

RESPONSE TO FREEDOM OF
INFORMATION ACT (FOIA) REQUEST

2017-0242

1

RESPONSE
TYPE☐

INTERIM

☒

FINAL

REQUESTER:

Julian Tarver

DATE:

JAN 18 2017

DESCRIPTION OF REQUESTED RECORDS:

SECY 12-0025

PART I. -- INFORMATION RELEASED

- ☐ Agency records subject to the request are already available in public ADAMS or on microfiche in the NRC Public Document Room.
- ☒ Agency records subject to the request are enclosed.
- ☐ Records subject to the request that contain information originated by or of interest to another Federal agency have been referred to that agency (see comments section) for a disclosure determination and direct response to you.
- ☐ We are continuing to process your request.
- ☒ See Comments.

PART I.A -- FEES

AMOUNT*

\$

*See Comments for details

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You will be billed by NRC for the amount listed.

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None. Minimum fee threshold not met.

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You will receive a refund for the amount listed.

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Fees waived.

PART I.B -- INFORMATION NOT LOCATED OR WITHHELD FROM DISCLOSURE

- ☐ We did not locate any agency records responsive to your request. *Note:* Agencies may treat three discrete categories of law enforcement and national security records as not subject to the FOIA ("exclusions"). 5 U.S.C. 552(c). This is a standard notification given to all requesters; it should not be taken to mean that any excluded records do, or do not, exist.
- ☐ We have withheld certain information pursuant to the FOIA exemptions described, and for the reasons stated, in Part II.
- ☐ Because this is an interim response to your request, you may not appeal at this time. We will notify you of your right to appeal any of the responses we have issued in response to your request when we issue our final determination.
- ☒ You may appeal this final determination within 30 calendar days of the date of this response by sending a letter or email to the FOIA Officer, at U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, or FOIA.Resource@nrc.gov. Please be sure to include on your letter or email that it is a "FOIA Appeal."

PART I.C COMMENTS (Use attached Comments continuation page if required)

In conformance with the FOIA Improvement Act of 2016, the NRC is informing you that: (1) you have the right to seek assistance from the NRC's FOIA Public Liaison; (2) you have the right to seek dispute resolution services from the NRC's FOIA Public Liaison or the Office of Government Information Services; and (3) notwithstanding the language in Parts I.B and II.B of this form, you may appeal this final determination within 90 calendar days of the date of this response by sending a letter or email to the FOIA Officer, at U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, or FOIA.Resource@nrc.gov. Please be sure to include on your letter or email that it is a "FOIA Appeal." Please see continuation sheet.

SIGNATURE - FREEDOM OF INFORMATION ACT OFFICER

Stephanie Blaney

2017-0242

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**RESPONSE TO FREEDOM OF INFORMATION
ACT (FOIA) REQUEST Continued**

RESPONSE
TYPE

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INTERIM

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FINAL

REQUESTER:

Julian Tarver

DATE:

JAN 18 2017

PART I.C COMMENTS (Continued)

This acknowledge receipt and closeout of your FOIA request.

There were a total of 177 pages in SECY 12-0025. Because you have expressed your unwillingness to pay fees, we are only providing 112 pages. This is representative of the number of pages that will equal or as close to the end of a record and the \$25 amount allowed without charging a fee.

Dear FOIA Requester:

The FOIA Improvement Act of 2016, which was enacted on June 30, 2016, made several changes to the Freedom of Information Act (FOIA). Federal agencies must revise their FOIA regulations to reflect those changes by December 27, 2016. In addition to revising our regulations, we intend to update the Form 464, which we use to respond to FOIA requests.

In the interim, please see the comment box in Part I.C of the attached Form 464. The comment box includes information related to the recent changes to FOIA that is applicable to your FOIA request, including an updated time period for filing an administrative appeal with the NRC.

Sincerely yours,

Stephanie Blaney /S/

Stephanie Blaney
FOIA Officer

Six-Month Status Update on Other Charter Activities

This is the U.S. Nuclear Regulatory Commission (NRC) staff's first 6-month periodic update on the review work conducted under the Charter in accordance with Staff Requirements Memorandum (SRM)-SECY-11-0117, "Charter for the Nuclear Regulatory Commission Steering Committee to Conduct a Longer-Term Review of the Events in Japan." This includes highlights of any potential policy issues that have arisen for Commission consideration and recommendations regarding the sunset of the Steering Committee, the Advisory Committee, and the Project Directorate.

Accident Timeline

The staff continues to receive specific information on the sequence of events and the status of equipment throughout the accident at Fukushima Daiichi. Specific documented sources include the following:

- Nuclear Emergency Response Headquarters—Government of Japan, "Report of the Japanese Government to the IAEA Ministerial Conference on Nuclear Safety—The Accident at TEPCO's Fukushima Nuclear Power Stations," International Atomic Energy Agency (IAEA) Ministerial Conference on Nuclear Safety, Vienna, Austria, June 7, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11178A379)
- Institute of Nuclear Power Operations (INPO) 11-05, "Special Report on the Nuclear Accident at the Fukushima Daiichi Nuclear Power Station," Revision 0, issued November 2011 (ADAMS Accession No. ML11347A454)
- Executive Summary of the Interim Report, Investigation Committee on the Accidents at Fukushima Nuclear Power Stations of Tokyo Electric Power Company, December 26, 2011 (<http://icanps.go.jp/eng/111226ExecutiveSummary.pdf>)

These reports validate the staff's basic understanding of events as presented in the Near-Term Task Force (NTTF) report, dated July 12, 2011, report, and continue to support the staff's plan for regulatory action. The staff will continue to follow the development of a more detailed timeline of events to support these and longer-term actions.

As noted in SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011, the NRC and the U.S. Department of Energy signed a Fukushima Daiichi Accident Study addendum to its memorandum of understanding on Cooperative Nuclear Safety Research (ADAMS Accession No. ML111930010) in July 2011. This cooperative research program will, among other things, develop a detailed understanding of the accident progression of each reactor and spent fuel pool. The staff also continues to work with Federal counterparts, industry, and the international community, including the Government of Japan, to establish cooperative efforts to share and integrate specific information into a common understanding of the sequence of events at the Fukushima Daiichi facility.

Ongoing Tier 1, 2, and 3 Regulatory Actions, Additional Issues, and Advisory Committee on Reactor Safeguards Recommendations

The staff continues work on Tier 1 and 2 regulatory actions in a manner that is consistent with the milestone schedule set forth in SECY-11-0137 and SRM-SECY-11-0124, "Staff Requirements-SECY-11-0124-Recommended Actions to be Taken without Delay from the Near-Term Task Force Report," as modified by this paper.

As described in Enclosure 3 of this paper, the staff developed a process for addressing additional issues that arise as a result of ongoing interactions with both domestic and international stakeholders, advisory committee recommendations, and internal staff deliberations. This process includes vetting documented issues by a screening group of agency senior-level scientists and engineers. This group makes recommendations to the Steering Committee on whether each issue is valid and has a nexus to the Fukushima Dai-ichi accident, or should be dispositioned with no additional action or some other NRC process, such as the generic issues resolution process.

NTTF Recommendation 4.1

Station Blackout (SBO) regulatory actions (Tier 1)

The staff has developed an Advanced Notice of Proposed Rulemaking (ANPR) soliciting external stakeholder input regarding regulatory activities for SBO mitigation. The ANPR is currently in concurrence with the review and approval effort occurring in parallel with this SECY paper. It is expected that the EDO will sign and issue this ANPR in the near term. The staff plans to hold a category 3 public meeting during the ANPR comment period. The meeting is not intended for the NRC to receive comments and instead is for the NRC to discuss the ANPR with external stakeholders to inform stakeholder views on SBO mitigation and thereby support stakeholders providing written feedback in response to the ANPR.

NTTF Recommendation 7.2, 7.3, 7.4, 7.5

Rulemaking to provide reliable spent fuel pool instrumentation and makeup capabilities (Tier 2)

This rulemaking will follow the staff's issuance of the proposed order that requires reliable instrumentation in spent fuel pools. The staff is budgeting resources and assessing the availability of staff with the necessary skills to develop a technical basis for a rulemaking that may begin in late calendar year 2012.

NTTF Recommendation 8

Integration of Onsite Emergency Response Processes, Procedures, Training and Exercises (Tier 1)

The development of the NTTF Recommendation 8 ANPR is underway. The working group is planning to hold public meetings to obtain stakeholder input on the proposed rulemaking strategies.

Comparison of Japanese and U.S. Requirements for Station Blackout

Upon review of Japan's ministerial orders and guides, the staff concludes that Japanese regulations require nuclear power plants to be designed such that safe shutdown of the reactor can be ensured in case of a short-term station blackout. The staff also finds that the regulatory expectations for station blackout mitigation are similar between the two countries.

Recommendation 1

In an SRM on SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated August 19, 2011, the Commission directed that NTTF Recommendation 1 should be pursued independent of any activities associated with the review of the other Task Force recommendations. To implement this direction, the staff established a working group to develop a comprehensive set of options for the Commission, including resource estimates, and the staff's recommendation. This activity is currently scheduled to be completed in February 2013 and will be coordinated with a number of ongoing staff activities related to defense in depth and regulatory framework, including the following:

- the Chairman's Risk-Informed Regulations Task Force
- updates to Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," to address defense in depth
- technology-neutral framework approach—NUREG-1860, "Feasibility Study for a Risk-Informed and Performance-Based Regulatory Structure for Future Plant Licensing"

Improving Communication with Stakeholders

The staff's efforts to improve communication with stakeholders are summarized in SECY-12-0010, "Engagement of Stakeholders Regarding the Events in Japan," which includes a description of the staff's progress and further recommendations on developing a chronology of events suitable for the general public, and to consulting with individual public citizens on the readability of the NTTF report.

Policy Issues

Additional policy issues identified by the staff are addressed in the body of this paper. This includes the staff's plans to submit to the Commission in July 2012 a notation vote paper that addresses operability of containment vents under severe accident conditions, the addition of filters to containment vents, and the addition of vents in areas outside the reactor building.

Plans to Sunset Longer Term Review Organization

In SRM-SECY-11-0117, the Commission specified that the longer term review will conclude when all longer term evaluations have been completed and regulatory actions identified and those regulatory actions have been referred to the NRC line organization for action using existing processes (e.g., the rulemaking process). Within the rubric of SECY-11-0137, the staff anticipates that completion of longer term evaluations will be marked by the completion of the staff's evaluation of the schedule and milestones, resources and critical skill sets, and implementation challenges related to addressing the Tier 3 recommendations. A Commission paper on Tier 3 recommendations is due to the Commission in early July 2012. The staff will provide more detailed plans for sunsetting the longer term review organization in its paper on Tier 3 recommendations.

National Academy of Sciences Study

The Conference Report on the Consolidated Appropriations Act, 2012 (Public Law 112-74) directs the NRC to transfer \$2,000,000 to the National Academy of Sciences (NAS) to fund an NAS study of the lessons learned from the events at the Fukushima nuclear plant. The project plan and budget for this study have been finalized and the funds have been transferred to NAS. The staff is working closely with NAS in anticipation of the study starting in the near term.

Full-scale Seismic and Kinetic Impact Tests

The Senate Report¹ on a draft version of Public Law 112-74 includes the following direction to NRC:

The Committee is concerned that risks to public health and safety exist due to a lack of understanding how critical nuclear energy infrastructure, particularly storage ponds and containers for spent nuclear fuel and waste, will respond to a catastrophic earthquake or kinetic impact event. The Committee directs the Nuclear Regulatory Commission [NRC] to develop protocols for the use of existing domestic seismic testing facilities, including the National Science Foundation's National Earthquake Engineering Simulation [NEES] program, to conduct tests on full-scale specimens of critical nuclear infrastructure, in order to validate related computer models and inform subsequent mitigation strategies. The NRC shall collaborate with NEES to submit a related plan and proposed budget to the Committee by January 23, 2012.

The Senate Report was completed on September 7, 2011, over 3 months before the President signed Public Law 112-74 on December 23, 2011. Therefore, the staff is in discussions with Senate staff regarding a revised schedule for the plan and proposed budget related to this action.

Resource Estimate and Schedule for Probabilistic Risk Analysis Methodology on Seismically Induced Fires and Floods

Background

As described in the NTTF Report, seismically induced fires have the potential to cause multiple failures of safety-related systems and induce separate fires in multiple locations at the site. Additionally, it has been recognized that events such as pipe ruptures (and subsequent flooding) could cause such problems in multiple locations simultaneously. Although these issues have been examined to a limited degree in the Generic Issues Program and Generic Letter (GL) 88-20, Supplement 5, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities," the NTTF concluded that the staff should reevaluate the potential for common-mode failures of plant safety equipment as the result of seismically induced fires and floods. Although this recommendation (NTTF Recommendation 3) was categorized as a Tier 3 item (identified for long-term evaluation), SRM-SECY-11-0137 directed the staff to initiate a probabilistic risk assessment (PRA) methodology to evaluate potential enhancements to the capability to prevent or mitigate seismically induced fires and floods as part of Tier 1 activities. Furthermore, the staff was asked to include a discussion of the resource

¹ S. Rep. No. 112-75 (Sep. 7, 2011)

estimate and schedule to develop the PRA methodology in the next 6-month status update to the Commission, as required by SRM-SECY-11-0117.

Staff Recommendation

The staff recognizes that the development of a PRA methodology to address seismically induced fires and floods represents a complex challenge. The scope of this effort is expected to cover seismically induced fires internal to the nuclear power plant, internal seismically induced floods (e.g., piping and tank ruptures), external seismically induced floods (e.g., upstream dam failures), and seismically induced losses of heat sink (e.g., downstream dam failures). There are significant challenges associated with this effort including, but not limited to the following:

- hazard definition and characterization
 - quantification of seismically induced fire ignition
 - quantification of site-specific seismically induced flooding frequencies
 - treatment of uncertainties
- modeling concurrent and subsequent initiating events
- treatment of systems interactions
- human reliability analysis applicability to seismically induced hazards
- multiunit risk considerations

The staff intends to engage in a variety of preplanning activities over the next four months in order to lay a foundation for the development of a more detailed and complete plan to address seismically induced fires and floods. Specific preplanning activities include the following:

1. Define specific objectives of the methodology:
 - a. the purpose of the method (e.g., screening and/or detailed analysis)
 - b. the anticipated scope of the method (e.g., operational modes, inclusion/exclusion of spent fuel pools)
 - c. potential risk criteria to be used in terms of assessing enhancements to the capability to prevent or mitigate seismically induced fires and floods
 - d. intended users (NRC staff and/or industry)
2. Identify internal and external stakeholders and assess their level of needed involvement for the development of the PRA methodology.
3. To the extent practical, gather relevant information, including nuclear power plant operating experience, general seismic experience, international data, and academic research.
4. As practical, coordinate planning activities with other initiatives, such as:
 - a. post-Fukushima request for information letters (under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.54(f))

- b. other related research activities, including generic issue resolution and standardized plant analysis risk
 - c. external hazard model development
5. Estimate resources required to develop the detailed project plan (contract and full-time equivalent (FTE) staff).
 6. Formulate a schedule for developing the project plan.

The result of this effort will be documented in an initial preplan that will provide a framework for the development of a more detailed project plan to address seismically induced fires and floods.

Challenges

The NRC staff is currently working on a number of issues that would need to be integrated into the development of this PRA methodology. For example, the staff is addressing several generic issues related to this topic, including the following:

- GI-199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants"

Additionally, the issuance of 10 CFR 50.54(f) letters presented in this paper and subsequent licensee responses should be considered in the development of the PRA methodology. In particular, the response to NTTF Recommendations 2.1 and 2.3 have the potential to provide additional insights into seismic and flooding hazard characterization which, in turn, may affect both the methodology and the input information to correctly assess potential enhancements to the capability to mitigate such events. It is also recognized that the manner in which licensees respond to these 10 CFR 50.54(f) letters may have implications for the implementation of the PRA methodology (e.g., use of seismic margins analysis or seismic PRA).

There are very few members of the staff with the requisite knowledge, skills, and abilities in seismic, fire, and flooding PRA to efficiently perform the above pre-planning activities. These staff members are currently engaged in other high priority work supporting post-Fukushima activities and development of agency PRA models for external hazards and fire. Consequently, the amount of staff resources that can be applied to the pre-planning effort for the development of a PRA method for seismically induced fires and floods are limited. This will reduce the level of detail and technical depth that the staff can include in the initial pre-plan.

Resources

The staff anticipates that it would have approximately 0.1 FTE available over the next four months to develop an initial pre-plan to support the later formulation of a detailed project plan for the development of a PRA methodology to address seismically induced fires and floods. No contract resources are anticipated for this preplanning effort.

Deliverables

1. Initial pre-plan document that will provide a framework for the development of a more detailed project plan

Schedule

- | | | |
|----|--|-----------|
| 1. | Complete the initial pre-plan: | June 2012 |
| 2. | Provide status in next SECY paper update | July 2012 |

**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.

STAFF'S PRIORITIZATION OF ACRS RECOMMENDATIONS FOR NRC ACTIONS TO BE TAKEN IN RESPONSE TO FUKUSHIMA LESSONS-LEARNED

The purpose of this enclosure is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's analysis of recommendations made by the Advisory Committee on Reactor Safeguards (ACRS) in letters dated October 13, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11284A136), and November 8, 2011 (ADAMS Accession No. ML11311A264). This enclosure also describes the staff's process for resolving the ACRS recommendations, as well as any other Fukushima-related issue that arises from the staff's ongoing lessons-learned deliberations, stakeholder interactions, and international outreach activities.

Process for Addressing Additional Issues

The staff developed a process to disposition all additional issues, including recommendations by the ACRS. All issues are reviewed by a panel of senior-level advisors from different NRC program offices. The panel determines whether each issue represents a valid safety concern, and whether there is a clear nexus to the Fukushima Dai-ichi accident. If neither criterion is met, or only one criterion is met, the panel chooses to either disposition the issue with no action, or direct it to one of the NRC's existing regulatory processes (e.g., generic issue process). If both criteria are met, the issue is forwarded for further consideration by the cognizant technical staff in the appropriate NRC line organization. Should the issue go forward, the cognizant technical staff is tasked with developing a proposal for Steering Committee (SC) disposition. The SC may elect to take no further action, disposition the issue using an existing NRC process, or prioritize the issue as a Tier 1, 2, or 3 item under the Japan Lessons-Learned Program.

This process will be used to disposition recommendations and issues sent to the NRC. The SC is routinely presented with a list of issues screened out by the panel of senior-level advisors for review, and it ultimately determines the final prioritization and disposition of each issue. Once this occurs, the staff documents the SC's findings, in detail, and plans to publish the results on the NRC's public Web site.

ACRS Recommendations

The staff has evaluated the recommendations of the ACRS in its October 13, 2011, and November 8, 2011, letters, using the staff's process for screening additional recommendations. The staff documented the SC's disposition of each ACRS recommendation, and has ensured that the cognizant technical staff working groups have used them to enhance the Tier 1, 2, and 3 actions that will be taken as a result of the events at the Fukushima Dai-ichi Nuclear Power Plant. A summary of the staff's disposition of the ACRS recommendations is provided in the table below. The staff addressed ACRS Recommendations 1(a)-1(g), 2(a)-2(f), and 3 from the letter dated October 13, 2011; as well as ACRS Conclusions 1-5 from letter dated November 8, 2011.

The staff also acknowledges the receipt of ACRS letter dated February 15, 2012. The staff will evaluate these additional ACRS comments/ recommendations and will enter them into its process for screening additional recommendations described above.

ACRS Recommendations Incorporated into Tier 1 Activities	
ACRS Recommendation	Staff Response
<ul style="list-style-type: none">• ACRS Recommendation 1(b)—“Actions related to NTTF Recommendation 2.3 should be expanded to assure that the walkdowns address the integrated effects of severe storms as well as seismic and flooding events.”• ACRS Conclusion 2—“Tier 1 recommendations should be expanded to include the additional immediate actions recommended in our October 13, 2011, report, regarding flooding hazard reevaluations, integrated walkdowns, station blackout, boiling water reactor (BWR) hardened vents, shared ventilation systems, hydrogen control and mitigation, spent fuel pools (SFPs) and integration of onsite emergency actions.”	<p>The NRC staff expanded NTTF Recommendation 2.3 to ensure that the walkdowns address the integrated effects of severe storms as well as seismic and flooding events, in light of the ACRS recommendations. This expansion of NTTF Recommendation 2.3 will have no net impact on the proposed staff resources stated in SECY-11-0137, “Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lesson Learned,” dated October 3, 2011.</p>
<ul style="list-style-type: none">• ACRS Recommendation 1(c)—“Actions related to NTTF Recommendation 4.1 should be expanded to include issuance of an advanced notice of proposed rulemaking and requiring licensee to provide an assessment of capabilities to cope with an extended station blackout (SBO).”• ACRS Recommendation 2(a)—“Performance-based criteria to mitigate and manage an extended SBO should be considered as an alternative to the specific coping times proposed in Recommendation 4.1.”	<p>The NRC staff expanded NTTF Recommendation 4.1 to include an advanced notice of proposed rulemaking (ANPR) and performance-based criteria for an extended SBO, in light of the ACRS recommendations and Commission direction in SRM-SECY-11-0124. This expansion of NTTF Recommendation 4.1 will have no net impact on the proposed staff resources stated in SECY-11-0137.</p> <p>Additionally, the Order associated with NTTF Recommendation 4.2 does include performance-based criteria for SBO coping times.</p>

ACRS Recommendations Incorporated into Tier 1 Activities	
ACRS Recommendation	Staff Response
<ul style="list-style-type: none">ACRS Conclusion 1—"Rulemaking activities related to strengthening of SBO mitigation capability should be expedited."	The NRC staff accelerated NTTF Recommendation 4.1 as a result of the Commission's decision in Staff Requirements Memorandum (SRM)-SECY-11-0124, "Recommended Actions To Be Taken Without Delay from the Near-Term Task Force Report," dated October 18, 2011. The staff has designated the SBO rulemaking as a high-priority rulemaking with a completion goal of 24 to 30 months. This acceleration of NTTF Recommendation 4.1 will have no net impact on the proposed staff resources stated in SECY-11-0137.
<ul style="list-style-type: none">ACRS Recommendation 1(d)—"Actions related to NTTF Recommendation 5.1 should also be applied to BWR plants with Mark II containments."	The NRC staff expanded NTTF Recommendation 5.1 to include BWR Mark II containments, in light of the ACRS recommendations. This expansion of NTTF Recommendation 5.1 will have no net impact on the proposed staff resources stated in SECY-11-0137.
<ul style="list-style-type: none">ACRS Recommendation 1(f)—"Information should be requested from licensees regarding current plant-specific spent fuel pool (SFP) instrumentation, power supplies, and sources of makeup and cooling water."ACRS Conclusion 5—"Staff Tier 1 Recommendation 7.1-2, 'Develop and issue order to licensees to provide reliable SFP instrumentation,' should be reconsidered. Schedules for SFP instrumentation improvements and other modifications to the SFP should be informed by quantification of the contribution made by SFPs to the overall plant risk."	The NRC staff enhanced NTTF Recommendation 7.1 and the associated SFP instrumentation Order in light of the ACRS recommendations. The staff used information gathered from all available resources regarding current plant-specific SFP instrumentation to inform the associated Order. This enhancement of NTTF Recommendation 7.1 will have no net impact on the proposed staff resources stated in SECY-11-0137.

ACRS Recommendations Incorporated into Tier 2 Activities	
ACRS Recommendation	Staff Response
<ul style="list-style-type: none">ACRS Recommendation 1(a)—“Actions related to NTTF Recommendation 2.1 should be expanded to include an expedited update of the applicable regulatory guidance, methods, and data for external flooding to ensure that outdated guidance and acceptance criteria are not used in the reevaluations.”	<p>The NRC staff will expand its actions related to NTTF Recommendation 2.1 to include “other external hazards” in light of Section 402 of the Consolidated Appropriations Act, 2012 (Public Law 112 74) and the ACRS recommendations. This is a new Tier 2 activity. However, in the Tier 1 actions associated with reevaluating seismic and flooding hazards, licensees will use the present-day regulatory guidance and methodologies that are currently being applied to ongoing reviews of ESP and COL applications.</p>
<ul style="list-style-type: none">ACRS Recommendation 1(f)—“Information should be requested from licensee regarding current plant-specific SFP instrumentation, power supplies, and sources of makeup and cooling water.”ACRS Conclusion 5—“Staff Tier 1 Recommendation 7.1-2, “Develop and issue order to licensees to provide reliable SFP instrumentation,” should be reconsidered. Schedules for SFP instrumentation improvements and other modifications to the SFP should be informed by quantification of the contribution made by SFPs to the overall plant risk.”	<p>The NRC staff will enhance NTTF Recommendations 7.2–7.5 in light of the ACRS recommendations. The staff will use information gathered from all available resources regarding current plant-specific SFP power supplies, and sources of makeup and cooling water, to inform future actions. These enhancements of NTTF Recommendations 7.2–7.5 will have no net impact on the proposed staff resources stated in SECY-11-0137.</p>

ACRS Recommendations Incorporated into Tier 3 Activities¹	
ACRS Recommendation	Staff Response
<ul style="list-style-type: none">• ACRS Recommendation 2(e)—“Selected reactor and containment instrumentation should be enhanced to withstand beyond-design-basis accident conditions.”• Conclusion 4—“Tier 2 recommendations should be expanded to include the additional actions recommended in our October 13, 2011, report regarding enhancement of selected reactor and containment instrumentation, and the need to proactively engage in efforts to capture and analyze data from the Fukushima event.”	The NRC staff will develop a new action on “reactor and containment instrumentation withstanding beyond-design-basis conditions” and add it to the Tier 3 actions that the NRC will take in response to the Fukushima lessons-learned.
<ul style="list-style-type: none">• ACRS Recommendation 1(e)—“Discussions with stakeholders should be initiated regarding near-term actions for additional hydrogen control and mitigation measures in reactor buildings for plants with Mark I and Mark II containments.”	The NRC staff will include discussions with stakeholders in its Tier 3 actions associated with NTTF Recommendation 6.
<ul style="list-style-type: none">• ACRS Recommendation 2(b)—“Recommendation 6 should be expanded to include a requirement for BWR plants with Mark I and Mark II containments to implement combustible gas control measures in reactor buildings as a near-term defense-in-depth measure.”	The NRC staff will enhance the Tier 3 actions associated with NTTF Recommendation 6 to include the implementation of combustible gas control measures in reactor buildings.

¹

The resource estimates associated with the incorporation of the above ACRS Recommendation into Tier 3 activities will be described in detail in the staff's 9-month SECY due to the Commission in July 2012.

ACRS Recommendations Incorporated into Tier 3 Activities	
ACRS Recommendation	Staff Response
<ul style="list-style-type: none">• ACRS Recommendation 2(c)—“Recommendation 6 should be expanded to include an assessment of the vulnerabilities introduced by shared ventilation systems or shared stacks in multi-unit.”	The NRC staff will enhance the Tier 3 actions associated with NTTF Recommendation 6 to include vulnerabilities introduced by shared ventilation systems or shared stacks in multiunit sites.
<ul style="list-style-type: none">• ACRS Recommendation 1(g)—“Actions related to NTTF Recommendation 8 should be expanded to include fire response procedures.”• ACRS Recommendation 2(d)—“Integration of onsite emergency response capabilities envisioned by Recommendation 8 should be expanded to include fire response procedures.”	The NRC staff evaluated how to appropriately integrate the fire response procedure into a licensee's onsite emergency response capabilities and determined that the fire response procedures would be best considered with the agency's Tier 3 actions associated with NTTF Recommendation 3.
<ul style="list-style-type: none">• ACRS Conclusion 3—“NTTF Recommendation 10.2 regarding evaluation of the command and control structure and qualifications of decision makers should be initiated in parallel with Tier 1 activities related to integration of onsite emergency actions.”	The NRC staff evaluated how to appropriately initiate the “evaluation of the command and control structure and qualifications of decision makers” and determined that they would be best considered with the agency's Tier 3 actions associated with NTTF Recommendation 10.

ACRS Recommendations Addressed by Other NRC Processes or Programs	
ACRS Recommendation	Staff Response
<ul style="list-style-type: none">ACRS Recommendation 2(f)—“The NRC should proactively engage in efforts to define and participate in programs to capture and analyze data from the Fukushima event to enhance understanding of severe accident phenomena, including BWR melt progressions, seawater addition effects, hydrogen transport and combustion, and safety systems operability.”	The NRC staff in the Office of Nuclear Regulatory Research (RES) is currently working on capturing and analyzing Fukushima data to enhance the agency’s understanding of severe accident phenomena.
<ul style="list-style-type: none">ACRS Recommendation 3—“Licensing actions requiring the granting of containment accident pressure (CAP) credit should be suspended until the implications of post-Fukushima containment pressure control measures are understood.”	The NRC staff determined that CAP credit will continue to be reviewed on a case-by-case basis.

New Tier 2 Activity—NTTF Recommendation 2.1 Other Natural External Hazards Reevaluations

The NTTF recommends the NRC require licensees to reevaluate and upgrade as necessary the design basis of structures, systems, and components (SSCs) important to safety for protection against updated seismic and flooding hazards. The ACRS recommended expanding this recommendation to include other natural external hazards other than seismic and flooding. The Consolidated Appropriations Act, Public Law 112-074, mandates the NRC to require licensees to reevaluate the external hazards at their sites and to require updates to their design basis, if necessary.

Regulations and Guidance

1. General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," requires, in part, that SSCs important to safety be designed to withstand the effects of natural phenomena such as tornadoes and hurricanes without loss of capability to perform their safety functions. The design bases for these SSCs shall reflect appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
2. GDC 4, "Environmental and Dynamic Effects Design Bases," requires, in part, that SSCs that are important to safety be adequately protected against the effects of missiles resulting from events and conditions outside the plant.
3. GDC 44, "Cooling Water," states, in part, that a system to transfer heat from SSCs important to safety to an ultimate heat sink (UHS) shall be provided. The system safety function shall be to transfer the combined heat load of these SSCs under normal operating and accident conditions.
4. The regulations in Subpart B, "Evaluation Factors for Stationary Power Reactor Site Applications On or After January 10, 1997," to 10 CFR Part 100, "Reactor Site Criteria," state, in part, that meteorological characteristics of the site that are necessary for safety analysis or that may have an impact upon plant design (such as maximum probable wind speed and precipitation) must be identified and characterized (10 CFR 100.20(c)(2)). The regulations further state, in part, that the physical characteristics of the site, including meteorology, must be evaluated and site parameters established such that potential threats from such physical characteristics will pose no undue risk to the type of facility proposed to be located at the site (10 CFR 100.21(d)).
5. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" contains the following sections of interest:
 - a. Section 2.3.1, "Regional Climatology"
 - b. Section 2.4.2, "Floods"
 - c. Section 2.4.11, "Low Water Considerations"

- d. Section 3.3.1, "Wind Loadings"
 - e. Section 3.3.2, "Tornado Loadings"
 - f. Section 3.5.1.4, "Missiles Generated by Tornadoes and Extreme Winds"
 - g. Section 5.4.7, "Residual Heat Removal (RHR) System"
 - h. Section 6.2.1, "Containment Functional Design"
 - i. Section 6.2.2, "Containment Heat Removal Systems"
 - j. Section 6.4, "Control Room Habitability System"
 - k. Section 9.1.3, "Spent Fuel Pool Cooling and Cleanup System"
 - l. Section 9.2.2, "Reactor Auxiliary Cooling Water Systems"
6. Interim Staff Guidance DC/COL-ISG-7, "Assessment of Normal and Extreme Winter Precipitation Loads on the Roofs of Seismic Category I Structures," was issued final on October 9, 2009.
7. Regulatory Guide (RG) 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 2, was issued January 1976.
8. RG 1.76, "Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants," Revision 1, was issued March 2007.
9. RG 1.221, "Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants," was issued October 2011.

Staff Assessment and Basis for Prioritization

As a follow-on activity to the completion of the Tier 1 actions on seismic and flooding hazards associated with NTTF Recommendation 2.1, the staff concludes that the recommendation should be enhanced to include other natural hazards (e.g., meteorological phenomena) that could affect the safety of power reactors in the U.S. This expansion was suggested to the staff by the ACRS and was subsequently mandated to the NRC in Section 402 of the Consolidated Appropriations Act of 2012.

ACRS letter dated October 13, 2011 (ADAMS Accession No. ML11284A136), recommended that the staff should expand actions related to NTTF Recommendation 2.3 to include:

The integrated effects of severe storms as well as seismic and flooding events.

The Consolidated Appropriations Act, Public Law 112-074, was signed into law on December 23, 2011. Section 402 clarified the scope of the staff's reevaluation of licensees' design bases to include other external events, as described below:

The Nuclear Regulatory Commission shall require reactor licensees to re-evaluate the seismic, tsunami, flooding, and other external hazards at their sites against current applicable Commission requirements and guidance for such licensees as expeditiously as possible, and thereafter when appropriate, as determined by the Commission, and require each licensee to respond to the Commission that the design basis for each reactor meets the requirements of its license, current applicable Commission requirements and guidance for such license. Based upon the evaluations conducted pursuant to this section and other information it deems relevant, the Commission shall require licensees to update the design basis for each reactor, if necessary.

Other Natural External Hazards. The NRC will undertake regulatory actions to ensure that SSCs important to safety will withstand other natural external hazards. These other external hazards can be considered to include meteorological phenomena such as wind and missile loads from tornadoes and hurricanes, maximum rainfall rates and snow and ice load for roof design, drought and other low-water conditions that may reduce or limit the available safety-related cooling water supply, extreme maximum and minimum ambient temperatures for normal plant heat sink and containment heat removal systems (post-accident), and meteorological conditions related to the maximum evaporation and drift loss and minimum water cooling for the UHS design. Flooding reevaluations and walkdowns in response to Tier 1 NTTF

Recommendations 2.1 and 2.3 will address reevaluation of flood hazards for each flood causing mechanism, based on present-day methodologies and regulatory guidance. This will include analyses of each flood causing mechanism that may impact the site including local intense precipitation and site drainage, flooding in streams and rivers, dam breaches and failures, storm surge and seiche, tsunami, channel migration or diversion, and combined effects.

The staff's assessment of the expansion of NTTF Recommendation 2.1 indicates that plants may differ in the way they protect against natural phenomena. The staff concluded that sufficient regulatory guidance currently exists to permit licensee reevaluations. However, the staff noted that results of inspections of SSCs at Fukushima Dai-ichi and Dai-ni Nuclear Power Stations may help inform the implementation of this recommendation. To the extent practical, the new information on the events at Fukushima Dai-ichi and Dai-ni should be incorporated into the reevaluations.

The staff concludes that this recommendation would improve safety. However, the staff also noted that the implementation of this recommendation would require significant resources for both licensees and the NRC, as well as specialized expertise to review licensee reevaluations and to document results of staff evaluations. Since sufficient resource flexibility, including availability of critical skill sets, does not exist at this time, the staff prioritized this action as a Tier 2 recommendation. Albeit very low, seismic and flooding hazards are expected to be the dominant risks to the operating fleet of plants from external hazards and therefore have been given priority as Tier 1 activities.

Staff Actions

Once sufficient expertise and resources are available, the NRC staff plans to undertake regulatory activities to do the following:

1. Continue stakeholder interactions to discuss the technical basis and acceptance criteria for conducting a reevaluation of site-specific external natural hazards. These interactions will also help to define guidelines for the application of current regulatory guidance and methodologies being used for early site permit and combined license reviews to the reevaluation of hazards at operating reactors.
2. Develop and issue a request for information to licensees pursuant to 10 CFR 50.54(f) to (1) reevaluate site-specific external natural hazards using the methodology discussed in Item 1 above, and (2) identify actions that have been taken, or are planned, to address plant-specific issues associated with the updated natural external hazards (including potential changes to the licensing or design basis of a plant).

3. Evaluate licensee responses and take appropriate regulatory action to resolve issues associated with updated site-specific natural external hazards.

Unique Implementation Challenges

The staff recognizes that the NRC and industry have limited, specialized expertise (e.g., physical scientists, hydrologists) to complete the actions associated with this recommendation.

Schedules and Milestones

Reevaluation of Other Natural External Hazards:

- I. Issue a 10 CFR 50.54(f) letter 6 months following initiation of action.
 - a. Initiate stakeholder interaction and technical development (e.g., methods, technical basis, acceptance criteria).
 - b. Develop a 10 CFR 50.54(f) letter.
 - c. Issue a 10 CFR 50.54(f) letter.
- II. Evaluate licensee responses to the 10 CFR 50.54(f) letter, based on a timeline to be developed during stakeholder interactions, taking into account available resources.
 - a. Write a safety evaluation or NUREG to document staff conclusions.
- III. Issue orders to licensees (if needed), 3 months following a decision to issue orders.
 - a. Develop the regulatory basis and draft orders.
 - b. Issue orders.
- IV. Initiate inspection activities, on a schedule to be determined
 - a. Develop temporary instructions.
 - b. Conduct inspections and document results.
- V. Issue letters to close out the 10 CFR 50.54(f) letter and orders, 1 month after last inspection.

Resources for Other Natural External Hazards Reevaluations

Activity	Resource Category	Specific Expertise Needed	Estimated FTE	Locations of Most Applicable Expertise within NRC
I. Develop 10 CFR 50.54(f) letter	Project/Program Management	Plant Licensing	0.3	NRR
	Technical	Physical Science	0.3	NRO, NRR
		Hydrology	0.2	NRO, NRR
		Electrical Engineering; Structural Engineering; Plant Systems	0.1	NRR, NRO
	Legal	Plant Licensing	0.1	OGC
II. Evaluate licensee responses to 10 CFR 50.54(f) letter	Project/Program Management	Plant Licensing	0.3	NRR
	Technical	Physical Science	3.8	NRO, NRR
		Hydrology	1.4	NRO, NRR
		Electrical Engineering; Structural Engineering; Plant Systems	3.0	NRR, NRO
	Legal	Plant Licensing	0.2	OGC
III. Issue orders to licensees (if needed)	Project/Program Management	Plant Licensing	0.3	NRR
	Legal	Plant Licensing	0.2	OGC
	Technical	Hydrology	0.1	NRO, NRR
		Electrical Engineering; Structural Engineering; Plant Systems	0.3	NRR, NRO
IV. Conduct inspection activities	Regional Inspection	Inspection	1.0	All Regions
	Project/Program Management	Inspection Program Management	0.3	NRR
	Technical	Hydrology	0.1	NRO, NRR
		Electrical Engineering; Structural Engineering; Plant Systems	0.3	NRR, NRO

V. Close out 10 CFR 50.54(f) letter and orders	Project/Program Management	Project Management	0.3	NRR
	Legal	Plant Licensing	0.2	OGC
Total FTE			12.8	

ALL POWER REACTOR
LICENSEES AND HOLDERS
OF CONSTRUCTION PERMITS IN
ACTIVE OR DEFERRED STATUS

Docket Nos. (as shown in Attachment 1)
License Nos. (as shown in Attachment 1) or
Construction Permit Nos. (as shown in
Attachment 1)

EA-12-XXX

**ORDER MODIFYING LICENSES
WITH REGARD TO RELIABLE SPENT FUEL POOL INSTRUMENTATION
(EFFECTIVE IMMEDIATELY)**

1

The Licensees and construction permit (CP) holders¹ identified in Attachment 1 to this Order hold licenses 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."

11.

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.

Enclosure 6

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 facility response to the earthquake appears to have been normal.

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 for 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.

The Unit 4 spent fuel pool contained the highest heat load of the six units with the full core present in the spent fuel pool and the refueling gates installed. However, because Unit 4 had been shut down for more than 3 months, the heat load was low relative to that present in spent fuel pools in the United States following shutdown for reactor refueling. Following the earthquake and tsunami, the operators in the Units 3 and 4 control room focused their efforts on stabilizing the Unit 3 reactor. During the event, concern grew that the spent fuel was

overheating, causing a high-temperature reaction of steam and zirconium fuel cladding generating hydrogen gas. This concern persisted primarily due to a lack of readily available and reliable information on water levels in the spent fuel pools. Helicopter water drops, water cannons, and cement delivery vehicles with articulating booms were used to refill the pools, which diverted resources and attention from other efforts. Subsequent analysis determined that the water level in the Unit 4 spent fuel pool did not drop below the top of the stored fuel and no significant fuel damage occurred. The lack of information on the condition of the spent fuel pools contributed to a poor understanding of possible radiation releases and adversely impacted effective prioritization of emergency response actions by decision makers.

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 modified by the NRC staff following interactions with stakeholders. Documentation of the NRC 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 NRC staff's prioritization of the recommendations based upon the potential safety enhancements.

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 United States. Therefore, continued operation and continued licensing activities do not pose an imminent threat to public health and safety. However, the NRC's assessment of new insights from the events at Fukushima Dai-ichi leads the NRC staff to conclude that additional requirements must be imposed on Licensees and 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.

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 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 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 and CP holders are maintaining an adequate level of public health and safety and common defense and security. While compliance with NRC requirements presumptively ensures 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 and 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 public health and safety.

In the case of spent fuel pools, compliance with existing regulations and guidance presumptively provides reasonable assurance of the safe storage of spent fuel. In particular, Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 establishes the general design criteria (GDC) for nuclear power plants. All currently operating reactors were licensed to the GDC or meet the intent of the GDC. The GDC provide the design features of the spent fuel storage and handling systems and the protection of these systems from natural phenomena and operational events. The accidents considered during licensing of U.S. nuclear power plants typically include failure of the forced cooling system and loss of spent fuel pool inventory at a specified rate within the capacity of the makeup water system. Further, spent fuel pools at U.S. nuclear power plants rely on maintenance of an adequate inventory of water under accident conditions to provide containment, as well as the cooling and shielding safety functions.

During the events in Fukushima, responders were without reliable instrumentation to determine water level in the spent fuel pool. This caused concerns that the pool may have boiled

dry, resulting in fuel damage.² Fukushima demonstrated the confusion and misapplication of resources that can result from beyond-design-basis external events when adequate instrumentation is not available.

The spent fuel pool level instrumentation at U.S. nuclear power plants is typically narrow range and, therefore, only capable of monitoring normal and slightly off-normal conditions. Although the likelihood of a catastrophic event affecting nuclear power plants and the associated spent fuel pools in the United States remains very low, beyond-design-basis external events could challenge the ability of existing instrumentation to provide emergency responders with reliable information on the condition of spent fuel pools. Reliable and available indication is essential to ensure plant personnel can effectively prioritize emergency actions.

Accordingly, the NRC has concluded that there is a need to redefine the level of protection of public health and safety regarded as adequate under the provisions of the backfit rule, 10 CFR 50.109(a)(4)(iii), and is requiring actions of Licensees and CP holders to meet the new level of protection. 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.

The Commission has determined that adequate protection of public health and safety requires that all power reactor Licensees and CP holders have a reliable means of remotely monitoring wide-range spent fuel pool levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event. These new requirements provide a greater 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

² See *Institute of Nuclear Power Operations (INPO) 11-005, "Special Report on the Nuclear Accident at the Fukushima Daiichi Nuclear Power Station," Revision 0, issued November 2011, p. 36.*

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 Part 52 identified in Attachment 1 to this Order shall be modified to include the requirements identified in Attachment 3 to this Order.

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 CP 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 impact, the basis for its determination that the requirement has an adverse impact, and either a proposal for achieving the same objectives specified in the Attachment 2 or Attachment 3 requirement in question, or a schedule for modifying the facility to address the adverse 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 CP holders shall provide an initial status report **sixty (60) days** after the 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 holder 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.

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 twenty (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 e-mail at 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/esubmittals.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/esubmittals.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 e-mail notice confirming receipt of the document. The E-Filing system also distributes an e-mail 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 e-mail at 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://ehd.nrc.gov/EHD_Proceeding/home.asp, 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

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

Michael R. Johnson, Director
Office of New Reactors

Dated this ____ day of March 2012 .

POWER REACTOR LICENSEES AND LICENSEES
WITH ACTIVE AND/OR DEFERRED CONSTRUCTION PERMITS

Arkansas Nuclear One, Units 1 and 2
Entergy Nuclear Operations, Inc.
London, AR
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

Beaver Valley Power Station, Units 1 and 2
First Energy Nuclear Operating Co.
Shippingport, PA
Docket Nos. 50-334 and 50-412
License Nos. DPR-66 and NPF-73

Bellefonte Nuclear Power Station, Units 1 and 2
Tennessee Valley Authority
Scottsboro, AL
Docket Nos. 50-438 and 50-439
Construction Permit Nos. CPPR-122 and CPPR-123

Braidwood Station, Units 1 and 2
Exelon Generation Co., LLC
Braceville, IL
Docket Nos. 50-456 and 50-457
License Nos. NPF-72 and NPF-77

Browns Ferry Nuclear Plant, Units 1, 2 and 3
Tennessee Valley Authority
Athens, AL
Docket Nos. 50-259, 50-260, and 50-296
License Nos. DPR-33, DPR-52 and DPR-68

Brunswick Steam Electric Plant, Units 1 and 2
Carolina Power & Light Co.
Southport, NC
Docket Nos. 50-325 and 50-324
License Nos. DPR-71 and DPR-62

Byron Station, Units 1 and 2
Exelon Generation Co., LLC
Byron, IL
Docket Nos. 50-454 and 50-455
License Nos. NPF-37 and NPF-66

Callaway Plant
Union Electric Co.
Fulton, MO
Docket No. 50-483
License No. NPF-30

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Calvert Cliffs Nuclear Power Plant, Inc.
Lusby, MD
Docket Nos. 50-317 and 50-318
License Nos. DPR-53 and DPR-69

Catawba Nuclear Station, Units 1 and 2
Duke Energy Carolinas, LLC
York, SC
Docket Nos. 50-413 and 50-414
License Nos. NPF-35 and NPF-52

Clinton Power Station, Unit 1
Exelon Generation Co., LLC
Clinton, IL
Docket No. 50-461
License No. NPF-62

Columbia Generating Station, Unit 2
Energy Northwest
Richland, WA
Docket No. 50-397
License No. NPF-21

Comanche Peak Steam Electric Station, Units 1 and 2
Luminant Generation Co., LLC
Glen Rose, TX
Docket Nos. 50-445 and 50-446
License Nos. NPF-87 and NPF-89

Cooper Nuclear Station
Nebraska Public Power District
Brownville, NE
Docket No. 50-298
License No. DPR-46

Crystal River Nuclear Generating Plant, Unit 3
Florida Power Corp.
Crystal River, FL
Docket No. 50-302
License No. DPR-72

Davis-Besse Nuclear Power Station, Unit 1
First Energy Nuclear Operating Co.
Oak Harbor, OH
Docket No. 50-346
License No. NPF-3

Diablo Canyon Nuclear Power Plant, Units 1 and 2
Pacific Gas & Electric Co.
Avila Beach, CA
Docket Nos. 50-275 and 50-323
License Nos. DPR-80 and DPR-82

Donald C. Cook Nuclear Power Plant, Units 1 and 2
Indiana Michigan Power Co.
Bridgman, MI
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74

Dresden Nuclear Power Station, Units 2 and 3
Exelon Generation Co., LLC
Morris, IL
Docket Nos. 50-237 and 50-249
License Nos. DPR-19 and DPR-25

Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC
Palo, IA
Docket No. 50-331
License No. DPR-49

Edwin I. Hatch Nuclear Plant, Units 1 and 2
Southern Nuclear Operating Co.
Baxley, GA
Docket Nos. 50-321 and Docket No. 50-366
License Nos. DPR-57 and NPF-5

Fermi, Unit 2
The Detroit Edison Co.
Newport, MI
Docket No. 50-341
License No. NPF-43

Fort Calhoun Station, Unit 1
Omaha Public Power District
Fort Calhoun, NE
Docket No. 50-285
License No. DPR-40

Grand Gulf Nuclear Station, Unit 1
Entergy Nuclear Operations, Inc.
Port Gibson, MS
Docket No. 50-416
License No. NPF-29

H. B. Robinson Steam Electric Plant, Unit 2
Carolina Power & Light Co.
Hartsville, SC
Docket No. 50-261
License No. DPR-23

Hope Creek Generating Station, Unit 1
PSEG Nuclear, LLC
Hancocks Bridge, NJ
Docket No. 50-354
License No. NPF-57

Indian Point Nuclear Generating Station, Units 2 and 3
Entergy Nuclear Operations, Inc.
Buchanan, NY
Docket Nos. 50-247 and 50-286
License Nos. DPR-26 and DPR-64

James A. FitzPatrick Nuclear Power Plant
Entergy Nuclear Operations, Inc.
Scriba, NY
Docket No. 50-333
License No. DPR-59

Joseph M. Farley Nuclear Plant, Units 1 and 2
Southern Nuclear Operating Co.
Columbia, AL
Docket Nos. 50-348 and 50-364
License Nos. NPF-2 and NPF-8

Kewaunee Power Station
Dominion Energy Kewaunee, Inc.
Kewaunee, WI
Docket No. 50-305
License No. DPR-43

LaSalle County Station, Units 1 and 2
Exelon Generation Co., LLC
Marseilles, IL
Docket Nos. 50-373 and 50-374
License Nos. NPF-11 and NPF-18

Limerick Generating Station, Units 1 and 2
Exelon Generation Co., LLC
Limerick, PA
Docket Nos. 50-352 and 50-353
License Nos. NPF-39 and NPF-85

McGuire Nuclear Station, Units 1 and 2
Duke Energy Carolinas, LLC
Huntersville, NC
Docket Nos. 50-369 and 50-370
License Nos. NPF-9 and NPF-17

Millstone Power Station, Units 2 and 3
Dominion Nuclear Connecticut, Inc.
Waterford, CT
Docket Nos. 50-336 and 50-423
License Nos. DPR-65 and NPF-49

Monticello Nuclear Generating Plant, Unit 1
Northern States Power Company
Monticello, MN
Docket No. 50-263
License No. DPR-22

Nine Mile Point Nuclear Station, Units 1 and 2
Nine Mile Point Nuclear Station, LLC
Scriba, NY
Docket Nos. 50-220 and 50-410
License Nos. DPR-63 and NPF-69

North Anna Power Station, Units 1 and 2
Virginia Electric & Power Co.
Louisa, VA
Docket Nos. 50-338 and 50-339
License Nos. NPF-4 and NPF-7

Oconee Nuclear Station, Units 1, 2, and 3
Duke Energy Carolinas, LLC
Seneca, SC
Docket Nos. 50-269, 50-270, and 50-287
License Nos. DPR-38, DPR-47, and DPR-55

Oyster Creek Nuclear Generating Station, Unit 1
Exelon Generation Co., LLC
Forked River, NJ
Docket No. 50-219
License No. DPR-16

Palisades Nuclear Plant
Entergy Nuclear Operations, Inc.
Covert, MI
Docket No. 50-255
License No. DPR-20

Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Arizona Public Service Company
Wintersburg, AZ
Docket Nos. 50-528, 50-529, and 50-530
License Nos. NPF-41, NPF-51 and NPF-74

Peach Bottom Atomic Power Station, Units 2 and 3
Exelon Generation Co., LLC
Delta, PA
Docket Nos. 50-277 and 50-278
License Nos. DPR-44 and DPR-56

Perry Nuclear Power Plant, Unit 1
First Energy Nuclear Operating Co.
Perry, OH
Docket No. 50-440
License No. NPF-58

Pilgrim Nuclear Power Station
Entergy Nuclear Operations, Inc.
Plymouth, MA
Docket No. 50-293
License No. DPR-35

Point Beach Nuclear Plant, Units 1 and 2
FPL Energy Duane Arnold, LLC
Two Rivers, WI
Docket Nos. 50-266 and 50-301
License Nos. DPR-24 and DPR-27

Prairie Island Nuclear Generating Plant, Units 1 and 2
Northern States Power Co. Minnesota
Welch, MN
Docket Nos. 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Quad Cities Nuclear Power Station, Units 1 and 2
Exelon Generation Co., LLC
Morris, IL
Docket Nos. 50-254 and 50-265
License Nos. DPR-29 and DPR-30

River Bend Station, Unit 1
Entergy Nuclear Operations, Inc.
St. Francisville, LA
Docket No. 50-458
License No. NPF-47

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

St. Lucie Plant, Units 1 and 2
Florida Power & Light Co.
Jensen Beach, FL
Docket Nos. 50-335 and 50-389
License Nos. DPR-67 and NPF-16

Salem Nuclear Generating Station, Units 1 and 2
PSEG Nuclear, LLC
Hancocks Bridge, NJ
Docket Nos. 50-272 and 50-311
License Nos. DPR-70 and DPR-75

San Onofre Nuclear Generating Station, Units 2 and 3
Southern California Edison Co.
San Clemente, CA
Docket Nos. 50-361 and 50-362
License Nos. NPF-10 and NPF-15

Seabrook Station, Unit 1
FPL Energy Seabrook, LLC
Seabrook, NH
Docket No. 50-443
License No. NPF-86

Sequoyah Nuclear Plant, Units 1 and 2
Tennessee Valley Authority
Soddy-Daisy, TN
Docket Nos. 50-327 and 50-328
License Nos. DPR-77 and DPR-79

Shearon Harris Nuclear Power Plant, Unit 1
Carolina Power & Light Co.
New Hill, NC
Docket No. 50-400
License No. NPF-63

South Texas Project, Units 1 and 2
STP Nuclear Operating Co.
Bay City, TX
Docket Nos. 50-498 and 50-499
License Nos. NPF-76 and NPF-80

Surry Nuclear Power Station, Units 1 and 2
Virginia Electric & Power Co.
Surry, VA
Docket Nos. 50-280 and 50-281
License Nos. DPR-32 and DPR-37

Susquehanna Steam Electric Station, Units 1 and 2
PPL Susquehanna, LLC
Salem Township, Luzerne Co., PA
Docket Nos. 50-387 and 50-388
License Nos. NPF-22 and NPF-14

Three Mile Island Nuclear Station, Unit 1
Exelon Generation Co., LLC
Middletown, PA
Docket No. 50-289
License No. DPR-50

Turkey Point Nuclear Generating, Units 3 and 4
Florida Power & Light Co.
Homestead, FL
Docket Nos. 50-250 and 50-251
License Nos. DPR-31 and DPR-41

Vermont Yankee Nuclear Power Plant, Unit 1
Entergy Nuclear Operations, Inc.
Vernon, VT
Docket No. 50-271
License No. DPR-28

Virgil C. Summer Nuclear Station, Unit 1
South Carolina Electric & Gas Co.
Jenkinsville, SC
Docket No. 50-395
License No. NPF-12

Vogtle Electric Generating Plant, Units 1, 2, 3, and 4
Southern Nuclear Operating Co.
Waynesboro, GA
Docket Nos. 50-424, 50-425, 52-025, and 52-026
License Nos. NPF-68, NPF-81, NPF-91 and NPF-92

Waterford Steam Electric Station, Unit 3
Entergy Nuclear Operations, Inc.
Killona, LA
Docket No. 50-382
License No. NPF-38

Watts Bar Nuclear Plant, Units 1 and 2
Tennessee Valley Authority
Spring City, TN
Docket No. 50-390 and 50-391
License No. NPF-90 and
Construction Permit No. CPPR-92

Wolf Creek Generating Station, Unit 1
Wolf Creek Nuclear Operating Corp.
Burlington, Coffey County, KS
Docket No. 50-482
License No. NPF-42

REQUIREMENTS FOR RELIABLE SPENT FUEL POOL LEVEL INSTRUMENTATION AT OPERATING REACTOR SITES AND CONSTRUCTION PERMIT HOLDERS

All licensees identified in Attachment 1 to this Order shall have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

1. The spent fuel pool level instrumentation shall include the following design features:
 - 1.1. Instruments: The instrumentation shall consist of a permanent, fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable. Portable instruments shall have capabilities that enhance the ability of trained personnel to monitor spent fuel pool water level under conditions that restrict direct personnel access to the pool, such as partial structural damage, high radiation levels, or heat and humidity from a boiling pool.
 - 1.2. Arrangement: The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the primary instrument channel and fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.
 - 1.3. Mounting: Installed instrument channel equipment within the spent fuel pool shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the spent fuel pool structure.
 - 1.4. Qualification: The primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. This reliability shall be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program).
 - 1.5. Independence: The primary instrument channel shall be independent of the backup instrument channel.
 - 1.6. Power supplies: Permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant ac and dc power distribution systems, such as portable generators or replaceable batteries. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

1. 7 Accuracy: The instrument channels shall maintain their designed accuracy following a power interruption or change in power source without recalibration.
 1. 8 Testing: The instrument channel design shall provide for routine testing and calibration.
 1. 9 Display: Trained personnel shall be able to monitor the spent fuel pool water level from the control room, alternate shutdown panel, or other appropriate and accessible location. The display shall provide on-demand or continuous indication of spent fuel pool water level.
2. The spent fuel pool instrumentation shall be maintained available and reliable through appropriate development and implementation of the following programs:
 - 2.1 Training: Personnel shall be trained in the use and the provision of alternate power to the primary and backup instrument channels.
 - 2.2 Procedures: Procedures shall be established and maintained for the testing, calibration, and use of the primary and backup spent fuel pool instrument channels.
 - 2.3 Testing and Calibration: Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy.

REQUIREMENTS FOR RELIABLE SPENT FUEL POOL LEVEL INSTRUMENTATION AT COL HOLDER REACTOR SITES

Attachment 2 to this Order for Part 50 Licensees requires reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

The design bases of Vogtle Units 3&4 address many of these attributes of spent fuel pool level instrumentation. 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 certified design largely addresses the requirements in Attachment 2 by providing two safety-related spent fuel pool level instrument channels. The instruments measure level from the top of the spent fuel pool to the top of the fuel racks to address the range requirements listed above. The safety-related classification provides for the following additional design features:

- Seismic and environmental qualification of the instruments
- Independent power supplies
- Electrical isolation and physical separation between instrument channels
- Display in the control room as part of the post-accident monitoring instrumentation
- Routine calibration and testing

As such, this Order requires Vogtle Units 3&4 to address the following requirements that were not specified in the certified design.

1. The spent fuel pool level instrumentation shall include the following design features:
 - 1.1 Arrangement: The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the safety-related instruments to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.
 - 1.2 Qualification: The level instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period.
 - 1.3 Power supplies: Instrumentation channels shall provide for power connections from sources independent of the plant alternating current (ac) and direct current (dc) power distribution systems, such as portable generators or replaceable batteries. Power supply designs should provide for quick and accessible connection of sources independent of the plant ac and dc power distribution systems. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.

- 1.4 Accuracy: The instrument shall maintain its designed accuracy following a power interruption or change in power source without recalibration.
 - 1.5 Display: The display shall provide on-demand or continuous indication of spent fuel pool water level.
2. The spent fuel pool instrumentation shall be maintained available and reliable through appropriate development and implementation of a training program. Personnel shall be trained in the use and the provision of alternate power to the safety-related level instrument channels.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
ALL OPERATING BOILING WATER)	Docket Nos. (as shown in Attachment 1)
REACTOR LICENSEES WITH MARK I AND)	License Nos. (as shown in Attachment 1)
MARK II CONTAINMENTS)	EA-12-XXX
)	

**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 facility response to the earthquake appears to have been normal.

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 (SBO). In addition, all direct current electrical power was lost early in the event on Units 1 and 2, and for 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.

Operators first considered using the facility's hardened vent to control pressure in the containment within an hour following the loss of all ac power at Unit 1. The Emergency Response Center began reviewing accident management procedures and checking containment venting procedures to determine how to open the containment vent valves without power.¹ However, without adequate core and containment cooling, primary containment (drywell) pressure and temperature in Units 1, 2, and 3 substantially exceeded the design values for the containments. When the operators attempted to vent the containments, they were significantly

¹ See Institute of Nuclear Power Operations (INPO) report "INPO 11-005, *Special Report on the Nuclear Accident at the Fukushima Daiichi Nuclear Power Station, Revision 0*," issued November 2011, p. 72

challenged opening the hardened wetwell (suppression chamber) vents because of complications from the prolonged SBO, and high radiation fields that impeded access.

At Fukushima Dai-ichi Units 1, 2, 3, and 4, venting the wetwell involved opening motor- and air-operated valves. Similar features are used in many hardened vent systems that were installed in U.S. BWR Mark I containment plants following issuance of Generic Letter (GL) 89-16, "Installation of a Hardened Wetwell Vent." In the prolonged SBO situation that occurred at Fukushima, operator actions were not possible from the control room because of the loss of power, and the loss of pneumatic supply pressure to the air-operated valves. The resultant delay in venting the containment precluded early injection of coolant into the reactor vessel. The lack of coolant, in turn, resulted in extensive core damage, high radiation levels, hydrogen production and containment failure. The leakage of hydrogen gas into the reactor building precipitated explosions in the secondary containment buildings of Units 1, 3, and 4, and the ensuing damage to the facility contributed to the uncontrolled release of radioactive material to the environment.

Fukushima Dai-ichi Units 1, 2, 3, and 4 use the Mark I containment design; however, because Mark II containment designs are only slightly larger in volume than Mark I containment designs and use wetwell pressure suppression, it can reasonably be concluded that a Mark II under similar circumstances would have suffered similar consequences.

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 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.

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 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.

In SRM-SECY-11-0137, the Commission directed the NRC staff to take certain actions and provided further guidance including directing the staff to consider filtered vents. The staff has determined that there are policy issues that need to be resolved before any regulatory action can be taken to require Licensees to install filtered vents. These policy issues include consideration of severe accident conditions in the design and operation of the vent, the addition of filters to hardened reliable vents, and consideration of vents in areas other than primary

containment. However, the NRC has also determined that Licensees should promptly begin the implementation of short-term actions relating to reliable hardened vents and to focus these actions on improvements that will assist in the prevention of core damage. As such, this Order requires Licensees to take the necessary actions to install reliable hardened venting systems in BWR facilities with Mark I and Mark II containments to assist strategies relating to the prevention of core damage. With respect to the policy issues discussed above, the NRC staff plans to submit a Policy Paper to the Commission in July 2012.

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, 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 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 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 public health and safety.

The events at Fukushima Dai-ichi highlight the possibility that extreme natural phenomena could challenge the prevention, mitigation and emergency preparedness defense-in-depth layers. At Fukushima, limitations in time and unpredictable conditions associated with the accident significantly challenged attempts by the responders to preclude core damage and containment failure. In particular, the operators were unable to successfully operate the containment venting system. The inability to reduce containment pressure inhibited efforts to cool the reactor core. If additional backup or alternate sources of power had been available to operate the containment venting system remotely, or if certain valves had been more accessible for manual operation, the operators at Fukushima may have been able to depressurize the containment earlier. This, in turn, could have allowed operators to implement strategies using low-pressure water sources that may have limited damage to the reactor core. Thus, the events at Fukushima demonstrate that reliable hardened vents at BWR facilities with Mark I and Mark II containment designs are important to maintain core and containment cooling.

Accordingly, the NRC has concluded that there is a need to redefine the level of protection of public health and safety regarded as adequate under the provisions of the backfit rule, 10 CFR 50.109(a)(4)(iii), and is requiring Licensee actions to meet the new level of protection. In addition, pursuant to 10 C.F.R. 2.202, the NRC finds that the public health, safety and interest

require that this Order be made immediately effective.

The Commission has determined that adequate protection of public health and safety requires that all operating BWR facilities with Mark I and Mark II containments have a reliable hardened venting capability for events that can lead to core damage. These new requirements provide greater mitigation capability consistent with the overall defense-in-depth philosophy, and therefore greater assurance that the challenges posed by severe external events to power reactors do not pose an undue risk to public health and safety. To provide reasonable assurance of adequate protection of public health and safety, all licenses identified in Attachment 1 to this Order shall be modified to include the requirements identified in Attachment 2 to this Order.

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 C.F.R. § 2.202, "Orders," and 10 C.F.R. Part 50, IT IS HEREBY ORDERED, EFFECTIVE IMMEDIATELY, THAT ALL LICENSES IDENTIFIED IN ATTACHMENT 1 TO THIS ORDER ARE MODIFIED AS FOLLOWS:

- A. All Licensees 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 following the submittal of the overall integrated plan, as required in Condition C.1. (schedule to be issued in August 2012), or December 31, 2016, whichever comes first.**

- B. 1. All Licensees 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, (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 to be in violation of the provisions of any Commission regulation or the facility license. The notification shall provide the Licensees' justification for seeking relief from or variation of any specific requirement.
2. Any Licensee that considers that implementation of any of the requirements described in Attachment 2 to this Order would adversely affect the 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 the Attachment 2 requirement in question, or a schedule for modifying the facility to address the adverse safety condition. If neither approach is appropriate, the Licensee 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. All Licensees 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.
2. All Licensees 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 shall report to the Commission when full compliance with the requirements described in Attachment 2 is achieved.

Licensee responses to Conditions B.1, B.2, C.1, C.2, and C.3 above shall be submitted in accordance with 10 C.F.R. § 50.4, "Written Communications."

The Director, Office of Nuclear Reactor Regulation may, in writing, relax or rescind any of the above conditions upon demonstration by the Licensee of good cause.

V.

In accordance with 10 C.F.R. § 2.202, the Licensee 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 twenty (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, 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 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 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 e-mail at 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/esubmittals.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/esubmittals.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 e-mail notice confirming receipt of the document. The E-Filing system also distributes an e-mail 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 e-mail at 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://ehd.nrc.gov/EHD_Proceeding/home.asp, 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 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

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

Dated this ____ day of March 2012

OPERATING BOILING WATER REACTOR LICENSES
WITH MARK I AND MARK II CONTAINMENTS

Browns Ferry Nuclear Plant, Unit 1
Tennessee Valley Authority
Athens, AL
Docket No. 50-259
License No. DPR-33

BWR-Mark I

Browns Ferry Nuclear Plant, Unit 2
Tennessee Valley Authority
Athens, AL
Docket No. 50-260
License No. DPR-52

BWR-Mark I

Browns Ferry Nuclear Plant, Unit 3
Tennessee Valley Authority
Athens, AL
Docket No. 50-296
License No. DPR-68

BWR-Mark I

Brunswick Steam Electric Plant, Unit 1
Carolina Power and Light
Southport, NC
Docket No. 50-325
License No. DPR-71

BWR-Mark I

Brunswick Steam Electric Plant, Unit 2
Carolina Power and Light
Southport, NC
Docket No. 50-324
License No. DPR-62

BWR-Mark I

Columbia Generating Station, Unit 2
Energy Northwest
Richland, WA
Docket No. 50-397
License No. NPF-21

BWR-Mark II

Cooper Nuclear Station
Nebraska Public Power District
Brownville, NE
Docket No. 50-298
License No. DPR-46

BWR-Mark I

Dresden Nuclear Power Station, Unit 2
Exelon Generation Co., LLC
Morris, IL
Docket No. 50-237
License No. DPR-19

BWR-Mark I

Dresden Nuclear Power Station, Unit 3
Exelon Generation Co., LLC
Morris, IL
Docket No. 50-249
License No. DPR-25

BWR-Mark I

Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC
Palo, IA
Docket No. 50-331
License No. DPR-49

BWR-Mark I

Edwin I. Hatch Nuclear Plant, Unit 1
Southern Nuclear Operating Co.
Baxley, GA
Docket No. 50-321
License No. DPR-57

BWR-Mark I

Edwin I. Hatch Nuclear Plant, Unit 2
Southern Nuclear Operating Co.
Baxley, GA
Docket No. 50-366
License No. NPF-5

BWR-Mark I

Fermi, Unit 2
The Detroit Edison Co.
Newport, MI
Docket No. 50-341
License No. NPF-43

BWR-Mark I

Hope Creek Generating Station, Unit 1
PSEG Nuclear, LLC
Hancock Bridge, NJ
Docket No. 50-354
License No. NPF-57

BWR-Mark I

James A. FitzPatrick Nuclear Power Plant
Entergy Nuclear Operations, Inc.
Scriba, NY
Docket No. 50-333
License No. DPR-59

BWR-Mark I

LaSalle County Station, Unit 1
Exelon Generation Co., LLC
Marseilles, IL
Docket No. 50-373
License No. NPF-11

BWR-Mark II

LaSalle County Station, Unit 2
Exelon Generation Co., LLC
Marseilles, IL
Docket No. 50-374
License No. NPF-18

BWR-Mark II

Limerick Generating Station, Unit 1
Exelon Generation Co., LLC
Limerick, PA
Docket No. 50-352
License No. NPF-39

BWR-Mark II

Limerick Generating Station, Unit 2
Exelon Generation Co., LLC
Limerick, PA
Docket No. 50-353
License No. NPF-85

BWR-Mark II

Monticello Nuclear Generating Plant, Unit 1
Northern States Power Company
Monticello, MN
Docket No. 50-263
License No. DPR-22

BWR-Mark I

Nine Mile Point Nuclear Station, Unit 1
Nine Mile Point Nuclear Station, LLC
Scriba, NY
Docket No. 50-220
License No. DPR-63

BWR-Mark I

Nine Mile Point Nuclear Station, Unit 2
Nine Mile Point Nuclear Station, LLC
Scriba, NY
Docket No. 50-410
License No. NPF-69

BWR-Mark II

Oyster Creek Nuclear Generating Station, Unit 1
Exelon Generation Co., LLC
Forked River, NJ
Docket No. 50-219
License No. DPR-16

BWR-Mark I

Peach Bottom Atomic Power Station, Unit 2
Exelon Generation Co., LLC
Delta, PA
Docket No. 50-277
License No. DPR-44

BWR-Mark I

Peach Bottom Atomic Power Station, Unit 3
Exelon Generation Co., LLC
Delta, PA
Docket No. 50-278
License No. DPR-56

BWR-Mark I

Pilgrim Nuclear Power Station
Entergy Nuclear Operations, Inc.
Plymouth, MA
Docket No. 50-293
License No. DPR-35

BWR-Mark I

Quad Cities Nuclear Power Station, Unit 1
Exelon Generation Co., LLC
Cordova, IL
Docket No. 50-254
License No. DPR-29

BWR-Mark I

Quad Cities Nuclear Power Station, Unit 2
Exelon Generation Co., LLC
Cordova, IL
Docket No. 50-265
License No. DPR-30

BWR-Mark I

Susquehanna Steam Electric Station, Unit 1
PPL Susquehanna, LLC
Salem Township, Luzerne Co., PA
Docket No. 50-388
License No. NPF-22

BWR-Mark II

Susquehanna Steam Electric Station, Unit 2
PPL Susquehanna, LLC
Salem Township, Luzerne Co., PA
Docket No. 50-387
License No. NPF-14

BWR-Mark II

Vermont Yankee Nuclear Power Plant, Unit 1
Entergy Nuclear Operations, Inc.
Vernon, VT
Docket No. 50-271
License No. DPR-28

BWR-Mark I

**REQUIREMENTS FOR RELIABLE HARDENED VENT SYSTEMS
AT BOILING-WATER REACTOR FACILITIES WITH
MARK I AND MARK II CONTAINMENTS**

1. Hardened Containment Venting System (HCVS) Functional Requirements

Boiling-Water Reactor (BWR) Mark I and Mark II containments shall have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following events that result in the loss of active containment heat removal capability or prolonged Station Blackout (SBO). The hardened vent system shall be accessible and operable under a range of plant conditions, including a prolonged SBO and inadequate containment cooling.

1.1 The design of the HCVS shall consider the following performance objectives:

- 1.1.1 The HCVS shall be designed to minimize the reliance on operator actions.
- 1.1.2 The HCVS shall be designed to minimize plant operators' exposure to occupational hazards, such as extreme heat stress, while operating the HCVS system.
- 1.1.3 The HCVS shall also be designed to minimize radiological consequences that would impede personnel actions needed for event response.

1.2 The HCVS shall include the following design features:

- 1.2.1 The HCVS shall have the capacity to vent the steam/energy equivalent of 1 percent of licensed/rated thermal power (unless a lower value is justified by analyses), and be able to maintain containment pressure below the primary containment design pressure.
- 1.2.2 The HCVS shall be accessible to plant operators and be capable of remote operation and control, or manual operation, during sustained operations.
- 1.2.3 The HCVS shall include a means to prevent inadvertent actuation.
- 1.2.4 The HCVS shall include a means to monitor the status of the vent system (e.g., valve position indication) from the control room or other location(s). The monitoring system shall be designed for sustained operation during a prolonged SBO.
- 1.2.5 The HCVS shall include a means to monitor the effluent discharge for radioactivity that may be released from operation of the HCVS. The monitoring system shall provide indication in the control room or other location(s), and shall be designed for sustained operation during a prolonged SBO.
- 1.2.6 The HCVS shall include design features to minimize unintended cross flow of vented fluids within a unit and between units on the site.

- 1.2.7 The HCVS shall include features and provision for the operation, testing, inspection and maintenance adequate to ensure that reliable function and capability are maintained.
- 1.2.8 The HCVS shall be designed for pressures that are consistent with maximum containment design pressures as well as dynamic loading resulting from system actuation.
- 1.2.9 The HCVS shall discharge the effluent to a release point above main plant structures.

2. Hardened Containment Venting System Quality Standards

The following quality standards are necessary to fulfill the requirements for a reliable HCVS:

- 2.1 The HCVS vent path up to and including the second containment isolation barrier shall be designed consistent with the design basis of the plant. These items include piping, piping supports, containment isolation valves, containment isolation valve actuators and containment isolation valve position indication components.
- 2.2 All other HCVS components shall be designed for reliable and rugged performance that is capable of ensuring HCVS functionality following a seismic event. These items include electrical power supply, valve actuator pneumatic supply and instrumentation (local and remote) components.

3. Hardened Containment Venting System Programmatic Requirements

- 3.1 The Licensee shall develop, implement, and maintain procedures necessary for the safe operation of the HCVS. Procedures shall be established for system operations when normal and backup power is available, and during SBO conditions.
- 3.2 The Licensee shall train appropriate personnel in the use of the HCVS. The training curricula shall include system operations when normal and backup power is available, and during SBO conditions.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
ALL POWER REACTOR)	Docket Nos. (as shown in Attachment 1)
LICENSEES AND HOLDERS)	License Nos. (as shown in Attachment 1) or
OF CONSTRUCTION PERMITS IN)	Construction Permit Nos. (as shown in
ACTIVE OR DEFERRED STATUS)	Attachment 1))
)	
)	EA-12-XXX

**ORDER MODIFYING LICENSES
WITH REGARD TO REQUIREMENTS FOR MITIGATION STRATEGIES
FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS
(EFFECTIVE IMMEDIATELY)**

I.

The Licensees and construction permits (CP) holders¹ 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.

¹ 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)

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.

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 for 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 Requirement 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, letter (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: (i) more than one unit at a site with two or more units, and (ii) 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.

Accordingly, the NRC has concluded that there is a need to redefine the level of protection of public health and safety regarded as adequate under the provisions of the backfit rule, 10 CFR 50.109(a)(4)(iii), and is requiring Licensee or CP holder action to meet that new level of protection. 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.

The Commission has determined that 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 Part 52 identified in Attachment 1 to this Order shall be modified to include the requirements identified in Attachment 3 to this Order.

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 Licensees' or CP holders' 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 e-mail at 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/esubmittals.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/esubmittals.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 e-mail notice confirming receipt of the document. The E-Filing system also distributes an e-mail 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 e-mail at 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://ehd.nrc.gov/EHD_Proceeding/home.asp, 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

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

Michael R. Johnson, Director
Office of New Reactors

Dated this ____ day of _____ 2012

**POWER REACTOR LICENSEES AND HOLDERS OF
CONSTRUCTION PERMITS IN ACTIVE OR DEFERRED STATUS**

Arkansas Nuclear One, Units 1 and 2
Entergy Nuclear Operations, Inc.
London, AR
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

Beaver Valley Power Station, Units 1 and 2
First Energy Nuclear Operating Co.
Shippingport, PA
Docket Nos. 50-334 and 50-412
License Nos. DPR-66 and NPF-73

Bellefonte Nuclear Power Station, Units 1 and 2
Tennessee Valley Authority
Scottsboro, AL
Docket Nos. 50-438 and 50-439
Construction Permit Nos. CPPR-122 and CPPR-123

Braidwood Station, Units 1 and 2
Exelon Generation Co., LLC
Braceville, IL
Docket Nos. 50-456 and 50-457
License Nos. NPF-72 and NPF-77

Browns Ferry Nuclear Plant, Units 1, 2 and 3
Tennessee Valley Authority
Athens, AL
Docket Nos. 50-259, 50-260, and 50-296
License Nos. DPR-33, DPR-52 and DPR-68

Brunswick Steam Electric Plant, Units 1 and 2
Carolina Power & Light Co.
Southport, NC
Docket Nos. 50-325 and 50-324
License Nos. DPR-71 and DPR-62

Byron Station, Units 1 and 2
Exelon Generation Co., LLC
Byron, IL
Docket Nos. 50-454 and 50-455
License Nos. NPF-37 and NPF-66

Callaway Plant
Union Electric Co.
Fulton, MO
Docket No. 50-483
License No. NPF-30

Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Calvert Cliffs Nuclear Power Plant, Inc.
Lusby, MD
Docket Nos. 50-317 and 50-318
License Nos. DPR-53 and DPR-69

Catawba Nuclear Station, Units 1 and 2
Duke Energy Carolinas, LLC
York, SC
Docket Nos. 50-413 and 50-414
License Nos. NPF-35 and NPF-52

Clinton Power Station, Unit 1
Exelon Generation Co., LLC
Clinton, IL
Docket No. 50-461
License No. NPF-62

Columbia Generating Station, Unit 2
Energy Northwest
Richland, WA
Docket No. 50-397
License No. NPF-21

Comanche Peak Steam Electric Station, Units 1 and 2
Luminant Generation Co., LLC
Glen Rose, TX
Docket Nos. 50-445 and 50-446
License Nos. NPF-87 and NPF-89

Cooper Nuclear Station
Nebraska Public Power District
Brownville, NE
Docket No. 50-298
License No. DPR-46

Crystal River Nuclear Generating Plant, Unit 3
Florida Power Corp.
Crystal River, FL
Docket No. 50-302
License No. DPR-72

Davis-Besse Nuclear Power Station, Unit 1
First Energy Nuclear Operating Co.
Oak Harbor, OH
Docket No. 50-346
License No. NPF-3

Diablo Canyon Nuclear Power Plant, Units 1 and 2
Pacific Gas & Electric Co.
Avila Beach, CA
Docket Nos. 50-275 and 50-323
License Nos. DPR-80 and DPR-82

Donald C. Cook Nuclear Power Plant, Units 1 and 2
Indiana Michigan Power Co.
Bridgman, MI
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74

Dresden Nuclear Power Station, Units 2 and 3
Exelon Generation Co., LLC
Morris, IL
Docket Nos. 50-237 and 50-249
License Nos. DPR-19 and DPR-25

Duane Arnold Energy Center
FPL Energy Duane Arnold, LLC
Palo, IA
Docket No. 50-331
License No. DPR-49

Edwin I. Hatch Nuclear Plant, Units 1 and 2
Southern Nuclear Operating Co.
Baxley, GA
Docket Nos. 50-321 and Docket No. 50-366
License Nos. DPR-57 and NPF-5

Fermi, Unit 2
The Detroit Edison Co.
Newport, MI
Docket No. 50-341
License No. NPF-43

Fort Calhoun Station, Unit 1
Omaha Public Power District
Fort Calhoun, NE
Docket No. 50-285
License No. DPR-40

Grand Gulf Nuclear Station, Unit 1
Entergy Nuclear Operations, Inc.
Port Gibson, MS
Docket No. 50-416
License No. NPF-29

H. B. Robinson Steam Electric Plant, Unit 2
Carolina Power & Light Co.
Hartsville, SC
Docket No. 50-261
License No. DPR-23

Hope Creek Generating Station, Unit 1
PSEG Nuclear, LLC
Hancocks Bridge, NJ
Docket No. 50-354
License No. NPF-57

Indian Point Nuclear Generating Station, Units 2 and 3
Entergy Nuclear Operations, Inc.
Buchanan, NY
Docket Nos. 50-247 and 50-286
License Nos. DPR-26 and DPR-64

James A. FitzPatrick Nuclear Power Plant
Entergy Nuclear Operations, Inc.
Scriba, NY
Docket No. 50-333
License No. DPR-59

Joseph M. Farley Nuclear Plant, Units 1 and 2
Southern Nuclear Operating Co.
Columbia, AL
Docket Nos. 50-348 and 50-364
License Nos. NPF-2 and NPF-8

Kewaunee Power Station
Dominion Energy Kewaunee, Inc.
Kewaunee, WI
Docket No. 50-305
License No. DPR-43

LaSalle County Station, Units 1 and 2
Exelon Generation Co., LLC
Marseilles, IL
Docket Nos. 50-373 and 50-374
License Nos. NPF-11 and NPF-18

Limerick Generating Station, Units 1 and 2
Exelon Generation Co., LLC
Limerick, PA
Docket Nos. 50-352 and 50-353
License Nos. NPF-39 and NPF-85

McGuire Nuclear Station, Units 1 and 2
Duke Energy Carolinas, LLC
Huntersville, NC
Docket Nos. 50-369 and 50-370
License Nos. NPF-9 and NPF-17

Millstone Power Station, Units 2 and 3
Dominion Nuclear Connecticut, Inc.
Waterford, CT
Docket Nos. 50-336 and 50-423
License Nos. DPR-65 and NPF-49

Monticello Nuclear Generating Plant, Unit 1
Northern States Power Company
Monticello, MN
Docket No. 50-263
License No. DPR-22

Nine Mile Point Nuclear Station, Units 1 and 2
Nine Mile Point Nuclear Station, LLC
Scriba, NY
Docket Nos. 50-220 and 50-410
License Nos. DPR-63 and NPF-69

North Anna Power Station, Units 1 and 2
Virginia Electric & Power Co.
Louisa, VA
Docket Nos. 50-338 and 50-339
License Nos. NPF-4 and NPF-7

Oconee Nuclear Station, Units 1, 2, and 3
Duke Energy Carolinas, LLC
Seneca, SC
Docket Nos. 50-269, 50-270, and 50-287
License Nos. DPR-38, DPR-47, and DPR-55

Oyster Creek Nuclear Generating Station, Unit 1
Exelon Generation Co., LLC
Forked River, NJ
Docket No. 50-219
License No. DPR-16

Palisades Nuclear Plant
Entergy Nuclear Operations, Inc.
Covert, MI
Docket No. 50-255
License No. DPR-20

Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Arizona Public Service Company
Wintersburg, AZ
Docket Nos. 50-528, 50-529, and 50-530
License Nos. NPF-41, NPF-51 and NPF-74

Peach Bottom Atomic Power Station, Units 2 and 3
Exelon Generation Co., LLC
Delta, PA
Docket Nos. 50-277 and 50-278
License Nos. DPR-44 and DPR-56

Perry Nuclear Power Plant, Unit 1
First Energy Nuclear Operating Co.
Perry, OH
Docket No. 50-440
License No. NPF-58

Pilgrim Nuclear Power Station
Entergy Nuclear Operations, Inc.
Plymouth, MA
Docket No. 50-293
License No. DPR-35

Point Beach Nuclear Plant, Units 1 and 2
FPL Energy Duane Arnold, LLC
Two Rivers, WI
Docket Nos. 50-266 and 50-301
License Nos. DPR-24 and DPR-27

Prairie Island Nuclear Generating Plant, Units 1 and 2
Northern States Power Co. Minnesota
Welch, MN
Docket Nos. 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Quad Cities Nuclear Power Station, Units 1 and 2
Exelon Generation Co., LLC
Morris, IL
Docket Nos. 50-254 and 50-265
License Nos. DPR-29 and DPR-30

River Bend Station, Unit 1
Entergy Nuclear Operations, Inc.
St. Francisville, LA
Docket No. 50-458
License No. NPF-47

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

St. Lucie Plant, Units 1 and 2
Florida Power & Light Co.
Jensen Beach, FL
Docket Nos. 50-335 and 50-389
License Nos. DPR-67 and NPF-16

Salem Nuclear Generating Station, Units 1 and 2
PSEG Nuclear, LLC
Hancocks Bridge, NJ
Docket Nos. 50-272 and 50-311
License Nos. DPR-70 and DPR-75

San Onofre Nuclear Generating Station, Units 2 and 3
Southern California Edison Co.
San Clemente, CA
Docket Nos. 50-361 and 50-362
License Nos. NPF-10 and NPF-15

Seabrook Station, Unit 1
FPL Energy Seabrook, LLC
Seabrook, NH
Docket No. 50-443
License No. NPF-86

Sequoyah Nuclear Plant, Units 1 and 2
Tennessee Valley Authority
Soddy-Daisy, TN
Docket Nos. 50-327 and 50-328
License Nos. DPR-77 and DPR-79

Shearon Harris Nuclear Power Plant, Unit 1
Carolina Power & Light Co.
New Hill, NC
Docket No. 50-400
License No. NPF-63

South Texas Project, Units 1 and 2
STP Nuclear Operating Co.
Bay City, TX
Docket Nos. 50-498 and 50-499
License Nos. NPF-76 and NPF-80

Surry Nuclear Power Station, Units 1 and 2
Virginia Electric & Power Co.
Surry, VA
Docket Nos. 50-280 and 50-281
License Nos. DPR-32 and DPR-37

Susquehanna Steam Electric Station, Units 1 and 2
PPL Susquehanna, LLC
Salem Township, Luzerne Co., PA
Docket Nos. 50-387 and 50-388
License Nos. NPF-22 and NPF-14

Three Mile Island Nuclear Station, Unit 1
Exelon Generation Co., LLC
Middletown, PA
Docket No. 50-289
License No. DPR-50

Turkey Point Nuclear Generating, Units 3 and 4
Florida Power & Light Co.
Homestead, FL
Docket Nos. 50-250 and 50-251
License Nos. DPR-31 and DPR-41

Vermont Yankee Nuclear Power Plant, Unit 1
Entergy Nuclear Operations, Inc.
Vernon, VT
Docket No. 50-271
License No. DPR-28

Virgil C. Summer Nuclear Station, Unit 1
South Carolina Electric & Gas Co.
Jenkinsville, SC
Docket No. 50-395
License No. NPF-12

Vogtle Electric Generating Plant, Units 1, 2, 3, and 4
Southern Nuclear Operating Co.
Waynesboro, GA
Docket Nos. 50-424, 50-425, 52-025, and 52-026
License Nos. NPF-68, NPF-81, NPF-91 and NPF-92

Waterford Steam Electric Station, Unit 3
Entergy Nuclear Operations, Inc.
Killona, LA
Docket No. 50-382
License No. NPF-38

Watts Bar Nuclear Plant, Units 1 and 2
Tennessee Valley Authority
Spring City, TN
Docket No. 5000390 and 5000391
License No. NPF-90 and
Construction Permit No. CPPR-92

Wolf Creek Generating Station, Unit 1
Wolf Creek Nuclear Operating Corp.
Burlington, Coffey County, KS
Docket No. 5000482
License No. NPF-42