

## NUCLEAR REGULATORY COMMISSION

[NRC–2012–0068]

### Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Effective Immediately)

In the Matter of:

ALL POWER REACTOR LICENSEES AND HOLDERS OF CON- Docket Nos. (as shown in Attachment 1) License Nos. (as shown in  
STRUCTION PERMITS IN ACTIVE OR DEFERRED STATUS. Attachment 1) or Construction Permit Nos. (as shown in Attach-  
ment 1))  
EA–12–049

#### I

The Licensees and construction permits (CP) holders<sup>1</sup> identified in Attachment 1 to this Order hold licenses and CPs issued by the U.S. Nuclear Regulatory Commission (NRC or Commission) authorizing operation and/or construction of nuclear power plants in accordance with the Atomic Energy Act of 1954, as amended, and Title 10 of the Code of Federal Regulations (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities,” and Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”

#### II

On March 11, 2011, a magnitude 9.0 earthquake struck off the coast of the Japanese island of Honshu. The earthquake resulted in a large tsunami, estimated to have exceeded 14 meters (45 feet) in height, that inundated the Fukushima Dai-ichi nuclear power plant site. The earthquake and tsunami produced widespread devastation across northeastern Japan and significantly affected the infrastructure and industry in the northeastern coastal areas of Japan.

When the earthquake occurred, Fukushima Dai-ichi Units 1, 2, and 3 were in operation and Units 4, 5, and 6 were shut down for routine refueling and maintenance activities. The Unit 4 reactor fuel was offloaded to the Unit 4 spent fuel pool (SFP). Following the earthquake, the three operating units automatically shut down and offsite power was lost to the entire facility. The emergency diesel generators (EDGs) started at all six units providing alternating current (ac) electrical power to critical systems at each unit. The facility response to the earthquake appears to have been normal.

<sup>1</sup> CP holders, as used in this Order, includes CPs, in active or deferred status, as identified in Attachment 1 to this Order (i.e., Watts Bar, Unit 2; and Bellefonte, Units 1 and 2)

Approximately 40 minutes following the earthquake and shutdown of the operating units, the first large tsunami wave inundated the site, followed by additional waves. The tsunami caused extensive damage to site facilities and resulted in a complete loss of all ac electrical power at Units 1 through 5, a condition known as station blackout. In addition, all direct current electrical power was lost early in the event on Units 1 and 2 and after some period of time at the other units. Unit 6 retained the function of one air-cooled EDG. Despite their actions, the operators lost the ability to cool the fuel in the Unit 1 reactor after several hours, in the Unit 2 reactor after about 70 hours, and in the Unit 3 reactor after about 36 hours, resulting in damage to the nuclear fuel shortly after the loss of cooling capabilities.

Following the events at the Fukushima Dai-ichi nuclear power plant, the NRC established a senior-level agency task force referred to as the Near-Term Task Force (NTTF). The NTTF was tasked with conducting a systematic and methodical review of the NRC regulations and processes and determining if the agency should make additional improvements to these programs in light of the events at Fukushima Dai-ichi. As a result of this review, the NTTF developed a comprehensive set of recommendations, documented in SECY–11–0093, “Near-Term Report and Recommendations for Agency Actions Following the Events in Japan,” dated July 12, 2011. These recommendations were enhanced by the NRC staff following interactions with stakeholders. Documentation of the staff’s efforts is contained in SECY–11–0124, “Recommended Actions to be Taken Without Delay From the Near-Term Task Force Report,” dated September 9, 2011, and SECY–11–0137, “Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned,” dated October 3, 2011.

As directed by the Commission’s staff requirements memorandum (SRM) for SECY–11–0093, the NRC staff reviewed the NTTF recommendations within the context of the NRC’s existing regulatory framework and considered the various regulatory vehicles available to the NRC to implement the recommendations. SECY–11–0124 and SECY–11–0137 established the staff’s prioritization of the recommendations based upon the potential safety enhancements.

Since receiving the Commission’s direction in SRM–SECY–11–0124 and SRM–SECY–11–0137, the NRC staff conducted public meetings to discuss enhanced mitigation strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities following beyond-design-basis external events. At these meetings, the industry described its proposal for a Diverse and Flexible Mitigation Capability (FLEX), as documented in the Nuclear Energy Institute’s (NEI’s) letter dated December 16, 2011 (Agency Documents Access and Management System (ADAMS) Accession No. ML11353A008). FLEX is proposed as a strategy to fulfill the key safety functions of core cooling, containment integrity, and spent fuel cooling. Stakeholder input influenced the staff to pursue a more performance-based approach to improve the safety of operating power reactors than envisioned in NTTF Recommendation 4.2, SECY–11–0124, and SECY–11–0137.

Current regulatory requirements and existing plant capabilities allow the NRC to conclude that a sequence of events such as the Fukushima Dai-ichi accident is unlikely to occur in the U.S. Therefore, continued operation and continued licensing activities do not pose an imminent threat to public health and safety. However, NRC’s assessment of new insights from the events at Fukushima Dai-ichi leads the staff to conclude that additional requirements must be imposed on Licensees or CP holders to increase the

capability of nuclear power plants to mitigate beyond-design-basis external events. These additional requirements are needed to provide adequate protection to public health and safety, as set forth in Section III of this Order.

Guidance and strategies required by this Order would be available if the loss of power, motive force, and normal access to the ultimate heat sink to prevent fuel damage in the reactor and SFP, affected all units at a site simultaneously. This Order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment, and SFP cooling. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

Additional details on an acceptable approach for complying with this Order will be contained in final Interim Staff Guidance (ISG) scheduled to be issued by the NRC in August 2012. This guidance will also include a template to be used for the plan that will be submitted in accordance with Section IV, Condition C.1 below.

### III

Reasonable assurance of adequate protection of the public health and safety and assurance of the common defense and security are the fundamental NRC regulatory objectives. Compliance with NRC requirements plays a critical role in giving the NRC confidence that Licensees or CP holders are maintaining an adequate level of public health and safety and common defense and security. While compliance with NRC requirements presumptively assures adequate protection, new information may reveal that additional requirements are warranted. In such situations, the Commission may act in accordance with its statutory authority under Section 161 of the Atomic Energy Act of 1954, as amended, to require Licensees or CP holders to take action in order to protect health and safety and common defense and security.

To protect public health and safety from the inadvertent release of radioactive materials, the NRC's defense-in-depth strategy includes multiple layers of protection: (1) Prevention of accidents by virtue of the design, construction, and operation of the plant; (2) mitigation features to prevent radioactive releases should an

accident occur; and (3) emergency preparedness programs that include measures such as sheltering and evacuation. The defense-in-depth strategy also provides for multiple physical barriers to contain the radioactive materials in the event of an accident. The barriers are the fuel cladding, the reactor coolant pressure boundary, and the containment. These defense-in-depth features are embodied in the existing regulatory requirements and thereby provide adequate protection of the public health and safety.

Following the events of September 11, 2001, the NRC issued Order EA-02-026, dated February 25, 2002, which required Licensees to develop mitigating strategies related to the key safety functions of core cooling, containment, and SFP cooling. NEI Document 06-12, "B.5.b Phase 2 & 3 Submittal Guideline" (ADAMS Accession No. ML070090060) provides guidelines that describe the necessary mitigating strategies. The NRC endorsed these guidelines in a letter dated December 22, 2006, designated as Official Use Only. Those mitigating strategies were developed in the context of a localized event that was envisioned to challenge portions of a single unit. The events at Fukushima, however, demonstrate that beyond-design-basis external events may adversely affect: (1) More than one unit at a site with two or more units, and (2) multiple safety functions at each of several units located on the same site.

The events at Fukushima further highlight the possibility that extreme natural phenomena could challenge the prevention, mitigation, and emergency preparedness defense-in-depth layers. To address the uncertainties associated with beyond-design-basis external events, the NRC is requiring additional defense-in-depth measures at licensed nuclear power reactors so that the NRC can continue to have reasonable assurance of adequate protection of public health and safety in mitigating the consequences of a beyond-design-basis external event.

The strategies and guidance developed and implemented by Licensees or CP holders in response to the requirements imposed by this Order will provide the necessary capabilities to supplement those of the permanently installed plant structures, systems, and components that could become unavailable following beyond-design-basis external events. These strategies and guidance will enhance the safety and preparedness capabilities established following September 11, 2001, and codified as 10 CFR 50.54(hh)(2). In order to address the potential for more widespread effects of

beyond design basis external events, this Order requires strategies with increased capacity to implement protective actions concurrently at multiple units at a site. The strategies shall be developed to add multiple ways to maintain or restore core cooling, containment and SFP cooling capabilities in order to improve the defense-in-depth of licensed nuclear power reactors.

The Commission has determined that ensuring adequate protection of public health and safety requires that power reactor Licensees and CP holders develop, implement and maintain guidance and strategies to restore or maintain core cooling, containment, and SFP cooling capabilities in the event of a beyond-design-basis external event. These new requirements provide a greater mitigation capability consistent with the overall defense-in-depth philosophy, and, therefore, greater assurance that the challenges posed by beyond-design-basis external events to power reactors do not pose an undue risk to public health and safety. In order to provide reasonable assurance of adequate protection of public health and safety, all operating reactor licenses and CPs under Part 50 identified in Attachment 1 to this Order shall be modified to include the requirements identified in Attachment 2 to this Order. All combined licenses (COLs) under 10 CFR part 52 identified in Attachment 1 to this Order shall be modified to include the requirements identified in Attachment 3 to this Order.

Accordingly, the NRC has concluded that these measures are necessary to ensure adequate protection of public health and safety under the provisions of the backfit rule, 10 CFR 50.109(a)(4)(ii), and is requiring Licensee or CP holder action. In addition, pursuant to 10 CFR 2.202, the NRC finds that the public health, safety and interest require that this Order be made immediately effective.

### IV

Accordingly, pursuant to Sections 161b, 161i, 161o, and 182 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR 2.202, and 10 CFR Parts 50 and 52, *it is hereby ordered, effective immediately, that all licenses and construction permits identified in attachment 1 to this order are modified as follows:*

A. 1. All holders of CPs issued under Part 50 shall, notwithstanding the provisions of any Commission regulation or CPs to the contrary, comply with the requirements described in Attachment 2 to this Order except to the extent that a more stringent

requirement is set forth in the CP. These CP holders shall complete full implementation prior to issuance of an operating license.

2. All holders of operating licenses issued under Part 50 shall, notwithstanding the provisions of any Commission regulation or license to the contrary, comply with the requirements described in Attachment 2 to this Order except to the extent that a more stringent requirement is set forth in the license. These Licensees shall promptly start implementation of the requirements in Attachment 2 to the Order and shall complete full implementation no later than two (2) refueling cycles after submittal of the overall integrated plan, as required in Condition C.1.a, or December 31, 2016, whichever comes first.

3. All holders of COLs issued under Part 52 shall, notwithstanding the provisions of any Commission regulation or license to the contrary, comply with the requirements described in Attachment 3 to this Order except to the extent that a more stringent requirement is set forth in the license. These Licensees shall promptly start implementation of the requirements in Attachment 3 to the Order and shall complete full implementation prior to initial fuel load.

B.1. All Licensees and CP holders shall, within twenty (20) days of the date of this Order, notify the Commission, (1) if they are unable to comply with any of the requirements described in Attachment 2 or Attachment 3, (2) if compliance with any of the requirements is unnecessary in their specific circumstances, or (3) if implementation of any of the requirements would cause the Licensee or CP holder to be in violation of the provisions of any Commission regulation or the facility license. The notification shall provide the Licensee's or CP holder's justification for seeking relief from or variation of any specific requirement.

2. Any Licensee or CP holder that considers that implementation of any of the requirements described in Attachment 2 or Attachment 3 to this Order would adversely impact safe and secure operation of the facility must notify the Commission, within twenty (20) days of this Order, of the adverse safety impact, the basis for its determination that the requirement has an adverse safety impact, and either a proposal for achieving the same objectives specified in Attachment 2 or Attachment 3 requirement in question, or a schedule for modifying the facility to address the adverse safety condition. If neither approach is appropriate, the

Licensee or CP holder must supplement its response to Condition B.1 of this Order to identify the condition as a requirement with which it cannot comply, with attendant justifications as required in Condition B.1.

C.1. a. All holders of operating licenses issued under Part 50 shall by February 28, 2013, submit to the Commission for review an overall integrated plan including a description of how compliance with the requirements described in Attachment 2 will be achieved.

b. All holders of CPs issued under Part 50 or COLs issued under Part 52 shall, within one (1) year after issuance of the final ISG, submit to the Commission for review an overall integrated plan including a description of how compliance with the requirements described in Attachment 2 or Attachment 3 will be achieved.

2. All Licensees and holders of CPs shall provide an initial status report sixty (60) days following issuance of the final ISG and at six (6)-month intervals following submittal of the overall integrated plan, as required in Condition C.1, which delineates progress made in implementing the requirements of this Order.

3. All Licensees and CP holders shall report to the Commission when full compliance with the requirements described in Attachment 2 or Attachment 3 is achieved.

Licensee or CP holders responses to Conditions B.1, B.2, C.1, C.2, and C.3, above shall be submitted in accordance with 10 CFR 50.4 and 10 CFR 52.3, as applicable.

As applicable, the Director, Office of Nuclear Reactor Regulation or the Director, Office of New Reactors may, in writing, relax or rescind any of the above conditions upon demonstration by the Licensee or CP holder of good cause.

## V

In accordance with 10 CFR 2.202, the Licensee or CP holder must, and any other person adversely affected by this Order may, submit an answer to this Order, and may request a hearing on this Order, within 20 days of the date of this Order. Where good cause is shown, consideration will be given to extending the time to answer or to request a hearing. A request for extension of time in which to submit an answer or request a hearing must be made in writing to the Director, Office of Nuclear Reactor Regulation or to the Director, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and include a statement of good cause

for the extension. The answer may consent to this Order.

If a hearing is requested by a Licensee, CP holder or a person whose interest is adversely affected, the Commission will issue an Order designating the time and place of any hearings. If a hearing is held, the issue to be considered at such hearing shall be whether this Order should be sustained. Pursuant to 10 CFR 2.202(c)(2)(i), the licensee, CP holder or any other person adversely affected by this Order, may, in addition to demanding a hearing, at the time the answer is filed or sooner, move the presiding officer to set aside the immediate effectiveness of the Order on the ground that the Order, including the need for immediate effectiveness, is not based on adequate evidence but on mere suspicion, unfounded allegations, or error.

All documents filed in NRC adjudicatory proceedings, including a request for hearing, a petition for leave to intervene, any motion or other document filed in the proceeding prior to the submission of a request for hearing or petition to intervene, and documents filed by interested governmental entities participating under 10 CFR 2.315(c), must be filed in accordance with the NRC E-Filing rule (72 FR 49139, August 28, 2007). The E-Filing process requires participants to submit and serve all adjudicatory documents over the internet, or in some cases to mail copies on electronic storage media. Participants may not submit paper copies of their filings unless they seek an exemption in accordance with the procedures described below.

To comply with the procedural requirements of E-Filing, at least 10 days prior to the filing deadline, the participant should contact the Office of the Secretary by email at [hearing.docket@nrc.gov](mailto:hearing.docket@nrc.gov), or by telephone at (301) 415-1677, to request (1) a digital ID certificate, which allows the participant (or its counsel or representative) to digitally sign documents and access the E-Submittal server for any proceeding in which it is participating; and (2) advise the Secretary that the participant will be submitting a request or petition for hearing (even in instances in which the participant, or its counsel or representative, already holds an NRC-issued digital ID certificate). Based upon this information, the Secretary will establish an electronic docket for the hearing in this proceeding if the Secretary has not already established an electronic docket.

Information about applying for a digital ID certificate is available on

NRC's public Web site at <http://www.nrc.gov/site-help/e-submittals/apply-certificates.html>. System requirements for accessing the E-Submittal server are detailed in NRC's "Guidance for Electronic Submission," which is available on the agency's public Web site at <http://www.nrc.gov/site-help/e-submittals.html>. Participants may attempt to use other software not listed on the web site, but should note that the NRC's E-Filing system does not support unlisted software, and the NRC Meta System Help Desk will not be able to offer assistance in using unlisted software.

If a participant is electronically submitting a document to the NRC in accordance with the E-Filing rule, the participant must file the document using the NRC's online, web-based submission form. In order to serve documents through the Electronic Information Exchange, users will be required to install a web browser plug-in from the NRC web site. Further information on the web-based submission form, including the installation of the Web browser plug-in, is available on the NRC's public Web site at <http://www.nrc.gov/site-help/e-submittals.html>.

Once a participant has obtained a digital ID certificate and a docket has been created, the participant can then submit a request for hearing or petition for leave to intervene. Submissions should be in Portable Document Format (PDF) in accordance with NRC guidance available on the NRC public Web site at <http://www.nrc.gov/site-help/e-submittals.html>. A filing is considered complete at the time the documents are submitted through the NRC's E-Filing system. To be timely, an electronic filing must be submitted to the E-Filing system no later than 11:59 p.m. Eastern Time on the due date. Upon receipt of a transmission, the E-Filing system time-stamps the document and sends the submitter an email notice confirming receipt of the document. The E-Filing system also distributes an email notice that provides access to the document to the NRC Office of the General Counsel and any others who have advised the Office of the Secretary that they wish to participate in the proceeding, so that the filer need not serve the documents on those participants separately. Therefore, applicants and other participants (or their counsel or representative) must apply for and receive a digital ID certificate before a hearing request/petition to intervene is filed so that they can obtain access to the document via the E-Filing system.

A person filing electronically using the agency's adjudicatory E-Filing system may seek assistance by contacting the NRC Meta System Help Desk through the "Contact Us" link located on the NRC Web site at <http://www.nrc.gov/site-help/e-submittals.html>, by email at [MSHD.Resource@nrc.gov](mailto:MSHD.Resource@nrc.gov), or by a toll-free call at (866) 672-7640. The NRC Meta System Help Desk is available between 8 a.m. and 8 p.m., Eastern Time, Monday through Friday, excluding government holidays.

Participants who believe that they have a good cause for not submitting documents electronically must file an exemption request, in accordance with 10 CFR 2.302(g), with their initial paper filing requesting authorization to continue to submit documents in paper format. Such filings must be submitted by: (1) First class mail addressed to the Office of the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemaking and Adjudications Staff; or (2) courier, express mail, or expedited delivery service to the Office of the Secretary, Sixteenth Floor, One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, Attention: Rulemaking and Adjudications Staff. Participants filing a document in this manner are responsible for serving the document on all other participants. Filing is considered complete by first-class mail as of the time of deposit in the mail, or by courier, express mail, or expedited delivery service upon depositing the document with the provider of the service. A presiding officer, having granted an exemption request from using E-Filing, may require a participant or party to use E-Filing if the presiding officer subsequently determines that the reason for granting the exemption from use of E-Filing no longer exists.

Documents submitted in adjudicatory proceedings will appear in NRC's electronic hearing docket, which is available to the public at <http://ehd1.nrc.gov/ehd/>, unless excluded pursuant to an order of the Commission, or the presiding officer. Participants are requested not to include personal privacy information, such as social security numbers, home addresses, or home phone numbers in their filings, unless an NRC regulation or other law requires submission of such information. With respect to copyrighted works, except for limited excerpts that serve the purpose of the adjudicatory filings and would constitute a Fair Use application, participants are requested not to include

copyrighted materials in their submission.

If a person other than the Licensee or CP holder requests a hearing, that person shall set forth with particularity the manner in which his interest is adversely affected by this Order and shall address the criteria set forth in 10 CFR 2.309(d).

In the absence of any request for hearing, or written approval of an extension of time in which to request a hearing, the provisions specified in Section IV above shall be final twenty (20) days from the date of this Order without further order or proceedings. If an extension of time for requesting a hearing has been approved, the provisions specified in Section IV shall be final when the extension expires if a hearing request has not been received. An answer or a request for hearing shall not stay the immediate effectiveness of this order.

For The Nuclear Regulatory Commission.  
Dated this 12th day of March 2012.

**Eric J. Leeds,**

*Director, Office of Nuclear Reactor Regulation.*

**Michael R. Johnson,**

*Director, Office of New Reactors.*

**Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status**

*Arkansas Nuclear One*

Entergy Operations, Inc., Docket Nos. 50-313 and 50-368, License Nos. DPR-51 and NPF-6

Mr. Christopher J. Schwarz, Vice President, Operations, Entergy Operations, Inc., Arkansas Nuclear One, 1448 S.R. 333, Russellville, AR 72802

*Beaver Valley Power Station*

First Energy Nuclear Operating Co., Docket Nos. 50-334 and 50-412, License Nos. DPR-66 and NPF-73

Mr. Paul A. Harden, Site Vice President, FirstEnergy Nuclear Operating Company, Mail Stop A-BV-SEB1, P.O. Box 4, Route 168, Shippingport, PA 15077

*Bellefonte Nuclear Power Station*

Tennessee Valley Authority, Docket Nos. 50-438 and 50-439, Construction Permit Nos. CPPR No. 122 and CPPR No. 123

Mr. Michael D. Skaggs, Senior Vice President, Nuclear Generation Development and Construction, Tennessee Valley Authority, 6A Lookout Place, 1101 Market Street, Chattanooga, TN 37402-2801

*Braidwood Station*

Exelon Generation Co., LLC, Docket Nos. STN 50-456 and STN 50-457, License Nos. NPF-72 and NPF-77  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Browns Ferry Nuclear Plant*

Tennessee Valley Authority, Docket Nos. 50-259, 50-260 and 50-296, License Nos. DPR-33, DPR-52 and DPR-68  
Mr. Preston D. Swafford, Chief Nuclear Officer and Executive Vice President, Tennessee Valley Authority, 3R Lookout Place, 1101 Market Street, Chattanooga, TN 37402-2801

*Brunswick Steam Electric Plant*

Carolina Power & Light Co., Docket Nos. 50-325 and 50-324, License Nos. DPR-71 and DPR-62  
Mr. Michael J. Annacone, Vice President, Carolina Power & Light Company, Brunswick Steam Electric Plant, P.O. Box 10429, Southport, NC 28461

*Byron Station*

Exelon Generation Co., LLC, Docket Nos. STN 50-454 and STN 50-455, License Nos. NPF-37 and NPF-66  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Callaway Plant*

Union Electric Co., Docket No. 50-483, License No. NPF-30  
Mr. Adam C. Heflin, Senior Vice President and Chief Nuclear Officer, Union Electric Company, P.O. Box 620, Fulton, MO 65251

*Calvert Cliffs Nuclear Power Plant*

Calvert Cliffs Nuclear Power Plant, LLC, Docket Nos. 50-317 and 50-318, License Nos. DPR-53 and DPR-69  
Mr. George H. Gellrich, Vice President, Calvert Cliffs Nuclear Power Plant, LLC, Calvert Cliffs Nuclear Power Plant, 1650 Calvert Cliffs Parkway, Lusby, MD 20657-4702

*Catawba Nuclear Station*

Duke Energy Carolinas, LLC, Docket Nos. 50-413 and 50-414, License Nos. NPF-35 and NPF-52  
Mr. James R. Morris, Site Vice President, Duke Energy Carolinas, LLC, Catawba Nuclear Station, 4800 Concord Road, York, SC 29745

*Clinton Power Station*

Exelon Generation Co., LLC, Docket No. 50-461, License No. NPF-62

Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Columbia Generating Station*

Energy Northwest, Docket No. 50-397, License No. NPF-21  
Mr. Mark E. Reddemann, Chief Executive Officer, Energy Northwest, MD 1023, P.O. Box 968, Richland, WA 99352

*Comanche Peak Nuclear Power Plant*

Luminant Generation Co., LLC, Docket Nos. 50-445 and 50-446, License Nos. NPF-87 and NPF-89  
Mr. Rafael Flores, Senior Vice President and Chief Nuclear Officer, Luminant Generation Company, LLC, Attn: Regulatory Affairs, P.O. Box 1002, Glen Rose, TX 76043

*Cooper Nuclear Station*

Nebraska Public Power District, Docket No. 50-298, License No. DPR-46  
Mr. Brian J. O'Grady, Vice President—Nuclear and Chief Nuclear Officer, Nebraska Public Power District, 72676 648A Avenue, P.O. Box 98, Brownville, NE 68321

*Crystal River Nuclear Generating Plant*

Florida Power Corp., Docket No. 50-302, License No. DPR-72  
Mr. Jon A. Franke, Vice President, Attn: Supervisor, Licensing & Regulatory Affairs, Progress Energy, Inc., Crystal River Nuclear Plant (NA2C), 15760 West Power Line Street, Crystal River, FL 34428-6708

*Davis-Besse Nuclear Power Station*

First Energy Nuclear Operating Co., Docket No. 50-346, License No. NPF-3  
Mr. Barry S. Allen, Site Vice President, FirstEnergy Nuclear Operating Company, c/o Davis-Besse NPS, 5501 N. State Route 2, Oak Harbor, OH 43449-9760

*Diablo Canyon Power Plant*

Pacific Gas & Electric Co., Docket Nos. 50-275 and 50-323, License Nos. DPR-80 and DPR-82  
Mr. John T. Conway, Senior Vice President—Energy Supply and Chief Nuclear Officer, Pacific Gas and Electric Company, Diablo Canyon Power Plant, 77 Beale Street, Mail Code B32, San Francisco, CA 94105

*Donald C. Cook Nuclear Plant*

Indiana Michigan Power Co., Docket Nos. 50-315 and 50-316, License Nos. DPR-58 and DPR-74  
Mr. Lawrence J. Weber, Senior Vice President and Chief Nuclear Officer,

Indiana Michigan Power Company, Nuclear Generation Group, One Cook Place, Bridgman, MI 49106

*Dresden Nuclear Power Station*

Exelon Generation Co., LLC, Docket Nos. 50-237 and 50-249, License Nos. DPR-19 and DPR-25  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Duane Arnold Energy Center*

NextEra Energy Duane Arnold, LLC, Docket No. 50-331, License No. DPR-49  
Mr. Peter Wells, Site Vice President, NextEra Energy, Duane Arnold Energy Center, 3277 DAEC Road, Palo, IA 52324-9785

*Edwin I. Hatch Nuclear Plant*

Southern Nuclear Operating Co., Docket Nos. 50-321 and 50-366, License Nos. DPR-57 and NPF-5  
Mr. Dennis R. Madison, Vice President, Southern Nuclear Operating Company, Inc., Edwin I. Hatch Nuclear Plant, 11028 Hatch Parkway North, Baxley, GA 31513

*Fermi*

Detroit Edison Co., Docket No. 50-341, License No. NPF-43  
Mr. Jack M. Davis, Senior Vice President and Chief Nuclear Officer, Detroit Edison Company, Fermi 2—210 NOC, 6400 North Dixie Highway, Newport, MI 48166

*Fort Calhoun Station*

Omaha Public Power District, Docket No. 50-285, License No. DPR-40  
Mr. David J. Bannister, Vice President and Chief Nuclear Officer, Omaha Public Power District, 444 South 16th St. Mall, Omaha, NE 68102-2247

*Grand Gulf Nuclear Station*

Entergy Operations, Inc., Docket No. 50-416, License No. NPF-29  
Mr. Michael Perito, Vice President, Operations, Entergy Operations, Inc., Grand Gulf Nuclear Station, Unit 1, 7003 Bald Hill Road, Port Gibson, MS 39150

*H. B. Robinson Steam Electric Plant*

Carolina Power & Light Co., Docket No. 50-261, License No. DPR-23  
Mr. Robert J. Duncan II, Vice President, Carolina Power & Light Company, 3581 West Entrance Road, Hartsville, SC 29550

*Hope Creek Generating Station*

PSEG Nuclear, LLC, Docket No. 50-354, License No. NPF-57

Mr. Thomas Joyce, President and Chief Nuclear Officer, PSEG Nuclear LLC—N09, P. O. Box 236, Hancocks Bridge, NJ 08038

*Indian Point Energy Center*

Entergy Nuclear Operations, Inc., Docket Nos. 50–247 and 50–286, License Nos. DPR–26 and DPR–64  
Mr. John Ventosa, Vice President, Operations, Entergy Nuclear Operations, Inc., Indian Point Energy Center, 450 Broadway, GSB, P.O. Box 249, Buchanan, NY 10511–0249

*James A. FitzPatrick Nuclear Power Plant*

Entergy Nuclear Operations, Inc., Docket No. 50–333, License No. DPR–59  
Mike Colomb, Vice President, Operations, Entergy Nuclear Operations, Inc., James A. FitzPatrick Nuclear Power Plant, P.O. Box 110, Lycoming, NY 13093

*Joseph M. Farley Nuclear Plant*

Southern Nuclear Operating Co., Docket Nos. 50–348 and 50–364, License Nos. NPF–2 and NPF–8  
Mr. Tom Lynch, Vice President—Farley, Southern Nuclear Operating Company, Inc., Joseph M. Farley Nuclear Plant, 7388 North State Highway 95, Columbia, AL 36319

*Kewaunee Power Station*

Dominion Energy Kewaunee, Inc., Docket No. 50–305, License No. DPR–43  
Mr. David A. Heacock, President and Chief Nuclear Officer, Dominion Energy Kewaunee, Inc., Innsbrook Technical Center, 5000 Dominion Boulevard, Glen Allen, VA 23060–6711

*LaSalle County Station*

Exelon Generation Co., LLC, Docket Nos. 50–373 and 50–374, License Nos. NPF–11 and NPF–18  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Limerick Generating Station*

Exelon Generation Co., LLC, Docket Nos. 50–352 and 50–353, License Nos. NPF–39 and NPF–85  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Millstone Nuclear Power Station*

Dominion Nuclear Connecticut, Inc., Docket Nos. 50–336 and 50–423, License Nos. DPR–65 and NPF–49

Mr. David A. Heacock, President and Chief Nuclear Officer, Dominion Nuclear Connecticut, Inc., Innsbrook Technical Center, 5000 Dominion Boulevard, Glen Allen, VA 23060–6711

*Monticello Nuclear Generating Plant*

Northern States Power Company, Docket No. 50–263, License No. DPR–22  
Mr. Timothy J. O'Connor, Site Vice President, Northern States Power Company—Minnesota, Monticello Nuclear Generating Plant, 2807 West County Road 75, Monticello, MN 55362–9637

*Nine Mile Point Nuclear Station*

Nine Mile Point Nuclear Station, LLC, Docket Nos. 50–220 and 50–410, License Nos. DPR–63 and NPF–69  
Mr. Ken Langdon, Vice President Nine Mile Point, Nine Mile Point Nuclear Station, LLC, P. O. Box 63, Lycoming, NY 13093

*North Anna Power Station*

Virginia Electric & Power Co., Docket Nos. 50–338 and 50–339, License Nos. NPF–4 and NPF–7  
Mr. David A. Heacock, President and Chief Nuclear Officer, Dominion Nuclear, Innsbrook Technical Center, 5000 Dominion Boulevard, Glen Allen, VA 23060–6711

*Oconee Nuclear Station*

Duke Energy Carolinas, LLC, Docket Nos. 50–269, 50–270 and 50–287, License Nos. DPR–38, DPR–47 and DPR–55  
Mr. Preston Gillespie, Site Vice President, Oconee Nuclear Station, Duke Energy Carolinas, LLC, 7800 Rochester Highway, Seneca, SC 29672

*Oyster Creek Nuclear Generating Station*

Exelon Generation Co., LLC, Docket No. 50–219, License No. DPR–16  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Palisades Nuclear Plant*

Entergy Nuclear Operations, Inc., Docket No. 50–255, License No. DPR–20  
Mr. Anthony J. Vitale, Site Vice President—Palisades, Entergy Nuclear Operations, Inc., Palisades Nuclear Plant, 27780 Blue Star Memorial Highway, Covert, MI 49043

*Palo Verde Nuclear Generating Station*

Arizona Public Service Company, Docket Nos. STN 50–528, STN 50–529 and STN 50–530, License Nos. NPF–41, NPF–51 and NPF–74

Mr. Randall K. Edington, Executive Vice President Nuclear and Chief Nuclear Officer, Arizona Public Service Co., P. O. Box 52034, MS 7602, Phoenix, AZ 85072–2034

*Peach Bottom Atomic Power Station*

Exelon Generation Co., LLC, Docket Nos. 50–277 and 50–278, License Nos. DPR–44 and DPR–56  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*Perry Nuclear Power Plant*

First Energy Nuclear Operating Co., Docket No. 50–440, License No. NPF–58  
Mr. Vito A. Kaminskas, Site Vice President—Nuclear—Perry, FirstEnergy Nuclear Operating Company, Perry Nuclear Power Plant, 10 Center Road, A290, Perry, OH 44081

*Pilgrim Nuclear Power Station Unit No. 1*

Entergy Nuclear Operations, Inc., Docket No. 50–293, License No. DPR–35  
Mr. Robert Smith, Vice President and Site Vice President, Entergy Nuclear Operations, Inc., Pilgrim Nuclear Power Station, 600 Rocky Hill Road, Plymouth, MA 02360–5508

*Point Beach Nuclear Plant*

NextEra Energy Point Beach, LLC, Docket Nos. 50–266 and 50–301, License Nos. DPR–24 and DPR–27  
Mr. Larry Meyer, Site Vice President, NextEra Energy Point Beach, LLC, Point Beach Nuclear Plant, Units 1 & 2, 6610 Nuclear Road, Two Rivers, WI 54241–9516

*Prairie Island Nuclear Generating Plant*

Northern States Power Co. Minnesota, Docket Nos. 50–282 and 50–306, License Nos. DPR–42 and DPR–60  
Mr. Mark A. Schimmel, Site Vice President, Northern States Power Company—Minnesota, Prairie Island Nuclear Generating Plant, 1717 Wakonade Drive East, Welch, MN 55089–9642

*Quad Cities Nuclear Power Station*

Exelon Generation Co., LLC, Docket Nos. 50–254 and 50–265, License Nos. DPR–29 and DPR–30  
Mr. Michael J. Pacilio, President and Chief Nuclear Officer, Exelon Nuclear, 4300 Winfield Road, Warrenville, IL 60555

*R.E. Ginna Nuclear Power Plant*

R.E. Ginna Nuclear Power Plant, LLC,  
Docket No. 50-244, License No. DPR-18

Mr. Joseph E. Pacher, Vice President,  
R.E. Ginna Nuclear Power Plant, LLC,  
R.E. Ginna Nuclear Power Plant, 1503  
Lake Road, Ontario, NY 14519

*River Bend Station*

Entergy Operations, Inc., Docket No. 50-458, License No. NPF-47

Mr. Eric W. Olson, Vice President,  
Operations, Entergy Operations, Inc.,  
River Bend Station, 5485 U.S.  
Highway 61N, St. Francisville, LA  
70775

*Salem Nuclear Generating Station*

PSEG Nuclear, LLC, Docket Nos. 50-272  
and 50-311, License Nos. DPR-70 and  
DPR-75

Mr. Thomas Joyce, President and Chief  
Nuclear Officer, PSEG Nuclear LLC—  
N09, P.O. Box 236, Hancocks Bridge,  
NJ 08038

*San Onofre Nuclear Generating Station*

Southern California Edison Co., Docket  
Nos. 50-361 and 50-362, License Nos.  
NPF-10 and NPF-15

Mr. Peter T. Dietrich, Senior Vice  
President and Chief Nuclear Officer,  
Southern California Edison Company,  
San Onofre Nuclear Generating  
Station, P.O. Box 128, San Clemente,  
CA 92674-0128

*Seabrook*

NextEra Energy Seabrook, LLC, Docket  
No. 50-443, License No. NPF-86

Mr. Paul Freeman, Site Vice President,  
NextEra Energy Seabrook, LLC, c/o  
Mr. Michael O'Keefe, NextEra Energy  
Seabrook, LLC, P.O. Box 300,  
Seabrook, NH 03874

*Sequoyah Nuclear Plant*

Tennessee Valley Authority, Docket  
Nos. 50-327 and 50-328, License Nos.  
DPR-77 and DPR-79

Mr. Preston D. Swafford, Chief Nuclear  
Officer and Executive Vice President,  
Tennessee Valley Authority, 3R  
Lookout Place, 1101 Market Street,  
Chattanooga, TN 37402-2801

*Shearon Harris Nuclear Power Plant*

Carolina Power & Light Co., Docket No.  
50-400, License No. NPF-63

Mr. Christopher L. Burton, Vice  
President, Progress Energy Carolinas,  
Inc., Shearon Harris Nuclear Power  
Plant, P.O. Box 165, Mail Zone 1, New  
Hill, NC 27562-0165

*South Texas Project*

STP Nuclear Operating Co., Docket Nos.  
50-498 and 50-499, License Nos.  
NPF-76 and NPF-80

Mr. Edward D. Halpin, President, Chief  
Executive Officer and Chief Nuclear  
Officer, STP Nuclear Operating  
Company, South Texas Project, P.O.  
Box 289, Wadsworth, TX 77483

*St. Lucie Plant*

Florida Power & Light Co., Docket Nos.  
50-335 and 50-389, License Nos.  
DPR-67 and NPF-16

Mr. Mano Nazar, Executive Vice  
President and Chief Nuclear Officer,  
NextEra Energy, 700 Universe  
Boulevard, P.O. Box 14000, Juno  
Beach, FL 33408-0420

*Surry Power Station*

Virginia Electric & Power Co., Docket  
Nos. 50-280 and 50-281, License Nos.  
DPR-32 and DPR-371

Mr. David A. Heacock, President and  
Chief Nuclear Officer, Dominion  
Nuclear, Innsbrook Technical Center,  
5000 Dominion Boulevard, Glen  
Allen, VA 23060-6711

*Susquehanna Steam Electric Station*

PPL Susquehanna, LLC, Docket Nos.  
50-387 and 50-388, License Nos.  
NPF-14 and NPF-22

Mr. Timothy S. Rausch, Senior Vice  
President and Chief Nuclear Officer,  
PPL Susquehanna, LLC, 769 Salem  
Boulevard, NUCSB3, Berwick, PA  
18603-0467

*Three Mile Island Nuclear Station, Unit 1*

(\* via corrected letter dated 3/13/12—  
ML12073A366) Exelon Generation  
Co., LLC, Docket No. 50-289, License  
No. DPR-50

Mr. Michael J. Pacilio, President and  
Chief Nuclear Officer, Exelon Nuclear,  
4300 Winfield Road, Warrenton, IL  
60555

*Turkey Point*

Florida Power & Light Co., Docket Nos.  
50-250 and 50-251, License Nos.  
DPR-31 and DPR-41

Mr. Mano Nazar, Executive Vice  
President and Chief Nuclear Officer,  
NextEra Energy, 700 Universe  
Boulevard, P.O. Box 14000, Juno  
Beach, FL 33408-0420

*Vermont Yankee Nuclear Power Station*

Entergy Nuclear Operations, Inc.,  
Docket No. 50-271, License No. DPR-28

Mr. Christopher J. Wamser, Site Vice  
President, Entergy Nuclear  
Operations, Inc., Vermont Yankee  
Nuclear Power Station, 320 Governor  
Hunt Road, Vernon, VT 05354

*Virgil C. Summer Nuclear Station*

South Carolina Electric & Gas Co.,  
Docket No. 50-395, License No. NPF-12

Mr. Thomas D. Gatlin, Vice President  
Nuclear Operations, South Carolina  
Electric & Gas Company, Virgil C.  
Summer Nuclear Station, Post Office  
Box 88, Mail Code 300, Jenkinsville,  
SC 29065

*Vogtle Electric Generating Plant*

Southern Nuclear Operating Co., Docket  
Nos. 50-424 and 50-425, License Nos.  
NPF-68 and NPF-81

Mr. Tom E. Tynan, Vice President,  
Southern Nuclear Operating  
Company, Inc., Vogtle Electric  
Generating Plant, 7821 River Road,  
Waynesboro, GA 30830

*Vogtle Electric Generating Plant, Units 3 & 4*

Southern Nuclear Operating Co., Docket  
Nos. 52-025 and 52-026, License Nos.  
NPF-91 and NPF-92

Mr. B. L. Ivey, Vice President,  
Regulatory Affairs, Southern Nuclear  
Operating Company, Inc., 40  
Inverness Center Parkway, Bin B022,  
Birmingham, AL 35242

*Waterford Steam Electric Station*

Entergy Operations, Inc., Docket No. 50-382, License No. NPF-38

Ms. Donna Jacobs, Vice President,  
Operations, Entergy Operations, Inc.,  
Waterford Steam Electric Station, Unit  
3, 17265 River Road, Killona, LA  
70057-0751

*Watts Bar Nuclear Plant, Unit 1*

Tennessee Valley Authority, Docket No.  
50-390, License No. NPF-90

Mr. Preston D. Swafford, Chief Nuclear  
Officer and Executive Vice President,  
Tennessee Valley Authority, 3R  
Lookout Place, 1101 Market Street,  
Chattanooga, TN 37402-2801

*Watts Bar Nuclear Plant, Unit 2*

Tennessee Valley Authority, Docket No.  
50-391, Construction Permit No.  
CPPR No. 092

Mr. Michael D. Skaggs, Senior Vice  
President, Nuclear Generation  
Development and Construction,  
Tennessee Valley Authority, 6A  
Lookout Place, 1101 Market Street,  
Chattanooga, TN 37402-2801

*William B. McGuire Nuclear Station*

Duke Energy Carolinas, LLC, Docket  
Nos. 50-369 and 50-370, License Nos.  
NPF-9 and NPF-17

Mr. Regis T. Repko, Vice President,  
Duke Energy Carolinas, LLC, McGuire  
Nuclear Site, 12700 Hagers Ferry  
Road, Huntersville, NC 28078

*Wolf Creek Generating Station*

Wolf Creek Nuclear Operating Corp.,  
Docket No. 50-482, License No. NPF-42

Mr. Matthew W. Sunseri, President and  
Chief Executive Officer, Wolf Creek  
Nuclear Operating Corporation, P.O.  
Box 411, Burlington, KS 66839

**Requirements for Mitigation Strategies  
for Beyond-Design-Basis External  
Events at Operating Reactor Sites and  
Construction Permit Holders**

This Order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment and spent fuel pool (SFP) cooling capabilities. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

(1) Licensees or construction permit (CP) holders shall develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment and SFP cooling capabilities following a beyond-design-basis external event.

(2) These strategies must be capable of mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink and have adequate capacity to address challenges to core cooling, containment, and SFP cooling capabilities at all units on a site subject to this Order.

(3) Licensees or CP holders must provide reasonable protection for the associated equipment from external events. Such protection must demonstrate that there is adequate capacity to address challenges to core cooling, containment, and SFP cooling capabilities at all units on a site subject to this Order.

(4) Licensees or CP holders must be capable of implementing the strategies in all modes.

(5) Full compliance shall include procedures, guidance, training, and acquisition, staging, or installing of equipment needed for the strategies.

**Requirements for Mitigation Strategies  
for Beyond-Design-Basis External  
Events at Col Holder Reactor Sites  
(VOGTLE Units 3 and 4)**

Attachment 2 to this order for Part 50 licensees requires a phased approach for mitigating beyond-design-basis external

events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment and spent fuel pool (SFP) cooling capabilities. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

The design bases of Vogtle Units 3 and 4 includes passive design features that provide core, containment and SFP cooling capability for 72 hours, without reliance on alternating current (ac) power. These features do not rely on access to any external water sources since the containment vessel and the passive containment cooling system serve as the safety-related ultimate heat sink. The NRC staff reviewed these design features prior to issuance of the combined licenses for these facilities and certification of the AP1000 design referenced therein. The AP1000 design also includes equipment to maintain required safety functions in the long term (beyond 72 hours to 7 days) including capability to replenish water supplies. Connections are provided for generators and pumping equipment that can be brought to the site to back up the installed equipment. The staff concluded in its final safety evaluation report for the AP1000 design that the installed equipment (and alternatively, the use of transportable equipment) is capable of supporting extended operation of the passive safety systems to maintain required safety functions in the long term. As such, this Order requires Vogtle Units 3 and 4 to address the following requirements relative to the final phase.

(1) Licensees shall develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment and SFP cooling capabilities following a beyond-design-basis external event.

(2) These strategies must be capable of mitigating a simultaneous loss of all ac power and loss of normal access to the normal heat sink and have adequate capacity to address challenges to core cooling, containment, and SFP cooling capabilities at all units on a site subject to this Order.

(3) Licensees must provide reasonable protection for the associated equipment from external events. Such protection must demonstrate that there is adequate capacity to address challenges to core cooling, containment, and SFP cooling capabilities at all units on a site subject to this Order.

(4) Licensees must be capable of implementing the strategies in all modes.

(5) Full compliance shall include procedures, guidance, training, and acquisition, staging, or installing of equipment needed for the strategies.  
[FR Doc. 2012-6547 Filed 3-16-12; 8:45 am]

BILLING CODE 7590-01-P

**NUCLEAR REGULATORY  
COMMISSION**

[Docket Nos. (as shown in Attachment 1);  
License Nos. (as shown in Attachment 1);  
EA-12-050; [NRC-2012-0069]

**In the Matter of All Operating Boiling  
Water Reactor Licensees With Mark I  
and Mark II Containments; Order  
Modifying Licenses With Regard To  
Reliable Hardened Containment Vents  
(Effective Immediately)**

**I**

The Licensees identified in Attachment 1 to this Order hold licenses issued by the U.S. Nuclear Regulatory Commission (NRC or Commission) authorizing operation of nuclear power plants in accordance with the Atomic Energy Act of 1954, as amended, and Title 10 of the Code of Federal Regulations (10 CFR) part 50, "Domestic Licensing of Production and Utilization Facilities." Specifically, these Licensees operate boiling-water reactors (BWRs) with Mark I and Mark II containment designs.

**II**

On March 11, 2011, a magnitude 9.0 earthquake struck off the coast of the Japanese island of Honshu. The earthquake resulted in a large tsunami, estimated to have exceeded 14 meters (45 feet) in height, which inundated the Fukushima Dai-ichi nuclear power plant site. The earthquake and tsunami produced widespread devastation across northeastern Japan, and significantly affected the infrastructure and industry in the northeastern coastal areas of Japan.

When the earthquake occurred, Fukushima Dai-ichi Units 1, 2, and 3 were in operation and Units 4, 5, and 6 were shut down for routine refueling and maintenance activities. The Unit 4 reactor fuel was offloaded to the Unit 4 spent fuel pool. Following the earthquake, the three operating units automatically shut down and offsite power was lost to the entire facility. The emergency diesel generators (EDGs) started at all six units providing alternating current (ac) electrical power to critical systems at each unit. The