the Refuel Mode
3. Only one RO is required during the Refuel Mode with an additional RO required to be assigned the responsibilities of movement of fuel during Core Alterations
4. (2013-006) Per Technical Specification Issuance of Amendment, dated October 2, 2002, Section 3.1 Changes to TS 5.2.2.g (portion Amendment 248), the individual assigned to provide technical support to the unit operations shift crew in the areas of thermal hydraulics, reactor engineering, and plant analysis (i.e. the Shift Technical Advisor position) may be provided by either a separate individual or the individual who also fulfills another role in the shift command structure, provided that individual meets the qualifications specified by the Commission Policy Statement on Engineering Expertise on Shift. If this allowance is utilized, the Minimum Total Personnel for the shift is 6 (six).

13.2 TRAINING

13.2.1 INTRODUCTION

The Duane Arnold Energy Center (DAEC) training programs have been established to provide qualified personnel to operate and maintain the plant in a safe manner and to comply with technical specifications and applicable regulations. The training programs provide
2013-004 reasonable assurance that fully trained and qualified operations, maintenance, engineering support, chemistry technician and radiation protection personnel are available to ensure the safe and efficient operation of DAEC. These training programs meet the requirements of 10CFR50.120 and 10CFR55. These programs shall consist of both retraining and replacement training elements and shall meet or exceed the minimum provisions outlined in ANSI/ANS 3.1-1978. The detailed content and conduct of these training programs are described in division, plant, and training department procedures.

The operations, maintenance, engineering support, chemistry technician and radiation protection training programs are based on a systematic approach to training and result in performance-based training. The systematic process includes analysis, design, development, implementation and evaluation phases. These training programs are accredited by the National Academy for Nuclear Training and are periodically evaluated to ensure they continue to meet accreditation standards. The DAEC Site-Specific simulator was certified in 1991.

13.2.2 GENERAL TRAINING

13.2.2.1 General Employee Training

The General Employee Training program is required for all plant personnel (including contractors, corporate support personnel, etc.) prior to unescorted access within the protected area. The initial training includes web-based content and evaluation (1) on the general description of the DAEC, radiation protection practices, quality assurance program, regulatory reporting requirements, security program, industrial safety practices, and site emergency plan.

Requalification training (2) is provided for all plant personnel granted unescorted access within the protected area. This training includes refresher training on initial training topics, and updates on applicable administrative policies and procedures followed by an evaluation.

(1) The term “evaluation” means one or more type of post-training examination such as online or written exam, practical demonstration, simulator scenario, etc.

(2) The term “requalification training” is used when satisfactory completion is required, by either administrative procedure or federal regulation, to maintain qualification for specified job positions. Otherwise, the term “continuing training” is used.

13.2.2.2 Fitness for Duty Training

The Fitness for Duty program is required for all plant personnel. Initial training includes classroom instruction and evaluation on the hazards of substance abuse, company substance abuse policies, and the consequences of failure to comply with those policies.

Requalification training is provided for all plant personnel. This training includes refresher training on initial training topics, updates on new policies and procedures, and an evaluation.

13.2.2.3 Asbestos Worker Training

Asbestos Worker training is required for all personnel who will work with asbestos. Initial training includes classroom instruction and evaluation on the uses of asbestos, health effects, personal protection, safe work practices, environmental monitoring, and applicable regulations.

Continuing training is designed to maintain and improve the asbestos worker knowledge and skills developed during initial training. It includes classroom instruction and evaluation.

13.2.2.4 Hazardous Materials Training

Hazardous Materials training is required for all personnel who will be exposed to health hazards or hazardous material, with varying levels of training depending on their duties. Initial training includes classroom instruction and evaluation on information that will allow employees to perform their duties in a safe, healthful manner, and to protect the environment and public.

Continuing training is designed to maintain and improve hazardous material worker knowledge and skills developed during initial training. It includes classroom instruction and evaluation.

13.2.2.5 Instructor Training

Instructors for accredited training programs are selected for their technical expertise in the subjects which they teach. They receive initial training in subjects such as the Systematic Approach to Training process, education theory, and instructional techniques. Instructors who will be performing training on the plant specific simulator receive training on the simulator computer controls. Initial training includes an evaluation of the instructor/trainee's classroom presentation abilities.

Instructor continuing training provides instructors with additional training on instructional skills, procedure changes, changes in regulatory requirements, and changes in industry guidelines when applicable. Instructors also attend selected continuing training courses, as designated by their supervisor, with the trainee(s) in their respective training program and are expected to maintain their technical skills and in-plant proficiency.

13.2.3 OPERATOR TRAINING PROGRAMS

13.2.3.1 Nuclear Station Plant Equipment Operator (NSPEO) Training

The NSPEOs are generally responsible for systems located outside the control room. This classification includes two watchstanders; one operator who works mainly in the Turbine Building and the buildings outside the power block, and another who works mainly in the Reactor Building.

NSPEO initial training is designed to provide the knowledge, skills and abilities necessary to monitor and operate the in-plant systems and equipment under both normal and emergency conditions. Training and evaluation are performed in the classroom and on the job.

Continuing training is designed to maintain and improve the required plant knowledge, skills, and abilities developed during initial training and ensures the NSPEOs are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for refresher training based on identified performance needs and input from line management.

13.2.3.2 Reactor Operator (RO) Initial Training

Candidates enter the Reactor Operator program after meeting the regulatory requirements for education, physical condition and general health, and power plant experience.

Reactor Operator Initial Training includes courses in reactor theory, heat transfer and fluid flow, and thermodynamics and is designed to provide the knowledge and skills and abilities necessary to monitor and operate plant systems and equipment from the control room under both normal and emergency conditions. Training and evaluation are performed in the classroom, on the job, and in the plant simulator. The final evaluation is a responsibility of the Nuclear Regulatory Commission (NRC), which issues a Reactor Operator License to successful candidates.

13.2.3.3 Senior Reactor Operator (SRO) Initial Training

Candidates enter the Senior Reactor Operator program after meeting the regulatory requirements for education, physical condition and general health, and power plant experience.

Senior Reactor Operator initial training includes the same courses provided Reactor Operators but with higher order learning objectives. The course also includes training on control room management , nuclear fuel handling, regulatory requirements, Security and Fire Plans, and SRO responsibilities during emergencies. Training and evaluation are performed in the classroom, on the job, and in the plant simulator. The final evaluation is a responsibility of the NRC, which issues a Senior Reactor Operator License to successful candidates.

13.2.3.4 Licensed Operator Requalification Training

Licensed Operator Requalification training is attended by Reactor Operators, Senior Reactor Operators, Shift Technical Advisors, and Operations Instructors with an SRO Certification.

The Licensed Operator Requalification training program is designed to continually enhance the fundamental plant knowledge, skills and abilities developed during initial training. Training and evaluation are performed in the classroom, in the plant, and in the plant simulator. The program content is based on both fixed and flexible components:

- The fixed component is a projected plan of lectures and plant manipulations derived from performance trends.

- The flexible component is based on emerging issues such as feedback from trainee critiques or Manager/Supervisor Evaluations, applicable modifications to plant equipment or procedures, lessons learned from industry and in-house operating experiences, observation of operator performance in plant, and the results of evaluations.

13.2.3.5 Shift Technical Advisor (STA) Training

Candidates entering the STA Training program should have a bachelors degree in engineering or physical science, work experience, or sufficient courses to provide a background for understanding the design and operation of nuclear power plants.

STA initial training provides the candidate with specific training in plant design, plant response, and analysis of the plant for transients and accidents. Training and evaluation are performed in the classroom, on the job, and in the plant simulator.

Continuing training consists of participation in Licensed Operator Requalification Training with additional training and evaluation on the oversight role of the STA. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.3.6 Control Room Supervisor (CRS) Training

The Control Room Supervisors are the senior utility management representatives stationed in the control room. This position requires completion of SRO initial training. The Control Room Supervisors also receive additional technical, supervisory, and management training. Training and evaluation are performed in the classroom, on the job, and in the plant simulator.

Continuing training consists of participation in Licensed Operator Requalification Training with additional professional development training. Topics are selected for refresher training based on identified performance needs and input from line management.

13.2.4 MAINTENANCE TRAINING PROGRAMS

13.2.4.1 Mechanical Maintenance Training

Nuclear station mechanic training is designed to provide the knowledge, skills and abilities to install, repair, adjust, and maintain plant mechanical equipment. Training and evaluation are performed in the classroom, lab, and on the job. Advancement from apprentice to journeyman takes approximately four years and progress is systematically tracked.

Continuing training is designed to maintain and improve the fundamental plant knowledge, skills, and abilities developed during initial training and ensures the mechanics are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.4.2 Electrical Maintenance Training

Nuclear station electrician training is designed to provide the knowledge, skills, and abilities to install, repair, adjust, and maintain plant electrical equipment. Training and evaluation are performed in the classroom, lab, and on the job. Advancement from apprentice to journeyman takes approximately four years and progress is systematically tracked.

Continuing training is designed to maintain and improve the fundamental plant knowledge, skills, and abilities developed during initial training and ensures the electricians are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.4.3 Instrumentation and Control (I&C) Technician Training

Nuclear station I&C technician training is designed to provide the knowledge, skills, and abilities to install, repair, adjust, and maintain plant equipment. Training and evaluation are performed in the classroom, lab, and on the job. Advancement from apprentice to journeyman takes approximately four years and progress is systematically tracked.

Continuing training is designed to maintain and improve the fundamental plant knowledge, skills, and abilities developed during initial training and ensures the I&C technicians are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

2013-004

13.2.4.4 Maintenance Department Head Training

2013-004

Maintenance Department Heads for the Mechanical, Electrical, and I&C shops and the Fix It Now (FIN) Supervisor receive additional technical, supervisory, and management training. This training is designed to enhance the supervisors knowledge of integrated plant operations and organizational needs of interfacing departments. In addition to the maintenance supervisory training, the FIN Supervisor receives periodic multidiscipline training by attending craft specific training session.

Continuing training is designed to maintain and improve the required knowledge, skills and abilities to perform the Maintenance Supervisor role. Topics include both technical and supervisory development aspects and are selected based on identified performance needs, industry issues and input from management.

13.2.5 RADIATION PROTECTION TRAINING PROGRAMS

13.2.5.1 Health Physics Technician Training

Health Physics Technician training is designed to provide the knowledge, skills and abilities necessary to perform radiological and environmental health protection duties. Training and evaluation are performed in the classroom, lab, and on the job. Advancement from apprentice to journeyman takes approximately four years and progress is systematically tracked.

Continuing training is designed to maintain and improve the required plant knowledge, skills, and abilities developed during initial training and ensures the Health Physics technicians are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.5.2 Chemistry Technician Training

Chemistry Technician training is designed to provide the knowledge, skills and abilities necessary to perform chemical and radiochemical analyses on plant systems and to maintain analysis equipment. Training and evaluation are performed in the classroom, lab, and on the job. Advancement from apprentice to journeyman takes approximately four years and progress is systematically tracked.

Continuing training is designed to maintain and improve the required plant knowledge, skills, and abilities developed during initial training and ensures the Chemistry technicians are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.5.3 Radwaste Systems Operator Training

2013-004

Radwaste systems operator training is designed to provide the knowledge, skills and abilities necessary to safely transfer, process, package, store, release and ship radioactive waste. Training and evaluation are performed in the classroom, lab, and on the job. Advancement from apprentice to journeyman takes approximately four years and progress is systematically tracked.

2013-004

Continuing training is designed to maintain and improve the required plant knowledge, skills, and abilities developed during initial training and ensures the radwaste systems operators are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.6 ENGINEERING AND ENGINEERING SUPPORT TRAINING

13.2.6.1 Engineering Support Training (EST)

Initial training for Engineering and Engineering support personnel is designed to provide the knowledge and skills necessary to perform assigned duties. This training includes classes in basic plant operation, plant organization and administration, codes and standards, and the discipline(s) related to specific positions. Training and evaluation are performed in the classroom and in the plant, when appropriate.

Continuing training is designed to maintain and improve job performance, develop a broader scope and depth of job-related knowledge and skills and ensure that EST training participants are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. Topics are selected for continuing training based on identified performance needs and input from line management.

13.2.7 EMERGENCY PREPAREDNESS TRAINING

13.2.7.1 Emergency Preparedness Training

Emergency preparedness training provides each member of the Emergency Response Organization (ERO) with the knowledge and skills necessary to perform assigned duties. The training program addresses emergency response plans and procedures and explains the structure of the ERO and it's facilities. Each member of the ERO receives initial indoctrination training, as well as facility-specific and position-specific training.

Continuing training for emergency response personnel is achieved through participation in drills, exercises or classroom instruction. Continuing training includes a review of significant changes to emergency plans, implementing procedures, emergency facilities and equipment. This training will also include significant lessons learned from industry events and/or in-house experience, when applicable.

13.2.8 FIRE PROTECTION TRAINING

13.2.8.1 Fire Brigade Training

2013-013

Fire brigade initial training meets the requirements of NFPA 805 and NFPA 600. Initial training includes classroom instruction on the DAEC Fire Plan, fire behavior and extinguishment, the use of fire fighting equipment, the use of self contained breathing apparatus, and search and rescue techniques. It also includes Live Fire training which is a series of practical exercises designed to provide fire brigade leaders and members with experience in fire extinguishment and the use of Self Contained Breathing Apparatus under those conditions found in firefighting.

Continuing training is designed to maintain and improve the fire fighting knowledge and skills developed during initial training and ensures that the Fire Brigade members are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house operating experience when applicable. It includes classroom instruction, Live Fire training, and participation in fire drills. Topics are selected for refresher training based on identified performance needs and input from line management.

13.2.9 SECURITY TRAINING

13.2.9.1 Security Training

Security personnel are provided training in accordance with a NRC approved training and qualification plan prior to assignment to security force duties. Initial training includes classroom instruction on the DAEC Security Plan and field instruction on weapons.

Continuing training is designed to maintain and improve the security knowledge and skills developed during initial training and ensures the Security Guards are aware of plant physical and procedural changes, changes to regulatory requirements, and lessons learned from industry and in-house security experience when applicable. It includes classroom instruction, field instruction, and participation in security drills. Topics are selected for refresher training based on identified performance needs and input from line management.

13.3 EMERGENCY PLANNING

The Duane Arnold Energy Center Emergency Plan has been submitted to the NRC as a separate document.

Provisions have been made for periodic review and updating of the Emergency Plan. Provisions have also been made for informing all concerned persons of significant revisions to the Emergency Plan and procedures. Revisions to the Emergency Plan and procedures are also submitted to the NRC.

[redacted] meet the requirements of Section 8 of Supplement 1 to NUREG-0737.

13.4 REVIEW AND AUDITS

13.4.1 ONSITE REVIEW

13.4.1.1 Administrative Control

2017-002 | Administrative control of plant operations is exercised through the Site Director.

13.4.1.2 Routine Reviews

The routine review of plant operations is at the plant level under the direction of
2017-002 | the Site Director or designee, with the active participation of the plant supervisory staff. The Site Director and his support personnel review operating logs, recorded data, performance data, and radiation exposure and environmental monitoring records and make corrections in operations as needed. Proposed revisions in operating procedures are referred to and reviewed by the On-site Review Group.

2017-002 | The Site Director is responsible for operating the station in strict compliance with the facility license and the Technical Specifications. He is also responsible for operating the station in accordance with applicable rules and practices.

13.4.1.3 On-site Review Group

The On-site Review Group is organized on the plant level and is composed of personnel with expertise in at least the following disciplines: Operations, Maintenance, Radiation Protection, Chemistry and Engineering.

One member is designated as the Chairman. One or more of the members are designated as Vice Chairmen. The Chairman, Vice Chairmen, Members, and Alternates
2017-002 | are appointed in writing by the Site Director to serve on a permanent basis; however, no more than two alternates can participate as voting members in On-site Review Group activities at any one time.

2017-002 | The On-site Review Group functions to advise the Site Director on all matters related to nuclear safety.

The On-site Review Group meets at least once per calendar month and as convened by the Chairman or Vice Chairman. A quorum of the On-site Review Group consists of the Chairman or Vice Chairman and four members including alternates.

The responsibilities and authority of the On-site Review Group are specified in FPL-1 QATR Appendix A and in the On-site Review Group Administrative Procedures.

During the startup period when power levels were being increased, an on-site committee reviewed the results and analyzed the tests performed at previously achieved

power levels for conformance with design parameters and approved tests at the next higher power level. General Electric was represented on this committee before commercial operations.

Minutes of the On-site Review Group proceedings are recorded and provided to
2017-002 | the Site Director.

13.4.2 AUDIT PROGRAM

The Nuclear Oversight Department is assigned responsibility for audits of facility activities. The audit program is described in the Quality Assurance Topical Report (see Section 17.2).

An audit by Nuclear Oversight and an offsite qualified fire protection consultant (or offsite qualified licensee personnel) will be performed on a frequency not to exceed two years.

13.5 PLANT PROCEDURES

13.5.1 ADMINISTRATIVE PROCEDURES

The DAEC administrative procedures are contained in the 1400 Manual, Administrative Control Document.

13.5.2 OPERATING AND MAINTENANCE PROCEDURES

13.5.2.1 Control Room Operating Procedures

13.5.2.1.1 Original Operating Procedures

The original operating and maintenance procedures are discussed in Section 13.6 of the original FSAR.

13.5.2.1.2 Current Operating Procedures

Integrated Plant Operating Instructions (IPOIs) exist to provide integrated procedures for major plant evolutions such as startup, power operation, reactor scram, and special operations as required.

Operating instructions (OIs) exist for individual plant systems.

The Technical Specifications list the areas which are to be covered by detailed written plant operating and maintenance procedures. These procedures, and changes thereto, are reviewed as required by the QATR and site procedures.

The DAEC has implemented procedures for limiting access to the control room to authorized individuals in accordance with the NUREG-0578, Section 2.2.2.a, NRC position, and shift turnover procedures in accordance with the NUREG-0578, Section 2.2.1.c, NRC position.

The NRC in Supplement 1 to NUREG-0737 (Generic Letter 82-33) required licensees to develop a set of human factored, symptom-based, emergency operating procedures (EOPS) to improve human reliability and the ability to mitigate the consequences of a broad range of initiating events and subsequent multiple failures or operator errors to respond to potential accident situations. The BWR Owner's Group

(BWROG) developed a set of Emergency Procedure Guidelines (EPGs) which could be utilized by individual licensees in their development of plant-specific EOPs. The EPGs have been updated to include Severe Accident Guidelines (SAGs) beyond that previously covered in EOPs. This updated guidance was issued by the BWROG as EPG/SAG Revision 1, as amended through Revision 3. This guidance maintained the same symptom-based approach as the previous revisions to the EPGs. DAEC implemented EPG/SAG Revision 3 such that any steps or actions in the SAG flowcharts are beyond the plant's design and licensing basis. The current EOP flowcharts have also been updated from the guidance in EPG/SAG Revision 3.

2017-007
2017-007
2017-007

13.5.2.2 Other Procedures

13.5.2.2.1 Maintenance and Testing Procedures

Maintenance and testing procedures, checklists, and other necessary records to satisfy routine inspections, preventive maintenance program, and license requirements, are developed by qualified plant staff members.

The Technical Specifications specify that detailed written procedures, including applicable check-off lists and instructions, are to be prepared for surveillance and testing requirements and preventive and corrective maintenance operations which could have an effect on the nuclear safety of the facility.

The maintenance procedures can be found in the Maintenance Procedures Manual and the surveillance and testing procedures are listed in a controlled database. The procedures can be divided into the following categories:

1. Routine Testing of Engineered Safeguards and Equipment as Required by the Facility License and the Technical Specifications is directed by the Manager, Procedures Department and is completed at the specified frequency. Written procedures and checklists are provided for these operations.

2. Routine Testing of Standby and Redundant Equipment

   Routine testing of standby and redundant equipment is directed by the Work Management Manager. The frequency of testing follows normal steam plant practice.

3. Routine Inspection and Preventive Maintenance

   Routine inspection and preventive maintenance of equipment is directed by the Mechanical Maintenance Department Head, Electrical Maintenance Department Head and Instrumentation and Controls Maintenance Department Head. The frequency and scope of inspections are in accordance with normal steam

2013-004

plant practices. Plant operating history and manufacturer's recommendations are also used in determining specific inspection and maintenance schedules. Routine inspection, calibration, and preventive maintenance of instruments are directed by the Instrumentation and Controls Maintenance Department Head. The frequency and scope of this work are established according to normal plant practice, operating history, and manufacturer's recommendations.

2013-004

4 . Special Testing

Special testing encompasses all testing not covered by items 1, 2, and 3 above. Some items in this category are:

a. Operational testing of equipment after overhaul.

b. Testing of equipment for proposed changes to operational procedures.

c. Testing of equipment for proposed design changes to equipment.

Special testing will be under the direction of the Engineering Director and the Operations Site Director. When necessary, appropriate procedures will be written by qualified members of the plant staff with review and approval by the On-site Review Group.

13.5.2.2.2 Emergency Planning Procedures

Organized emergency procedures outlining the actions and responsibilities of plant personnel and offsite support groups have been developed and are contained in the DAEC Emergency Plan and the Emergency Plan Implementing Procedures (EPIPs). These procedures implement the Emergency Plan discussed in Section 13.3.

The purposes of these emergency procedures are to classify emergencies according to severity, assign responsibilities, and outline the actions to be taken to confine and reduce the hazard in order to protect both the general public and plant personnel.

In the implementation of the Emergency Plan, detailed procedures have been prepared to specify the manipulation of controls and equipment to place the facility in a safe condition and to prescribe other appropriate protective measures to be taken by the employees. These implementing procedures are available at the site for review by the NRC. This section describes the principal features of the implementing procedures as follows:

1. [redacted]

2. [redacted]

3. [redacted]

4. [redacted]

5. [redacted]

6. [redacted]

7. [redacted]

8. [redacted]

9. [redacted]

10. [redacted]

[redacted]

Controlled copies of the DAEC Emergency Plan Implementing Procedures (EPIP) are provided to the NRC Region III office.

13.5.2.2.3 Refueling Operations

Detailed refueling procedures are used to ensure a safe and orderly refueling. The procedures specify or make reference to other system operation documents that specify periodic shutdown margin checks, detailed channeling and fuel-handling techniques, and other precautionary steps to ensure that the facility license and Technical Specifications are not violated.

When fuel is being inserted, removed, or rearranged in the core or when control rods are being installed, removed, or manipulated, licensed operators will be in the control room. Senior Reactor Operators (SROs) or SROs limited to fuel handling will be present on the Refuel Floor during core alterations. Technical personnel may provide guidance where necessary. Core verification will be performed after the refueling operations are completed.

Fuel and control rod identifications are tracked using Spent Fuel Pool and core locations. The serial numbers on both the fuel and control rods are matched to these locations and records are kept for these items as lifetime records.

Core alterations are performed using fuel handling procedures and fuel moving plans that are developed from analysis of the previous cycle's fuel exposure and taking into account shutdown margin.

Other refueling operations include the replacement of control rods and incore monitors, channeling operations, fuel sipping when necessary, and the inspection of selected portions of the reactor vessel and primary system.

13.5.2.2.4 Radioactive Materials Safety Procedures

Procedures for the handling and monitoring of radioactive materials are contained in plant procedures and manuals. The provisions of these procedures are designed to conform to the standards of the Code of Federal Regulations, particularly those applicable in Title 10 and Title 49. These procedures are approved by the On-site Review Group.

13.5.2.2.5 Radiological Procedures

Procedures for personnel radiation protection are prepared consistent with the requirements of 10 CFR 20 and are to be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

REFERENCES FOR SECTION 13.5

1. NRC Safety Evaluation Report - BWROG EPG, Revision 4, September 1988.

2. Supplement 1 to NUREG-0737 - Requirements for Emergency Response Capability (Generic Letter 82-33), December 17, 1982.

3. NUREG-0899, Guidelines for the Preparation of Emergency Operating Procedures Resolution of Comments on NUREG-0799, August 1982.

4. NRC Safety Evaluation of the DAEC Procedures Generation Package, dated May 9, 1990.

5. BWR Owner's Group Emergency Procedure and Severe Accident Guidelines, Revision 3, January 2013. 2017-007

13.6 INDUSTRIAL SECURITY

The DAEC plans for physical protection of the facility are described in the Facility Operating License No. DPR-49 and are withheld from public disclosure pursuant to 10 CFR 73.21, "Requirements for the Protection of Safeguards Information." The Facility Operating License was revised by NRC letter dated October 28, 2004, incorporating the DAEC Physical Security Plan, Revision 0. This administrative License change became effective on that date. Detailed security measures for the physical protection of Nuclear Power Plants are required by 10 CFR 50.34(c), "Licensing of Production and Utilization Facilities," and applicable sections of 10 CFR 73, "Physical Protection of Plants and Materials."

13.7 FIRE PROTECTION PROGRAM

2013-013

13.7.1 FIRE PROTECTION PROGRAM

The fire protection program is based on the NRC requirements and guidelines, Nuclear Electric Insurance Limited (NEIL) Property Loss Prevention Standards and related industry standards. With regard to NRC criteria, the fire protection program meets the requirements of 10 CFR 50.48(c), which endorses, with exceptions, the National Fire Protection Association's (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition. DAEC has further used the guidance of NEI 04- 02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)" as endorsed by Regulatory Guide 1.205, "Risk-Informed, Performance Fire Protection for Existing Light-Water Nuclear Power Plants."

Adoption of NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition in accordance with 10 CFR 50.48(c) serves as the method of satisfying 10 CFR 50.48(a) and General Design Criterion 3. Prior to adoption of NFPA 805, General Design Criterion 3, "Fire Protection" of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," was followed in the design of safety and non-safety related structures, systems, and components, as required by 10 CFR 50.48(a).

NFPA 805 does not supersede the requirements of GDC 3, 10 CFR 50.48(a), or 10 CFR 50.48(f). Those regulatory requirements continue to apply. However, under NFPA 805, the means by which GDC 3 or 10 CFR 50.48(a) requirements are met may be different than under 10 CFR 50.48(b). Specifically, whereas GDC 3 refers to SSCs important to safety, NFPA 805 identifies fire protection systems and features required to meet the Chapter 1 performance criteria through the methodology in Chapter 4 of NFPA 805. Also, under NFPA 805, the 10 CFR 50.48(a)(2)(iii) requirement to limit fire damage to SSCs important to safety so that the capability to safely shut down the plant is satisfied by meeting the performance criteria in Section 1.5.1 of NFPA 805.

A Safety Evaluation was issued on September 10, 2013 by the NRC, that transitioned the existing fire protection program to a risk-informed, performance-based program based on NFPA 805, in accordance with 10 CFR 50.48(c).

13.7.1.1 Design Basis Summary

13.7.1.1.1 Defense-in-Depth

The fire protection program is focused on protecting the safety of the public, the environment, and plant personnel from a plant fire and its potential effect on safe reactor operations. [redacted]

2013-013

[redacted]

13.7.1.1.2 NFPA 805 Performance Criteria

[redacted]

2013-013

[redacted]

13.7.1.1.3 Codes of Record

The codes used for the design and installation of credited fire protection systems are listed in Table 13.7-1. For specific applications and evaluations of codes refer to FP-AB-100 Fire Protection Program.

13.7.1.2 System Description

13.7.1.2.1 Required Systems

Nuclear Safety Capability Systems, Equipment, and Cables

[redacted]

Fire Protection Systems and Features

[redacted]

2013-013 Radioactive Release

[redacted]

13.7.1.2.2 Definition of "Power Block" Structures

[redacted]

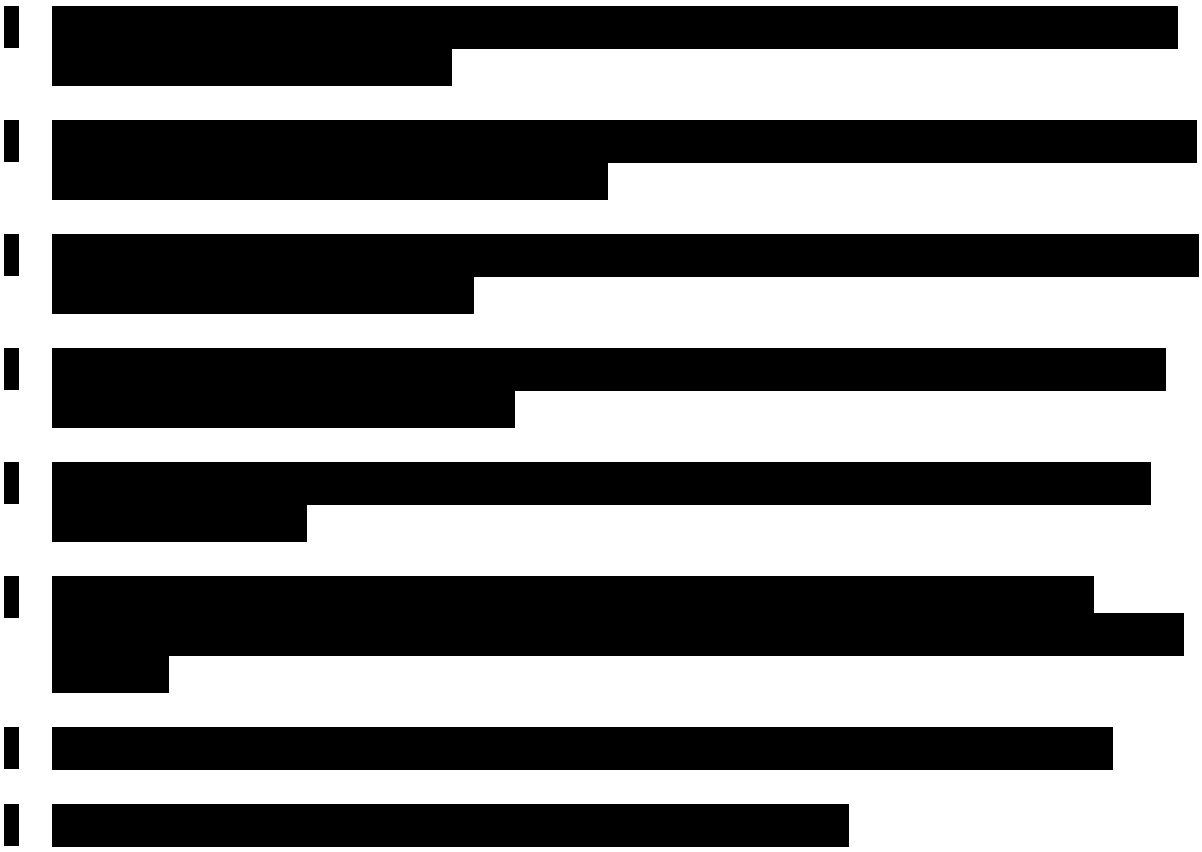
13.7.1.3 Safety Evaluation

[redacted]

13.7.1.4 Fire Protection Program Documentation, Configuration Control and Quality Assurance

[redacted]

2013-013



2013-013

REFERENCES FOR SECTION 13.7

1. Safety Evaluation by the Office of Nuclear Reactor Regulation Transition to a Risk-Informed, Performance-Based Fire Protection Program In Accordance With 10 CFR 50.48(c) Amendment No. 286 to Renewed Facility Operating License No. DPR-49 Nextera Energy Duane Arnold, LLC Duane Arnold Energy Center Docket No. 50-331, 9/10/2013, (ML13210A449)

2. License Amendment Request, August 5, 2011, Transition to 10 CFR 50.48(c) - NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition (ML11221A280)

3. National Fire Protection Association Standards, NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition

4. Regulatory Guide 1.205, Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants, Revision 1, December 2009

5. NEI 04-02, Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c), Revision 1, September 2005

6. FAQ 12-0062, Updated Final Safety Analysis Report (UFSAR) Standard Level of Detail, Revision 1, May 21, 2012

2013-013

Table 13.7-1

FIRE PROTECTION CODE OF RECORD

Code	Title	Year
NFPA 10	Standard for Portable Fire Extinguishers	1975
NFPA 12	Standard on Carbon Dioxide Extinguishing Systems	1975
NFPA 13	Standard for the Installation of Sprinkler Systems	System dependent, see Fire Protection Program
NFPA 14	Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems	1985
NFPA 15	Standard for Water Spray Fixed Systems for Fire Protection	System dependent, see Fire Protection Program
NFPA 20	Standard for the Installation of Stationary Pumps for Fire Protection	1970
NFPA 24	Standard for the Installation of Private Fire Service Mains and their Appurtenances	1969
NFPA 30	Flammable and Combustible Liquids Code	1969
NFPA 51B	Standard for Fire Prevention During Welding, Cutting, and other Hot Work	1977
NFPA 72	Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems	System dependent, see Fire Protection Program
NFPA 80	Standard for Fire Doors and Fire Windows	1967
NFPA 90A	Standard for the Installation of Air-Conditioning and Ventilating Systems	System dependent, see Fire Protection Program
NFPA 600	Standard on Industrial Fire Brigades	2005

2013-013

Table 13.7-2

POWER BLOCK BUILDINGS