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# 13.0 Conduct of Operations

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# 13.1 Organization

## 13.1.1 Corporation Organization

The corporate structure of Duke Energy pertinent to Nuclear Generation is shown in Figures 13-1 and 13-2.

### 13.1.1.1 Corporate Functions, Responsibilities and Authorities

**HISTORICAL INFORMATION BELOW NOT REQUIRED TO BE REVISED**

*Duke has years of experience in the design, construction and operation of electric generating stations. As of 1994, Duke's total system capacity was approximately 18,000 MWe. Duke operated eight fossil stations with a 38% share of this total capacity, three nuclear steam-electric stations with a 60% share; and 27 hydroelectric stations, four pumped storage units, and combustion turbine and diesel peaking units accounting for the remaining 2% share.*

*Company involvement in nuclear power began in the early 1950's with various personnel receiving nuclear training. Selected personnel have been involved full time in nuclear projects since the mid-1950's. Duke participated in the Carolina-Virginia Nuclear Power Associates (CVNPA), which resulted in a 17,000 kWe nuclear steam-electric unit at Parr, South Carolina. This unit, the Carolinas-Virginia Tube Reactor (CVTR), produced electricity over the period 1963 to 1967 as part of a five-year operating research program. Duke's three unit Oconee Nuclear Station began operation in 1973, the two unit McGuire Nuclear Station began operation in 1981, and two unit Catawba Nuclear station began operation in 1984. As a result of these and other assignments, many engineering personnel in the Duke organization have had prior nuclear experience as well as extensive experience in the power field.*

*Various departments within the Company have responsibility for design, construction, quality assurance and operation of each nuclear station. Duke contracts with a nuclear steam supply system (NSSS) vendor for the design and manufacture of the complete NSSS. The NSSS vendor also provides technical consultation in areas such as construction, testing, startup and initial fuel loading. As stated in Section 1.1, plant support functions are rendered principally by Westinghouse, along with other consultants and suppliers as may be required.*

Duke's corporate functions, responsibilities and authorities for quality assurance are addressed in Topical Report, DUKE-1A.

Nuclear System Directive 321, "Professional Engineering Practice," describes the expectations and requirements related to Professional Engineering Practice in the Duke Energy Nuclear Generation Department for those engineering activities not covered by utility exemptions.

The Duke Energy Corporation Chairman of the Board, President and Chief Executive Officer has overall responsibility for corporate functions involving planning, design, construction and operation of the Company's generation, transmission, and distribution facilities, as well as other staff functions.

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### 13.1.1.2 Organization for Design and Construction

Effective November 1, 1991, Duke reorganized to create the Power Generation Group, which includes the Nuclear Generation Department. Separate organizations for design and construction ceased to exist.

## 13.1.2 Operating Organization

### 13.1.2.1 Nuclear Generation Organization

See Quality Assurance Program Description Topical Report DUKE-QAPD-001

### 13.1.2.2 Deleted

### 13.1.2.3 Nuclear Site

#### 13.1.2.3.1 Site Organization

The nuclear site organization centralizes the resources for safe and efficient nuclear plant operations under a vice president at the nuclear site.

The Vice President of McGuire Nuclear Station has the responsibility for overall plant nuclear safety as established by Technical Specifications. The site staff is fully capable and equipped to handle all situations involving safety of the station and public. The Nuclear site organization is shown on Figure 13-3.

As established by the Duke Quality Assurance Program Topical Report, Duke-1A, anyone involved in quality activities in the Duke organization has the authority and responsibility to stop work if they discover deficiencies in quality.

#### 13.1.2.3.2 Personnel Functions, Responsibilities and Authorities

The functions and responsibilities of key site supervisory staff are described in the succeeding paragraphs.

(a) Plant Manager

The Plant Manager reports to the Vice President, McGuire Station and has direct responsibility for operating the station in a safe, reliable and efficient manner. He is responsible for protection of the station staff and the general public from radiation exposure and/or any other consequences of an accident at the station. He bears the responsibility for compliance with the facility operating license.

(b) Operations Manager

The Operations Manager has the responsibility for directing the actual day-to-day operation of the station. In the event of the absence of the Plant Manager, the Operations Manager, if so designated, assumes the responsibilities and authority of the Plant Manager.

(c) Assistant Operations Manager - Shift

The Assistant Operations Manager - Shift is responsible for the overall activities of all the on-shift licensed and non-licensed operating personnel.

(d) Operations Shift Manager (OSM)

An OSM is the senior licensed individual responsible for the actual operation of the station on his/her assigned shift. He/She oversees the activities of the operators on his/her shift and is cognizant of all maintenance activity being performed while on duty. The OSM on duty has both the authority and the obligation to shut down a unit if, in his/her opinion, conditions warrant this action.

(e) Control Room Supervisor (CRS)

The CRS assists the OSM in operation of the station on his/her assigned shift. The CRS on duty has both the authority and the obligation to shut down a unit if, in his/her opinion, conditions warrant this action.

(f) Reactor Operator

A Reactor Operator is responsible for the actual operation of a Unit on his/her assigned shift. The Reactor Operator has both the authority and obligation to shut down a unit if, in his/her opinion, conditions warrant this action.

(g) Radiation Protection Manager

The Radiation Protection Manager has the responsibility for conducting the Radiation Protection program. His duties include the training of personnel, continuous determination of the radiological status of the station, surveillance of radioactive waste disposal operations, conducting the radiological environmental monitoring program and maintaining all required records. He has direct access to the Station Manager in matters concerning any phase of radiological protection.

(h) Chemistry Manager

The Chemistry Manager is responsible for overall chemistry and radiochemistry requirements, with special emphasis on primary and secondary system water chemistry.

(i) Maintenance Manager

The Maintenance Manager is responsible for directing maintenance activities in connection with electrical, instrument and control and mechanical equipment. The Maintenance Manager also has responsibility for Preventative Maintenance (PM) and repair of all electrical, instrument and control and mechanical equipment.

(j) Work Management Manager

The Work Management Manager is responsible for directing the station's operational and outage activities through the coordination, development, shift and outage management of a timely and effective integrated station schedule.

(k) Organizational Effectiveness Director

The Organization Effectiveness Director is responsible for directing the activities of Regulatory Affairs, Performance Improvement, Emergency Preparedness and Procedures.

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(l) Shift Technical Advisor (STA)

A STA supports the OSM/CRS in diagnosing and mitigating plant abnormal conditions to ensure a safe overall plant status.

(m) Engineering General Manager

The Engineering General Manager is a senior leader for the site and is the site single point of contact for site engineering issues as well as having many other ancillary site duties. Site engineering activities include: Design Engineering, Mechanical Systems, Electrical Systems, and Reactor Systems. The Site Engineering General Manager reports directly to the Vice President McGuire Nuclear Station.

(n) Training Manager

The Site Training Manager is responsible for implementation and oversite of the training programs for site personnel. The Site Training Division provides the analysis, design,

development, implementation, and evaluation of training and qualifications programs in support of personnel performing work in the nuclear station. Furthermore, the Site Training Division ensures station training programs meet or exceed all facility licensing, UFSAR, Nuclear Policy or regulatory requirements.

(o) Site Services Manager

The Site Services Manager is responsible for directing the activities of facility maintenance, materials and equipment distribution, tools and equipment repair, and technical support.

#### 13.1.2.4 Shift Crew Composition

For station operations shift crew requirements are defined in Chapter 5 of the Technical Specifications and SLC 16.13.4.

#### 13.1.2.5 Nuclear General Office Organization

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The organization chart is shown in Figure 13-2. The functions and responsibilities are described in the Quality Assurance Program Description Topical Report DUKE-QAPD-001.

Deleted paragraph(s) in 2017 update.

### 13.1.3 Qualifications of Station Personnel

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#### 13.1.3.1 Minimum Qualification Requirements

The qualifications of personnel in the site organization, except for the radiation protection manager and licensed operators, are in accordance with Section 4 of the “Standard for Selection and Training of Nuclear Power Plant Personnel,” ANSI N18.1-1971. The qualifications of the radiation protection manager are in accordance with Regulatory Guide 1.8, September 1975. The education and experience eligibility requirements for licensed operators are in accordance with the guidelines outlined bby the National Academy for Nuclear Training (NANT), which have been found acceptable by the Nuclear Regulatory Commission for meeting 10 CFR 55.31 and have been incorporated into applicable station training procedures. Replacement personnel for positions in the stations are fully trained and qualified to fill their appointed positions. Qualifications of key site personnel are available for inspection onsite. Reference Technical Specification 5.3.1.

#### 13.1.3.2 Qualifications of Station Personnel

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# 13.2 Training Program

## 13.2.1 Program Description

The principal objective of Duke Energy Employee Training and Qualification System (ETQS) Standards is to outline methods to ensure training is used as a strategic tool to provide highly skilled knowledgeable personnel for safe, reliable plant operation, improved equipment performance, and to support human performance improvement. This assures job proficiency of all station personnel involved in safety-related work through effective training and qualification. The program is designed to accommodate future growth and meet commitments to and comply with applicable established regulations and accreditation standards.

Qualification is indicated by successful completion of prescribed training, demonstration of the ability to perform assigned work or tasks competently and independently; and where required by regulation, maintaining a current and valid license issued by the agency establishing the requirements.

The Vice President, McGuire Nuclear Site, is responsible for the quality of work performed by individuals in the nuclear station. The Station Manager is responsible for the timely and effective development of assigned personnel. The Site Training Manager is responsible for implementation of the ETQS Standards at McGuire Nuclear Station.

Training is designed, developed and implemented according to a systematic approach to training. Employees are provided with formal training to establish the knowledge foundation and on-the-job training to develop work performance skills. Continuing training is provided, as required, to maintain proficiency in these knowledge and skill components, and to provide further employee development.

The ETQS is designed to prepare initial, incumbent and supplemental personnel for safe, reliable and efficient operation of the nuclear facility. The program is intended to meet or exceed INPO accreditation standards and regulatory requirements.

Appropriate training for personnel of various training and experience backgrounds is provided. The level at which an employee initially enters the training and qualification system for the particular area is determined by an evaluation of the employee's past experience and level of ability.

The length of time typically devoted to the accredited training programs follows:

1. Non-licensed Operators (NLO) - approximately 30 weeks initial training followed by approximately 52 weeks of On-the-Job Training resulting in duty area qualifications,
2. Operations Shift Manager (OSM) - approximately 30 weeks initial training followed by approximately 156 weeks of On-the-Job Training plus mentoring and SRO License resulting in OSM qualification,
3. Shift Technical Advisor (STA) - approximately 32 weeks initial training followed by approximately 136 weeks of On-the-Job Training plus mentoring resulting in STA qualification,
4. Reactor Operators (RO) - approximately 30 weeks initial training followed by approximately 130 weeks of On-the-Job Training plus mentoring resulting in RO License,
5. Senior Reactor Operators (SRO) - approximately 30 weeks initial training followed by approximately 130 weeks of On-the-Job Training plus mentoring resulting in SRO License,

6. Continuing Training for Licensed Personnel - approximately 8 weeks continuing training per year including classroom and simulator training to maintain license,
7. I&E Personnel - approximately 14 weeks initial training followed by approximately 104 weeks of On-the-Job Training resulting in duty area qualifications,
8. Mechanical Maintenance Personnel - approximately 23 weeks initial training followed by approximately 81 weeks of On-the-Job Training resulting in duty area qualifications,
9. Mechanical Maintenance Supervisor Program - approximately 52 weeks initial training including On-the-Job Orientation and Position-Specific Guides training resulting in program completion,
10. Radiation Protection Personnel - approximately 26 weeks initial training followed by approximately 104 weeks of On-the-Job Training resulting in duty area qualifications.
11. Chemistry Technicians - approximately 14 weeks initial training followed by approximately 104 weeks of On-the-Job Training resulting in duty area qualifications, and
12. Engineering Support Personnel - approximately 16 weeks initial training followed by approximately 104 weeks of On-the-Job Training/On-Job-Orientation resulting in duty area qualifications.

## 13.2.2 Program Content Description

Station assigned personnel may be trained and qualified through participation in prescribed parts of the General Employee Training (GET), Employee Training and Qualification System (ETQS), and Employee Development/Management Supervisory Training.

### 13.2.2.1 General Employee Training

General Employee Training (GET) encompasses those general administrative, safety, radiological and emergency procedures (administrative in nature) established by station management and applicable regulations.

All persons granted access to the Restricted/Protected area of a nuclear power plant receive initial and continuing training in the following areas commensurate with their job duties:

1. Emergency Response/Preparedness,
2. Plant Security,
3. Behavioral Observation,
4. Fitness for Duty,
5. Industrial Safety and Environmental Management,
6. Hazard Communication,
7. Quality Assurance Program,
8. Radiation Protection,
9. Site Specific Information,
10. Fire Protection, and
11. General Organization/Administrative Overview.

#### 13.2.2.1.1 Fire Brigade Training

The primary purpose of the Fire Brigade Training Program is to develop a group of station employees skilled in fire fighting techniques and emergency response. They are trained and equipped to function as a team for the fighting of fires. The station fire brigade organization is intended to be self-sufficient with respect to fire fighting activities.

The Fire Brigade Training program provides for initial training of all new fire brigade members, quarterly classroom training and drills, annual practical training, and leadership training for fire brigade leaders.

### 13.2.2.2 Employee Training and Qualification System (ETQS) Training

ETQS training is designed, developed and implemented to assist station employees in gaining an understanding of applicable fundamentals, procedures, and practices; and in developing manipulative skills necessary to perform assigned work in a competent and independent manner. Technical training consists of Initial Training, On-the-Job Training and Qualification, and Continuing Training.

#### 13.2.2.2.1 Initial Job Training

Initial job training is designed to provide knowledge of the fundamentals, basic principles, and procedures involved in work to which an employee is assigned. An accredited training program is maintained using a systematic approach in the following areas:

1. Non-licensed Operators (NLO),
2. Operations Shift Manager (OSM),
3. Shift Technical Advisor (STA),
4. Reactor Operators (RO),
5. Senior Reactor Operators (SRO),
6. Continuing Training for Licensed Operators,
7. I&E,
8. Mechanical Maintenance Personnel,
9. Mechanical Maintenance Supervisor Program,
10. Radiation Protection Personnel,
11. Chemistry Technicians, and
12. Engineering Support Personnel.

#### 13.2.2.2.2 On-the-Job Training and Qualifications

On-the-job training (OJT) is a systematic method of providing the required job-related skills and knowledge for a position. This training is conducted in the work environment by qualified OJT trainers and evaluated using Trainee Performance Evaluations (TPE) by qualified TPE Evaluators or through OJT and qualified Mentorship. The elements of OJT and Evaluation (by TPE or Mentorship) are fundamental portions of the overall qualification process. Applicable tasks and related procedures make up the OJT and TPE qualifications program for each technical area which is designed to supplement training received through formal classroom, laboratory, and/or simulator training. The objective of the program is to assure the trainee's

ability to perform job tasks as described in the task descriptions, Training and Qualification Guides and/or Position Specific Guides (PSG).

#### 13.2.2.2.3 Continuing Training

Continuing Training is any training not provided as Initial Training and Qualification which maintains and improves job-related knowledge and skills.

##### 13.2.2.2.3.1 Operator Requalification Training

Operator Requalification Training is designed to maintain and demonstrate continued competence of all licensed operators. The training is described in the Duke Energy's - Employee Training and Qualification System Standards.

#### 13.2.2.3 Employee Development/Management Supervisory Training

Employee Development/Management Supervisory Training may consist of various classes for different management personnel levels. An individual's training will depend on the position description and nomination by management. The site maintains a formal process for the identification, nomination and selection of Leadership candidates.

### 13.2.3 Operator License Training

Duke Energy's Reactor Operator (RO) and Senior Reactor Operator (SRO) training programs are based upon a systems approach to training as defined by 10CFR 55.4. These training programs were accredited by the Institute of Nuclear Power Operations and the National Nuclear Accrediting Board on May 30, 1985. Certification of these training programs was made to the NRC in Mr. H.B. Tucker's letters dated May 18, 1987 and September 11, 1987.

The training for Reactor Operator and Senior Reactor Operator replacement is described in the Duke Energy's - Employee Training and Qualification System Standards.

### 13.2.4 Training Program Evaluations

Training and qualifications activities are monitored by Site Training Personnel. Trainees and supplemental personnel may provide input concerning training program effectiveness. Evaluation information may be collected through:

1. verification of program objectives as related to job duties for which intended,
2. periodic Working Group Program evaluations,
3. testing to determine student accomplishment of these objectives,
4. student evaluation of the instruction,
5. instructor evaluations of the students,
6. supervisor's evaluation of the trainee's performance after training on-the-job,
7. supervisor's evaluation of the instructor, and
8. periodic self-evaluation of the accredited programs.

The performance and competency of licensed Reactor Operators and Senior Reactor Operators is evaluated through “Periodic Licensed Operator Requalification”.

### 13.2.5 Training and Qualifications Program

Records are maintained on each employee's participation in training activities, according to the requirements established by the Duke Energy's - Employee Training and Qualification System Standards. It is the Training Manager's responsibility to ensure training records of individuals are accurate and retrievable.

Records are retained as per Station Technical Specifications.

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# 13.3 Emergency Planning

Duke Energy's response to an emergency situation at McGuire Nuclear Station is detailed in two related documents. The McGuire Nuclear Station Emergency Plan and its Emergency Plan Implementing Procedures detail the station's organization, facilities, and capabilities. Further information is available in the plans themselves, which have been submitted at both the headquarters and Region II offices of the NRC, and which are maintained current through subsequent submission of document revisions to these NRC offices.

## 13.3.1 Emergency Plans

Emergency plans involve administrative controls to assure that actions are taken in the event plant conditions warrant these actions. The McGuire Emergency Plan is a controlled document and the implementing procedures for the Emergency Plan should be designated appropriately for the procedure related function. That is, non-safety procedures may be used for manipulating non-safety related structures, systems, and components (SSCs). Likewise, safety related procedures shall be used when manipulating safety related SSCs. These procedures and the Emergency Plan are subject to the pertinent requirements of the Appendix B Quality Assurance Program.

See UFSAR Section 1.8 (Response to TMI Concerns).

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# 13.4 Review and Audit

## 13.4.1 On-Site Review

The Onsite Review Committee is addressed with the Independent Review function in the description of the Quality Assurance Program referenced in Chapter 17.

## 13.4.2 Independent Review

The Independent Review function is addressed in the description of the Quality Assurance Program referenced in Chapter 17.

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# 13.5 Station Procedures

Safety-related operating, maintenance, and testing activities are conducted in accordance with approved, written procedures meeting the requirements of Regulatory Guide 1.33 and ANSI N18.7-1976/ANS-3.2.

## 13.5.1 Description of Station Procedures

### 13.5.1.1 Procedures Performed by or at the Direction of Licensed Operators

Integrated operations of the station are performed in accordance with approved, written procedures. These procedures are intended to provide a pre-planned method of conducting station operations, to eliminate errors due to on-the-spot analyses and judgments.

General station operating procedures provide instructions for operating the station as a whole during major evolutions or steady state conditions. The format of these procedures includes a purpose, limits and precautions, initial conditions and step-by-step instructions and necessary enclosures.

General station operating procedures are sufficiently detailed that qualified individuals can perform the required functions without direct supervision. Written procedures, however, cannot address all contingencies and therefore contain a degree of flexibility appropriate to the activities for which each is applicable.

The following is a typical listing of general station operating procedures:

Controlling Procedure for Unit Startup

Controlling Procedure for Unit Shutdown

Controlling Procedure for Unit Operation

Operation with Computer Out of Service

Preparation for Refueling

#### 13.5.1.1.1 System Operating Procedures

Operating activities which affect the proper functioning of the station's safety-related systems and components are performed in accordance with approved, written procedures. These procedures are intended to provide a pre-planned method of conducting operations of systems to eliminate errors due to on-the-spot analyses and judgments.

System operating procedures provide instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation and other instructions appropriate for operations of systems related to the safety of the plant. The format of these procedures includes a purpose, limits and precautions, initial conditions and step-by-step instructions and necessary enclosures.

System operating procedures are sufficiently detailed that qualified individuals can perform the required functions without direct supervision. Written procedures, however, cannot address all contingencies and therefore contain a degree of flexibility appropriate to the activities for which each is applicable.

The following is a typical listing of system operating procedures:

Accumulator Operation

AC Electrical Operation Other Than Normal Lineup
Annulus Ventilation System Operation
Auxiliary Building, Turbine, and Steam Dog House Ventilation System Operation
Auxiliary Feedwater System Operation
Battery Charger and Inverter Operation
Boron Concentration Control Operation
Boron Recycle System Operation
Chemical and Volume Control System Operation
Component Cooling Water System Operation
Condensate and Feedwater System Operation
Condenser Circulating Low Level Intake Water System Operation
Containment Purge and Ventilation System Operation
Containment Spray System Operation
Containment Ventilation Cooling Water System Operation
Control Area Ventilation System Operation
Demineralizer Resin Sluice
Draining The Reactor Coolant System
Emergency Diesel Operation
Equipment Decontamination System Operation
Failed Fuel Detection and Handling
Fill, Drain and Purification of Refueling Cavity
Filling and Venting the Reactor Coolant System
Fire Protection System Operation
Fuel and Component Handling
Fuel Pool Ventilation System Operation
Hydrogen Blanket and Bulk Storage System Operation
Hydrogen Skimmer and Containment Air Return System Operation
Ice Condenser Refrigeration System Operation
Incore Instrumentation System Operation
Instrument Air System Operation
Liquid Waste Monitor and Disposal System Operation
Liquid Waste Recycle System Operation
Main Steam System Operation
Neutron Source Handling
Nitrogen System Operation

Normal Power Checklist

Nuclear Service Water System Operation

Oxygen System Operation

Pressurizer Operation

Pressurizer Relief Tank Operation

Reactor Coolant Pump Operation

Receipt, Inspection and Storage of Control Components

Residual Heat Removal System Operation

Rod Control

Safety Injection System Operation

S/G Blowdown System Operation

S/G Secondary Fill, Drain, Layup and Recirculation

Solid Waste Disposal Compactor System Operation

Spent Fuel Cooling System Operation

Spent Fuel Handling

Station Communication System Operation

Trace Heating System Operation

Turbine Generator Operation

Waste Gas System Operation

#### 13.5.1.1.2 Emergency Operating Procedure and Abnormal Operating Procedures

Emergency operating procedures and Abnormal Operating Procedures are written which specify steps to be taken during foreseeable emergency or abnormal situations. These procedures are based on a sequence of observations and actions, with emphasis placed on operator responses to indications in the control room. When immediate operator actions are required to prevent or mitigate the consequences of an emergency or abnormal situation, procedures require that these actions be implemented at the earliest possible time, even if full knowledge of the emergency or abnormal situation is not yet available.

The format of these procedures includes symptoms, immediate actions and subsequent actions.

The actions outlined in emergency operating procedures and abnormal operating procedures are based on a conservative course of action to be followed by the operating crew. Written procedures, however, cannot address all contingencies and therefore contain a degree of flexibility consistent with the fact that an emergency situation may not follow an anticipated sequence.

The following is a typical listing of abnormal operating procedures:

Emergency Boration

High Activity in Reactor Coolant

Rod Control Malfunction

Load Rejection
Loss of KC or KC System Leakage
Loss of Condenser Vacuum
Loss of Control Room
Loss of Electrical Power
NC System Leakage Within Capacity of NV Pumps
Loss of VI
Loss of Letdown, Charging, or Seal Injection
Loss of RN
Loss of ND or ND System Leakage
Malfunction of Nuclear Instrumentation System
Spent Fuel Damage
Turbine-Generator Trip

The following is a list of typical listings of Emergency Operating Procedures:

Reactor Trip or Safety Injection
Rediagnosis
Reactor Trip Response
Natural Circulation Cooldown
Natural Circulation Cooldown with Steam Void In Vessel
Loss of Reactor or Secondary Coolant
Safety Injection Termination
Post LOCA Cooldown and Depressurization
Transfer to Cold Leg Recirc
Transfer to Hot Leg Recirc
Faulted Steam Generator Isolation
Steam Generator Tube Rupture
Post-SGTR Cooldown Using Backfill
Post-SGTR Cooldown Using Blowdown
Post-SGTR Cooldown Using Steam Dump
Loss of All AC Power
Loss of All AC Power Recovery Without S/I Required
Loss of All AC Power Recovery with S/I Required
Loss of Emergency Coolant Recirc
LOCA Outside Containment
Uncontrolled Depressurization of All Steam Generators

SGTR with Loss of Reactor Coolant - Subcooled Recovery Desired

SGTR with Loss of Reactor Coolant - Saturated Recovery Desired

Critical Safety Function Status Trees

Response to Nuclear Generation/ATWS

Response to Loss of Core Shutdown

Response to Inadequate Core Cooling

Response to Degraded Core Cooling

Response to Saturated Core Cooling

Response to Loss of Secondary Heat Sink

Response to Steam Generator Overpressure

Response to Steam Generator High Level

Response to Loss of Normal Steam Release Capabilities

Response to Steam Generator Low Level

Response to Imminent Pressurized Thermal Shock Condition

Response to Anticipated Pressurized Thermal Shock Condition

Response to High Containment Pressure

Response to Containment Flooding

Response to High Containment Radiation Level

Response to High Containment H2 Concentration

Response to High Pzr Level

Response to Low Pzr Level

Response to Voids in Reactor Vessel

References 1- 4 detail the means whereby the station emergency procedures (EPs) meet the criteria of NUREG-0737, Item I.C.1. The EPs are based on the Emergency Response Guidelines (ERGs) of the Westinghouse Owners Group. General agreement that the ERGs satisfy Item I.C.1 of NUREG-0737 is provided by References 5-8.

#### 13.5.1.1.3 Temporary Operating Procedures

Temporary operating procedures are approved written procedures issued during the operational phase of the station for operating activities which are of a non-recurring nature. Examples of such uses are: (a) to direct operating activities during special testing or maintenance; (b) to provide guidance in unusual situations not within the scope of normal procedures; (c) to assure orderly and uniform operations for short periods of time when the station, a unit, a structure, a system or a component is performing in a manner not addressed by existing procedures or has been modified or extended in such a manner that portions of existing procedures do not apply.

The format of these procedures includes a purpose, limits and precautions, initial conditions and step-by-step instructions and necessary enclosures.

Temporary operating procedures are sufficiently detailed that qualified individuals can perform the required functions without direct supervision. Written procedures, however, cannot address

all contingencies and therefore contain a degree of flexibility appropriate to the activities for which each is applicable.

#### 13.5.1.1.4 Annunciator Response Procedures

Annunciator response procedures are written which specify operator actions necessary to respond to an off-normal condition as indicated by an alarm. The format for annunciator response procedures includes alarm setpoints, probable causes, automatic actions, immediate manual actions, and supplementary actions.

To insure that annunciator response procedures are readily accessible for reference, a positive method is employed to allow their retrieval. Each annunciator panel is designated by a unique and obvious nameplate. All of the annunciator windows within a panel are designated by identifying names. The annunciator response procedures are grouped by panels, then subdivided by annunciator names so that the response procedure for an annunciator may be quickly located.

### 13.5.1.2 Procedures Performed by Non-Licensed Personnel

#### 13.5.1.2.1 Maintenance Procedures

Maintenance of station safety-related structures, systems and components is performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances (for example, skills normally possessed by qualified maintenance personnel may not require detailed step-by-step delineation in a written procedure) which conform to applicable codes, standards, specifications, criteria, etc. Where appropriate sections of related vendor manuals, instructions or approved drawings with acceptable tolerances do not provide adequate guidance to assure the required quality or work, an approved, written maintenance procedure is provided.

Each procedure is sufficiently detailed that qualified workers can perform the required functions without direct supervision. Written procedures, however, cannot address all contingencies and maintenance procedures, therefore, contain a degree of flexibility appropriate to the activities for which each is applicable.

The station's Maintenance group under the Maintenance Superintendent, has responsibility for preparation and implementation of maintenance procedures related to electrical and mechanical equipment.

#### 13.5.1.2.2 Instrument Procedures

Maintenance, testing, and calibration of station safety-related instruments is performed in accordance with written, approved procedures.

Each procedure is sufficiently detailed that qualified workers can perform the required functions without direct supervision. Written procedures, however, cannot address all contingencies and therefore contain a degree of flexibility appropriate to the activities for which each is applicable.

The station's Maintenance group under the Maintenance Superintendent, has responsibility for preparation and implementation of instrument procedures.

#### 13.5.1.2.3 Periodic Test Procedures

Testing conducted on a periodic basis to determine various station parameters and to verify the continuing capability of safety-related structures, systems and components to meet performance

requirements is conducted in accordance with approved, written procedures. Periodic tests procedures are used to perform such testing and are sufficiently detailed that qualified personnel can perform the required functions without direct supervision.

Periodic test procedures are performed by the station's Chemistry, RP, Operations, Maintenance and Engineering groups.

#### 13.5.1.2.4 Chemistry Procedures

Chemical and radiochemical activities associated with station safety-related structures, systems, and components are performed in accordance with approved, written procedures and the station chemistry manual.

Each procedure is sufficiently detailed that qualified workers can perform the required functions without direct supervision. Written procedures, however, cannot address all contingencies and therefore contain a degree of flexibility appropriate to the activities for which each is applicable.

The station's chemistry section has responsibility for preparation and implementation of chemistry procedures.

#### 13.5.1.2.5 Radiation Protection Procedures

Information concerning these procedures is presented in Sections 12.1.5 and 12.2.5.

#### 13.5.1.2.6 Plant Security Procedures

Information concerning these procedures is presented in the Station Security Plan.

#### 13.5.1.2.7 Radioactive Waste Management Procedures

Information concerning these procedures is presented in Sections 11.2.4, 11.3.4, and 11.5.3.

#### 13.5.1.2.8 Emergency Preparedness Procedures

Information concerning these procedures is presented in Section 13.3.

#### 13.5.1.2.9 Materials and Control Procedures

Information concerning these procedures is presented in Duke Energy's Topical Report, Quality Assurance Program, DUKE-1.

#### 13.5.1.2.10 Modification Procedures

Information concerning these procedures is presented in Duke Energy's Topical Report, Quality Assurance Program, DUKE-1.

### 13.5.1.3 Administrative Controls

Station administrative procedures are written to administratively control all station testing, maintenance, and operating activities. Listed below are several areas for which administrative procedures are written, including principle features:

1. The reactor operator's authority and responsibility: The reactor operator is given the authority to manipulate controls which directly or indirectly affect core reactivity, including a reactor trip if he deems necessary. He is also assigned the responsibility for knowing the

limits and setpoints associated with safety-related equipment and systems as specified in the Technical Specifications and designated in the operating procedures.

2. The senior reactor operator's authority and responsibility: The senior reactor operator, in addition to the authorities and responsibilities described for the reactor operator, is given the authority to direct the licensed activities of the reactor operator and ultimately is held responsible for all licensed activities at the station within his control.
3. Activities affecting station operation or operating indications: All station personnel performing functions which may affect unit operation or Control Room indications are required to notify the Control Operator (licensed Reactor Operator) prior to initiating such action. Removal of an instrument or component from service requires the permission of the Shift Supervisor (licensed Senior Reactor Operators).
4. Manipulation of facility controls: No one is permitted to manipulate the facility controls who is not a licensed reactor operator or senior reactor operator, except for license trainees operating under the direction of a licensed operator. The licensed operators are required to comply with the requalification program as described in Section 13.2.2.
5. Responsibility for licensed activities: Responsibility for directing the licensed activities of licensed operators is assigned to individuals with senior reactor operator licenses by virtue of their position within the station organization.
6. Equipment control: Equipment control is maintained and documented through the use of safety tags and equipment delineating tags.
7. Master surveillance testing schedule: This procedure establishes a master surveillance testing schedule to insure that all safety-related testing is performed and evaluated on a timely basis. Surveillance testing is scheduled such that the safety of the station is not dependent on the performance of a structure, system or component which has not been tested within its specified testing interval. The master surveillance testing schedule identifies surveillance and testing requirements, applicable procedures, and required test frequency. Assignment of responsibility for these requirements is also indicated.

A station Directive is written which requires a reactor operator or senior reactor operator to be present at the controls at all times during the operation of the facility. The area designated “at the controls” is defined by Figure 13-8.

Administrative or special orders of a transient or self canceling nature are issued (and rescinded if necessary) by the use of intrastation memoranda.

The administrative control of maintenance is maintained as follows:

1. In order to assure safe, reliable, and efficient operation, a comprehensive maintenance program for the station's safety-related structures, systems and components is established.
2. The Maintenance Superintendent is responsible for directing the performance of station maintenance activities.
3. Personnel performing maintenance activities are qualified in accordance with applicable codes and standards, as appropriate.
4. Maintenance is performed in accordance with written procedures which conform to applicable codes, standards, specifications, criteria, etc.
5. Maintenance is scheduled so as not to jeopardize station operation or the safety or a reactor or reactors.

6. Maintenance histories are maintained on station safety-related electrical equipment, mechanical equipment, and instrumentation.

The administrative control of modifications is discussed in Topical Report, DUKE-1, Quality Assurance Program.

## 13.5.2 Administration of Station Procedures

### 13.5.2.1 Preparation of Procedures

The preparation, review, and approval of procedures is performed in accordance with Section 17.3.2.14, Document Control, of the Topical Report, Duke-1, Quality Assurance Program.

### 13.5.2.2 Changes to Procedures

Changes to an approved procedure undergo the same review and approval process referenced in the previous section.

### 13.5.2.3 Development and Maintenance of Emergency Procedures

The administrative control of emergency procedures (EPs) differs from that of other station procedures. The process is described in detail in References 1- 4. Briefly, an EP draft is developed from the corresponding Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERGs). The draft is reviewed for the written correctness of specific information, e.g., valve tag numbers and equipment locations, and for adherence to the station Emergency Procedure Writers Guide (contained in References 1-4). A technical verification review is also performed. Prior to final approval the EP is validated according to the program described in References 1-4. This validation is to ensure that the EP as written is executable by the operator. Validation is performed on the McGuire Nuclear Station plant simulator or with another of the methods described in References 1- 4. From this point the EP goes to the qualified reviewer and the approval process proceeds as for operating procedures. Changes to EPs follow the same process of written correctness review by the Operations group and human factors review against the Writers Guide.

## 13.5.3 References

1. April 14, 1983 letter from H. B. Tucker (Duke Power Co.) to H. R. Denton (NRC) transmitting the original Duke Power Co. McGuire Nuclear Station Response to Supplement 1 of NUREG-0737.
2. September 8, 1983 letter from H. B. Tucker (Duke Power Co.) to H. R. Denton (NRC) transmitting Revision 1 of the Duke Power Co. McGuire Nuclear Station Response to Supplement 1 of NUREG-0737.
3. February 16, 1984 letter from H. B. Tucker (Duke Power Co.) to H. R. Denton (NRC) transmitting Revision 2 of the Duke Power Co. McGuire Nuclear Station Response to Supplement 1 of NUREG-0737.
4. March 29, 1984 letter from H. B. Tucker (Duke Power Co.) to H. R. Denton (NRC) transmitting Revision 3 of the Duke Power Co. McGuire Nuclear Station Response to Supplement 1 of NUREG-0737.
5. June 1, 1983 letter from D. G. Eisenhut (NRC) to J. J. Sheppard (WOG) transmitting the SER on the BASIC version of the ERGs.

6. March 11, 1985 letter from J. A. Zwolinski (NRC) to J. J. Sheppard (WOG) transmitting a supplemental SER on the BASIC version of the ERGs.
7. December 26, 1985 letter from T. M. Novak (NRC) to D. Butterfield (WOG) transmitting a supplemental SER on the BASIC version of the ERGs.
8. December 27, 1984 letter from D. G. Eisenhut (NRC) to J. J. Sheppard (WOG) transmitting a preliminary review of Revision 1 to the ERGs.
9. NUREG-0954, Supplement 4, SER related to the operation of Catawba Nuclear Station Units 1 and 2, December 1984, pp. 13-7 through 13-10.

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# 13.6 Station Records

McGuire station records are maintained in a controlled and systematic manner in order to adequately document station operation. This maintenance is in accordance with the intent of the following:

1. Title 10, Code of Federal Regulations, Part 50, Appendix B, Criterion XVII;
2. Title 18, Code of Federal Regulations, Part 125, Section 125.3, Section 22.2.
3. American National Standard (ANS) 3.2.

## 13.6.1 Station Records Administration

The Nuclear Document Management and Information Services Manager has the final responsibility for the proper management of station records. The various station supervisors are responsible to the Engineering Manager for assuring the proper management, as applicable, of records within their purview.

Station records are maintained in an identifiable and retrievable manner in the station Master File. Access to, and use of, the Master File is controlled.

## 13.6.2 Station Records Requirements

### 13.6.2.1 Administrative Records

#### 13.6.2.1.1 Reportable Occurrences

Records of reportable occurrences are retained for a minimum of six (6) years.

#### 13.6.2.1.2 Nuclear Safety Review Board

Minutes of meetings of the Nuclear Safety Review Board applicable to McGuire Nuclear Station are retained for the life of the plant + 10 years.

### 13.6.2.2 Environmental Records

Records of off-site environmental surveys are retained for the life of the station.

### 13.6.2.3 Maintenance Records

#### 13.6.2.3.1 Modifications

Records of modifications to the station as described in the FSAR are retained for the life of the station.

#### 13.6.2.3.2 Maintenance Histories

Maintenance histories are maintained on station safety-related structures, systems and components. These histories contain a description of maintenance performed and sufficient documentation to assure identification of any replacement parts used. These records are retained for the life of the plant.

#### 13.6.2.3.3 Inspections

Safety-related inspections, such as equipment inservice inspections, cleanliness inspections and procedure compliance inspections, are documented in such a manner as to allow identification of the individual(s) performing the inspection, when the inspection was performed, the type and purpose of the inspection, and the results of the inspection. These records are retained for the life of the plant.

### 13.6.2.4 Operating Records

#### 13.6.2.4.1 Changes to Operating Procedures

Records of changes to safety-related operating procedures are retained for the life of the station.

#### 13.6.2.4.2 Switchboard Record

The Switchboard Record contains data on station and unit electrical power loadings and generation, generator temperatures, bus voltages and transmission line voltages, and is retained for the life of the plant.

#### 13.6.2.4.3 Reactor Operations Logbook

The Reactor Operations Logbook is maintained for each unit at the station. The logbook contains information concerning changes in reactivity. Notations are made of any abnormal conditions of operation due to auxiliary equipment and of releases of radioactive waste, both gaseous and liquid. Alarms received are normally logged by computer, however, those pertaining to reactor core conditions are also listed in this log with appropriate explanation. The Reactor Operations Logbook is retained for a minimum of six (6) years.

#### 13.6.2.4.4 Control Room Senior Reactor Operator Logbook

The Control Room Senior Reactor Operator Logbook contains a summary of station operation for each shift. Significant abnormalities which occur are explained in greater detail than would be expected in the Reactor Operations Logbook. The Shift Supervisor Logbook is retained for a minimum of six (6) years.

### 13.6.2.5 Radiological Records

#### 13.6.2.5.1 Personnel Radiation Exposure

Personnel radiation exposure records, including an individual's past radiation exposure history and current radiation exposure, for the appropriate personnel as required by 10CFR 20, are retained for the life of the station.

#### 13.6.2.5.2 Radiation Monitoring

Radiation monitoring records, including records of radiation and contamination surveys identifiable as to location(s) and date(s), are retained for the life of the station.

#### 13.6.2.5.3 Radioactive Releases

Records of radioactive releases and waste disposal are retained for the life of the station.

### 13.6.2.6 Special Nuclear Material Records

#### 13.6.2.6.1 Physical Inventory

Position maps, photographs, television tapes or other suitable devices showing the location and identification of each fuel assembly are maintained for each fuel storage area. These records are updated at the completion of each major fuel handling operation. Also, a record is maintained of the storage location history of each fuel assembly from the time it is received at the station until it is shipped off site. Special nuclear material physical inventory records are maintained for the life of the station.

#### 13.6.2.6.2 Isotopic Inventory

Records are kept which show the isotopic content of each fuel assembly as follows:

1. When received.
2. Semi-annually while being irradiated in a reactor.
3. At the time of shutdown prior to each refueling outage.
4. At the time the fuel assembly is shipped off site.

Isotopic inventory records are retained for the life of the station.

### 13.6.2.7 Testing Records

#### 13.6.2.7.1 Preoperational Testing

Safety-related preoperational testing records are retained in sufficient detail to permit adequate confirmation of the testing program. In particular, these records identify the data taker(s), the results of the testing and whether or not the results were acceptable, discrepancies and their cause, and any corrective action resulting from the test. Preoperational testing records are retained for the life of the station.

#### 13.6.2.7.2 Special Testing

Records of special reactor tests or experiments are retained for the life of the station.

#### 13.6.2.7.3 Periodic Testing

Safety-related periodic testing records are retained in sufficient detail to permit adequate confirmation of the testing program. In particular these records identify the data taker(s), the results of the testing and whether or not the results were acceptable, discrepancies and their cause, and any corrective action resulting from the test. Also, records of other periodic checks, calibrations, etc., performed in accordance with surveillance requirements for safety-related parameters, structures, systems and components are retained. Periodic testing and surveillance records are retained for the life of the plant.

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# 13.7 Nuclear Security

The requirements to implement 10 CFR 73.55 through its Commission-approved Physical Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Cyber Security Plan referred to collectively as "Security Plans," describes the comprehensive security program for McGuire Nuclear Station.

## 13.7.1 Physical Security

A combined Duke Energy Physical Security Plan, Security Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security and Contingency Plan is submitted for the protection of McGuire Nuclear Station against potential acts of radiological sabotage via a determined violent external assault, attack by stealth, or deceptive actions, an internal threat, a land vehicle bomb assault, and waterborne vehicle bomb assault. This information is to be withheld from public disclosure pursuant to 10 CFR 73.21.

The general scope of activities encompassed by the Duke Energy Physical Security Plan, Security Training and Qualification Plan, Safeguards Contingency Plan and Independent Spent Fuel Storage Security and Contingency Plan include:

1. Performance Objectives;
2. Performance Evaluation Program;
3. Physical Security Organization;
4. Qualification for Employment in Security
5. Security Personnel Training;
6. Liaison with Local Law Enforcement;
7. Physical Security Barriers, Posts and Structures;
8. Nuclear Site Access and Control Requirements;
9. Surveillance, Observation and Monitoring for detection of unauthorized intrusion;
10. Security Communications Systems;
11. Response to Security Threats;
12. Review, Evaluation, and audit of the Physical Security Program;
13. Special Situations Affecting Security;
14. Maintenance, Testing and Calibration of Security Systems and equipment;
15. Compensatory Measures for degraded Physical Barriers and Security Systems;
16. Security Records; and
17. Temporary Suspension of Security Measures.

The Duke Energy Physical Security Plan, Security Training and Qualification Plan and Safeguards Contingency Plan conforms to the requirements of 10 CFR 50.34(c)(2), (d) and (e), 10 CFR 73.55, and NRC Orders EA-03-086, EA-06-037 and EA-06-137. The Duke Energy Independent Spent Fuel Storage Installation Security and Contingency Plan conforms to the requirements of 10 CFR 72.212 and NRC Order EA-02-104 (McGuire and Oconee) or EA-05-084 (Catawba).

## 13.7.2 Cyber Security

A separate Duke Energy Cyber Security Plan is submitted for the protection of the McGuire Nuclear Station against potential acts of radiological sabotage via cyber attack to digital computer and communication systems and networks associated with:

1. Safety-related and important to safety functions;
2. Security functions;
3. Emergency preparedness functions, including offsite communications; and
4. Support systems and equipment which if compromised, would adversely impact safety, security, or emergency preparedness functions.

The safety-related and important-to-safety functions, security functions, and emergency preparedness functions including offsite communications are herein referred to as SSEP functions.

In the context of cyber security, systems or equipment that perform important to safety functions include structures, systems and components (SSCs) in the balance of plant (BOP) that could directly or indirectly affect reactivity at a nuclear power plant and could result in an unplanned reactor shutdown or transient.

The Duke Energy Cyber Security Plan conforms to the requirements of 10 CFR 50.34(c)(2), 10 CFR 73.54 and 10 CFR 73.55.

This information is to be withheld from public disclosure pursuant to 10 CFR 2.30(d).

## 13.7.3 Reference

1. Letter, from R. Michael Glover, Duke Energy to NRC, "Duke Energy Physical Security Plan, Revision 16", dated April 15, 2010.
2. Letter from R. Michael Glover, Duke Energy to NRC, "Response to Requested changes Regarding Duke Energy License Amendment Request for Cyber Security Plan," dated August 9, 2011.

THIS IS THE LAST PAGE OF THE TEXT SECTION 13.7.

## 13.8 Former Appendix A, B and C to Chapter 13

This material has been deleted. It contained information that can be found or referenced in this Chapter in Section 13.2.

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