

Evaluation of the Duke Energy Request to Further Consolidate the Duke Charlotte Emergency Operations Facility

By letter dated April 29, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML16120A076), as supplemented by letters dated October 3, 2016 (ADAMS Accession No. ML16277A521), and January 16, 2017 (ADAMS Accession No. ML17017A210), Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC (referred to hereafter as “Duke Energy”) requested U.S. Nuclear Regulatory Commission (NRC) approval to consolidate the Emergency Operations Facilities (EOFs) for Brunswick Steam Electric Plant (Brunswick), Shearon Harris Nuclear Power Plant (Harris), and H.B. Robinson Steam Electric Plant (Robinson) with the existing Duke Charlotte EOF.

The NRC staff considered relevant regulations and guidance documents in its evaluation of Duke Energy’s request to further consolidate the Duke Charlotte EOF. In particular, under paragraph 50.47(b)(8) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities,” an acceptable emergency plan must meet the following standard: “Adequate emergency facilities and equipment to support the emergency response are provided and maintained.” In addition, paragraph IV.E.8.c of Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” of 10 CFR Part 50 establishes the minimum capabilities for an applicant/licensee EOF, which were added in a 2011 final rule, “Enhancements to Emergency Preparedness Regulations” (76 FR 72598; November 23, 2011):

- The capability for obtaining and displaying plant data and radiological information for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves;
- The capability to analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee and offsite response organizations for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves; and
- The capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the emergency operations facility serves more than one site.

A licensee with an EOF located more than 25 miles from a nuclear power reactor site must also have an additional facility closer than 25 miles to the nuclear power reactor site so that NRC and offsite responders can interact face-to-face with emergency response personnel entering and leaving the nuclear power reactor site. This additional near-site facility must meet the following requirements in paragraph IV.E.8.b of Appendix E to Part 50, which were added in the 2011 final rule:

- Space for members of an NRC site team and Federal, State, and local responders;
- Additional space for conducting briefings with emergency response personnel;
- Communication with other licensee and off-site emergency response facilities;
- Access to plant data and radiological information; and
- Access to copying equipment and office supplies.

The NRC’s issuance of the guidance document, NUREG-0696, “Functional Criteria for Emergency Response Facilities” (ADAMS Accession No. ML051390358), in 1981, established criteria for the NRC staff to use in evaluating whether an applicant/licensee met the

then-existing requirements of Part 50, Appendix E, paragraph IV.E.8 and Part 50, Appendix A, General Design Criteria 19, "Control Room." Section 4 of NUREG-0696 provided compliance criteria for the EOF in the following categories:

- Functions (section 4.1);
- Location, Structure, and Habitability (section 4.2);
- Staffing and Training (section 4.3);
- Size (section 4.4);
- Radiological Monitoring (section 4.5);
- Communications (section 4.6);
- Instrumentation, Data System Equipment, and Power Supplies (section 4.7);
- Technical Data and Data System (section 4.8); and
- Records Availability and Management (section 4.9).

In the staff requirements memorandum to SECY-04-0236, "Southern Nuclear Operating Company's Proposal to Establish a Common Emergency Operations Facility at Its Corporate Headquarters," dated February 23, 2005 (ADAMS Accession No. ML050550131), the Commission provided the following direction to the NRC staff:

The staff should consider revising 10 CFR Part 50 to make the requirements for EOFs more performance-based to allow other multi-plant licensees to consolidate their EOFs, if those licensees can demonstrate their emergency response strategies will adequately cope with an emergency at any of the associated plants...

In response, EOF regulations were amended as part of the 2011 final rulemaking and NUREG-0696 was supplemented by the Office of Nuclear Security and Incident Response (NSIR)/Division of Preparedness and Response (DPR) Interim Staff Guidance (ISG) document, NSIR/DPR-ISG-01, "Emergency Planning for Nuclear Power Plants," (ADAMS Accession No. ML113010523). Section VI.1 of NSIR/DPR-ISG-01 provided guidance for a performance-based approach for evaluating changes to a consolidated EOF.

Functions:

In its submittal, Duke Energy discusses how the Duke Charlotte EOF gives the Duke Energy licensees the capability to: (1) manage the overall licensee response effort; (2) coordinate radiological and environmental assessments; (3) make determinations of recommended public protective actions; (4) perform off-site notifications to State and local agencies; (5) coordinate event, plant, and response information provided to public information staff for dissemination to the media and the public; (6) staff and activate the facility within time frames and at emergency classification levels defined in the licensees' emergency plans; (7) coordinate emergency response activities with Federal, State, and local agencies; (8) locate NRC and off-site agency staff closer to affected sites because the EOF is greater than 25 miles from the sites; (9) obtain and display key plant data and radiological information for each plant the EOF serves; (10) analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee staff and off-site agency responders for each type of plant; and (11) effectively respond to and coordinate response efforts for events occurring simultaneously at more than one site.

Duke Energy staffs the Duke Charlotte EOF with emergency response organization (ERO) personnel from its co-located corporate office, in addition to personnel from the nearby Catawba

and McGuire sites. Duke Energy corporate personnel possess expertise in emergency preparedness, radiological engineering, safety analysis, probabilistic risk assessment, and other areas. The Duke Charlotte EOF will continue to be the primary facility from which the Duke Energy licensees will be responsible for managing the overall licensee emergency response, coordinating assessment of radiological and environmental conditions, and making determinations regarding protective actions and providing interface with off-site response, with the respective site Technical Support Centers (TSCs) serving as backup. Duke Energy will keep event classification responsibility at the respective sites' TSC. If the EOF were to become unavailable during an event, the TSC for the respective site will also be capable of assuming responsibility from the EOF for notifying off-site agencies, performing dose assessment, and determining protective action recommendations. In its evaluation, the NRC staff determined that the proposed addition of the Brunswick, Harris, and Robinson sites to the Duke Charlotte EOF would not impact how the Duke Charlotte EOF continues to meet the functional requirements for an EOF based on it satisfying the criteria in NUREG-0696 and NSIR/DPR-ISG-01. The Duke Charlotte EOF will provide for the continued capability to perform functions in a manner that is comparable to the current Brunswick, Harris, and Robinson EOFs and will continue to perform the same functions for the sites it currently serves.

In addition, in its letter dated October 3, 2016, Duke Energy described that it plans to:

- Conduct a dual-site drill at the Duke Charlotte EOF on June 21, 2017, with the Brunswick (boiling water reactor) and Oconee (pressurized water reactor) nuclear stations. The drill at each site will include activation of the ERO and facilities, off-site notifications, dose assessment, protective action recommendations, and field monitoring team coordination. Additionally, the event at one of the two sites will affect multiple units.
- Offer the States of North Carolina and South Carolina the opportunity to participate, as appropriate, in the dual-site simultaneous drill to verify their interfaces and coordination with the Duke Charlotte EOF for the addition of new sites.
- Offer the Federal Emergency Management Agency (FEMA) and the NRC an opportunity to observe the dual-site simultaneous drill to verify continued adequacy of offsite and licensee radiological emergency preparedness (REP) plans and preparedness.

Successful conduct of this dual-site drill will demonstrate the ability of the Duke Charlotte EOF to continue to effectively function during simultaneous events at multiple nuclear power reactor sites with different reactor technologies. The States of North Carolina and South Carolina intend to participate in the June 21, 2017, dual-site drill involving Brunswick and Oconee. While not required, the NRC staff and FEMA intend to observe the drill.

Location, Structure, and Habitability:

The Duke Charlotte EOF is located in the Duke Energy Center at 526 South Church Street in Charlotte, North Carolina. The facility meets the intent of the guidance in NUREG-0696 that the building be "well-engineered for the design life of the plant," and that it should be capable of withstanding wind loads and live loads equal to, or greater than, those contained in the current North Carolina Building Code. As the facility is greater than 10 miles from any of the nuclear power reactor sites, habitability criteria in NUREG-0696 are not applicable and a backup EOF is not required under paragraph IV.E.8.b. of Appendix E to Part 50.

The facility is located in the Nuclear General Office complex, allowing for corporate support and management personnel to quickly staff the EOF with expertise from various disciplines. A

consolidated EOF has been in Charlotte, North Carolina, since 1987. The facility was moved from the first to the third floor of the Duke Energy Center in October 2015 to allow for additional space and further upgrades to the facility. Some key features of the third floor upgraded facility include: a larger size; more than 50 new computers; 3 sub-areas to the main EOF area featuring large electronic flat screen “knowledge walls;” glass-walled rooms surrounding the main EOF area that support major functions; workstations to accommodate a multi-site event; and video conferencing capabilities. All electrical outlets, the heating, ventilation and air conditioning (HVAC) systems, lighting fixtures, and the wiring closet that supports both the voice and data communications in the Duke Charlotte EOF have backup power available.

Offsite Agreement:

In its April 29, 2016, submittal, Duke Energy provided signed letters of concurrence from respective agencies in the States of North Carolina and South Carolina, and local response organizations, indicating that they concur with the proposed consolidation of the site EOFs with the Duke Charlotte EOF. Local response agencies do not currently respond to the Brunswick, Harris or Robinson site EOFs, and Duke Energy does not expect that to change once those sites are consolidated into the Duke Charlotte EOF.

Per the “Memorandum of Understanding Between the Department of Homeland Security/Federal Emergency Management Agency and Nuclear Regulatory Commission Regarding Radiological Response, Planning and Preparedness,” dated December 7, 2015 (ADAMS Accession No. ML15344A371), FEMA has responsibility for determining the adequacy of off-site REP plans and preparedness, and providing its findings to the NRC. By letter dated October 3, 2016 (ADAMS Accession No. ML16287A740), FEMA indicated that it had reviewed Duke Energy’s proposal for the consolidation of EOFs and determined that there are no impediments to the responders from the States of North Carolina and South Carolina operating from the Duke Charlotte EOF, and that off-site REP plans and preparedness are not negatively impacted by the change.

Impact on NRC’s Incident Response:

Paragraph IV.E.8.b of Appendix E to 10 CFR Part 50 requires that, for an EOF located more than 25 miles from a nuclear reactor site, provisions be made for locating NRC and off-site responders closer to the reactor site to facilitate face-to-face interaction with emergency personnel entering and leaving the site.

Duke Energy states that near-site response locations will be established to meet this requirement. These locations will provide for conference areas with white boards, separate briefing/debriefing areas, telephones, ERO telephone contact lists, computers with access to the internet, necessary office supplies and photocopier access, and access to plant radiological information.

Duke Energy intends to establish response facilities at the following locations near the Brunswick, Harris, and Robinson sites should the NRC Site Team or off-site agencies determine they need to relocate from the Duke Charlotte EOF to be near the affected site(s):

- Duke Energy Progress Building in Leland, North Carolina (20 miles from Brunswick);
- Harris Energy & Environmental Center in New Hill, North Carolina (2 miles from Harris);
- and

- Remote Emergency Response Facility in Hartsville, South Carolina (7 miles from Robinson).

Staffing and Training:

Duke Energy intends to provide site-specific training on the Brunswick, Harris, and Robinson sites to the ERO staff prior to consolidation of these sites into the Duke Charlotte EOF, including instruction on the reactor technologies, differences in the radiological and environmental characteristics of those sites, and determination of their associated protective action recommendations. ERO staff will receive periodic training and will participate in activation drills, in accordance with Brunswick, Harris, and Robinson's emergency plans, to maintain proficiency in emergency response responsibilities.

In support of the NRC's Reactor Oversight Process, Nuclear Energy Institute (NEI) document, NEI 99-02 (Revision 7), "Regulatory Assessment Performance Indicator Guideline" (ADAMS Accession No. ML13261A116), includes the ERO Performance Indicator (PI) under the Emergency Preparedness Cornerstone, which allows the licensee and NRC staff to verify the licensee's ability to meet the performance-based consolidated EOF criteria and to adequately cope with an emergency at any of the licensee's sites. The PI tracks the participation of ERO members assigned to fill key positions in performance enhancing experiences, and ensures that the risk significant aspects of classification, notification, and protective action recommendation development are evaluated and included in the PI process. The PI also ensures that utilities with common EOFs where personnel are assigned to the key positions that support multiple nuclear sites are monitored to ensure that each receives a "meaningful opportunity to gain proficiency."

Size:

The Duke Charlotte EOF consists of approximately 7,658 square feet of working space. Based on the guidance in NUREG-0696, section 4.4, the facility can accommodate approximately 100 personnel. Duke Charlotte EOF staffing will include approximately 50 personnel for a single site event, including NRC and State responders.

Paragraph IV.E.8.c(3) to Appendix E of 10 CFR Part 50 requires the capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the EOF serves more than one site. However, neither NRC requirements nor guidance establish the minimum number of simultaneous events at multiple sites that a consolidated EOF needs to support. Recognizing that there is a possibility for simultaneous events to occur at the sites the Duke Charlotte EOF serves, Duke Energy discusses in its submittal that the Duke Charlotte EOF will be able to support simultaneous events at two of the sites it serves. Additionally, Duke Energy indicated that the Duke Charlotte EOF was designed with physical capabilities (e.g. space, equipment) to support simultaneous responses for up to three sites and has the capability to expand staffing, command and control, and coordination functions.

The main EOF area contains three segregated areas, each with its own equipment (e.g., computers, phones, wall displays) to support the EOF functions for each affected site. The rooms surrounding the main EOF area with major support functions (e.g. off-site communications, radiation assessment, accident assessment, offsite monitoring) also include

separate space and equipment for up to three sites. Finally, as stated in section 3.1.1 of the Duke Energy letter dated April 29, 2016, the respective site's TSCs will serve as a backup to the EOF, if required.

As part of its submittal, Duke Energy reviewed historical information on event declarations for an Alert classification and above at Catawba, McGuire, Oconee, Brunswick, Harris, and Robinson going back to 1980 to determine the occurrence of simultaneous declared emergencies at any of those six sites. Based on the best available information, Duke Energy found that the two closest events were 18 days and 28 days apart, and had separate initiating events. These included an Alert at Brunswick on September 21, 1989, and an Alert at Harris on October 9, 1989. The next closest events included an Alert at Brunswick on February 7, 2016, followed by an Alert at Oconee on March 6, 2016. While capable of supporting simultaneous events at multiple sites, this review of historical data indicates that the operating sites using the Duke Charlotte EOF have not had a need to activate the EOF for simultaneous events during their operation.

As part of its evaluation, the NRC staff physically walked down the facility on August 2-3, 2016, to verify the physical size, layout, and capabilities of the Duke Charlotte EOF to effectively support simultaneous events at multiple nuclear power reactor sites.

Radiological Monitoring:

The guidance in NUREG-0696 specifies that to ensure adequate radiological protection of EOF personnel, radiation monitoring systems should be provided in the EOF. As the Duke Charlotte EOF is beyond 10 miles from any of the nuclear power reactor sites that it serves, radiological monitoring capabilities for EOF personnel, as described in NUREG-0696, are not applicable.

Communications:

The Duke Charlotte EOF has sufficient internal and external telecommunications capabilities to support EOF functions for simultaneous events involving multiple sites. The Duke Charlotte EOF will continue to provide for reliable voice communication to the respective station TSCs and control rooms, the NRC and other Federal agencies as appropriate, State and local emergency operations centers, and the respective site Joint Information Centers. The current communications system at the Duke Charlotte EOF includes: the Duke Telephone System (with access to the internal phone system, the public switch network, and long distance); the Duke Emergency Management Network (DEMNET); a radio system for communication with radiological field monitoring teams at their respective sites; the NRC Emergency Telecommunications System telephones; State of North Carolina satellite radio/telephone; and facsimile capabilities. Additionally, Duke Energy uses two service providers to support independent connections to the internet.

DEMNET serves as the primary means of communication regarding event classification, meteorological information, and protective action recommendations to State and local agencies; and includes both a primary mode (internet) and secondary mode (satellite) as paths for communication. Existing commercial telephone service and fax serve as the designated back-up communications methods in the event of a DEMNET failure. Additionally, Duke Energy's communications systems include provisions for backup power.

Instrumentation, Data System Equipment, and Power Supplies:

Duke Energy is installing a new plant communication voice and data network under the 10 CFR 50.54(q) process to provide secure access to plant data for Brunswick, Harris, and Robinson. This network will provide for access at the Duke Charlotte EOF to the same data points as those available to the Control Room, TSC, and Operational Support Center (OSC), including the Safety Parameter Display System (SPDS). The local area network equipment, all electrical outlets, lighting fixtures, and HVAC loads in the Duke Charlotte EOF, and core network equipment in the Energy Center, have back-up power.

Technical Data and Data Systems:

The Duke Charlotte EOF will be able to receive, store, process, and display information needed to perform assessments of actual and potential offsite consequences of an emergency at Brunswick, Harris, and Robinson. The Duke Charlotte EOF will have access to the same data points that are available to the operators in each respective site's control room and emergency responders in the TSC and OSC, including the SPDS data points. All Duke Energy sites use the Unified Radiological Assessment System for Consequence Analysis Interface for off-site dose assessment.

Records Availability and Management:

The Duke Charlotte EOF will maintain hard copies of important reference materials for Brunswick, Harris, and Robinson. Also, station design documentation, plant drawings, procedures, and other documentation will be available electronically through a local area network connection.

Conclusion:

On the basis of its evaluation, the staff concludes the Duke Charlotte EOF will continue to fulfill necessary emergency response functions and meet applicable regulations in 10 CFR 50.47 and Appendix E of 10 CFR Part 50, and criteria set forth in NUREG-0696, as supplemented by NSIR/DPR ISG-01. Given the technological capabilities of the facility, the EOF's capacity to address multi-site events, an ERO comprised of experienced and diverse personnel from the Duke Energy corporate offices, and longstanding NRC and State experience with the Duke Charlotte EOF, the further consolidation of the Duke Charlotte EOF will continue to effectively support Duke Energy's emergency response at all of the sites that the facility serves. The NRC staff continues to find that there will be reasonable assurance that protective measures can and will be implemented in the event of a radiological emergency at any of the sites that the facility serves.