

**PREDECISIONAL
BEING PROVIDED TO SUPPORT THE 11/16/2016 MEETING WITH ACRS
AND NOT TO SOLICIT EXTERNAL STAKEHOLDER FEEDBACK**

FOR: The Commissioners

FROM: Victor M. McCree
Executive Director for Operations

SUBJECT: DRAFT FINAL RULE—MITIGATION OF BEYOND-DESIGN-BASIS EVENTS
(RIN 3150-AJ49)

PURPOSE:

To obtain Commission approval to publish a final rule that establishes requirements for the mitigation of beyond-design-basis events (MBDBE) for nuclear power reactor licensees and applicants.

SUMMARY:

The staff of the U.S. Nuclear Regulatory Commission (NRC) has prepared a draft final rule *Federal Register* (FR) notice (FRN) (Enclosure 1) that would establish MBDBE requirements. This rule (1) makes generically applicable requirements previously imposed by order for the mitigation of beyond-design-basis external events and for remotely monitoring the spent fuel pool wide-range level, (2) includes provisions to have an integrated response capability, and (3) addresses six petitions for rulemaking (PRMs).

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BACKGROUND:

As discussed in Section I of the draft FRN, the NRC has undertaken numerous regulatory actions in the aftermath of the 2011 Fukushima Dai-ichi event in Japan. These actions began with the work of the Near-Term Task Force (NTTF) and the development of the associated NTTF recommendations. The NRC's response to the NTTF Report, which was an enclosure to SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated July 12, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11186A950), was provided in SECY-11-0124, "Recommended Actions To Be Taken without Delay from the Near-Term Task Force Report" and SECY-11-0137 "Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned." These two papers identified actions to be taken in the near term and prioritized the NTTF recommendations. The near-term actions ultimately culminated in the issuance of three orders; a request for information, under Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), that addressed several regulatory issues; and two Advance Notices of Proposed Rulemaking (ANPR). The regulatory efforts to address lessons learned from Fukushima have evolved over time, and the two rulemaking activities discussed in the ANPRs were consolidated into the MBDBE rulemaking.

The NRC staff (staff) developed and provided to the Commission a proposed rule in SECY-15-0065, "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)," on April 30, 2015 (ADAMS Accession No. ML15049A201). The Commission issued its direction on the proposed rule on August 27, 2015, in Staff Requirements Memorandum (SRM)-SECY-15-0065 (ADAMS Accession No. ML15239A767). In accordance with the Commission's direction, the staff revised the proposed rule and issued it for a 90-day public comment period on November 13, 2015 (80 FR 70609). In addition to seeking comment on the proposed rule and supporting draft guidance, the FRN also requested feedback on a number of specific topics related to the proposed rule and on the potential cumulative effects of regulation (CER). The agency also published three draft regulatory guides for comment with the proposed rule.

The comment period closed on February 11, 2016. The NRC received 20 comment submissions that the staff reviewed and considered in the development of the final MBDBE rule, as described in Enclosure 2. During development of the final rule, the staff held a public meeting to discuss CER and used the feedback obtained at that meeting to inform implementation requirements in the final MBDBE rule.

DISCUSSION:

The draft final rule applies to power reactor applicants and licensees and includes the following provisions:

- Provisions that make generically applicable requirements previously imposed by Order EA-12-049,¹ "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ADAMS Accession No. ML12054A735), for the mitigation of beyond-design-basis external events. These requirements constitute the majority of the requirements in this rule, and are located mainly in 10 CFR 50.155(b)(1), with portions in paragraphs (c), (d), (e), and (g) as described further below.

¹ The final MBDBE rule rescinds Order EA-12-049.

- Provisions that make generically applicable requirements previously imposed by Order EA-12-051,² “Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Effective Immediately),” dated March 12, 2012 (ADAMS Accession No. ML12056A044), for remotely monitoring the spent fuel pool wide-range level. These requirements appear in 10 CFR 50.155(f).
- Requirements for licensees to consider the effects of the reevaluated seismic and flooding hazards information within the mitigation strategies and guidelines, in accordance with the Commission direction provided in SRM-COMSECY-14-0037 (ADAMS Accession No. ML15089A236), “Staff Requirements—COMSECY-14-0037—Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards,” dated March 30, 2015. These requirements appear in 10 CFR 50.155(b)(2).
- Reasonable protection requirements that enable the proper degree of regulatory assurance to be applied to the equipment and structures, systems, and components (SSCs) that perform a beyond-design-basis function for the purposes of the MBDBE rule. These requirements appear in 10 CFR 50.155(c)(2) and (c)(3).
- Requirements for an integrated response capability consisting of (1) strategies and guidelines for beyond-design-basis external events, (2) reevaluated seismic and flooding mitigation strategies and guidelines or event-specific approaches, (3) strategies and guidelines for the loss of large areas of the plant because of explosions and fires, and (4) integration with the emergency operating procedures. These requirements appear in 10 CFR 50.155(b)(4).
- Supporting requirements for the integrated response capability that include staffing, communications, training, drills or exercises, and documentation of changes. These requirements are found in 10 CFR 50.155(b), (c), (d), (e) and (g).
- Requirements that facilitate the decommissioning of reactors that are subject to this rule. These requirements appear in 10 CFR 50.155(a)(2).
- Provisions that rescind orders for which the MBDBE rule will now provide the governing substantive requirements. These requirements appear in 10 CFR 50.155(i).
- Provisions that facilitate the removal of a variety of license conditions for which the MBDBE rule will now provide the governing substantive requirements. These requirements appear in 10 CFR 50.155(i).

Discussion of Public Comments and Changes to the Rule

The final MBDBE rule reflects a number of changes and improvements compared to the proposed rule. These changes stemmed from the staff’s consideration of the public comments provided on the proposed rule. Section IV of the draft final MBDBE rule FRN (Enclosure 1) and the supporting comment response document (Enclosure 2) provide a discussion of the public comments. The staff made changes to the MBDBE rule in the following areas:

² The final MBDBE rule rescinds Order EA-12-051.

- **Seismic and Flooding Reevaluated Hazards.** The staff moved the treatment of reevaluated seismic and flooding hazard information to 10 CFR 50.155(b)(2) in the final MBDBE rule. This revision provides licensees with flexibility in how to address the effects of the reevaluated hazard information within the mitigation strategies and guidelines, including an allowance for event-specific approaches. This rule structure provides better alignment of the final MBDBE rule and its supporting guidance than had been provided in the proposed rule and implements the Commission's direction in SRM-COMSECY-14-0037.
- **Reasonable Protection.** The staff clarified the rule's supporting statement of considerations to explain that the application of reasonable protection is function based. This revision to the MBDBE rule also improves alignment between the MBDBE rule and its supporting guidance.
- **Loss of All Alternating Current (ac) Power.** The staff clarified the final MBDBE rule by removing the word "extended" from the conditions the strategies and guidelines of § 50.155(b)(1) must be able to address, which formerly read "an extended loss of all ac power." The new rule text avoids confusion with the term "extended loss of ac power" used in the industry guidance supporting the final rule. The staff also clarified the rule's supporting statement of considerations regarding how the MBDBE rule and guidance address a loss of all ac power. Two staff members, who had provided public comment on the proposed rule, submitted a non-concurrence package (Enclosure 3) to object to the staff's resolution of their comments.
- **Relocation and Revision of Staffing and Communications Requirements.** Public comment on the proposed rule suggested that the rule could be clarified by relocating the staffing and communications requirements from the proposed Section VII of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," to 10 CFR 50.155, "Mitigation of Beyond Design-Basis Events." The final MBDBE rule relocates these requirements into 10 CFR 50.155. The staffing and communications requirements are now directly linked to the implementation of mitigation strategies. This change improves the clarity of the final MBDBE rule and reflects licensees' implementation of Order EA-12-049.
- **Flexible Scheduling.** The NRC realized that the nuclear industry would be challenged by the proposed 2-year compliance date for the MBDBE rule and requested feedback on whether this schedule provided sufficient time to address the reevaluated hazards information given planned schedules for procurement and implementation of plant modifications and programmatic changes. In consideration of that feedback, including the feedback provided during a public meeting held on November 10, 2016, the staff added a flexible scheduling provision into the final MBDBE rule as 10 CFR 50.155(h)(2).
- **Rescission of Orders and Removal of License Conditions.** A central objective of the MBDBE rulemaking is to make generically applicable the requirements initially imposed under Orders EA-12-049 and EA-12-051, giving due consideration to lessons learned from the implementation of the orders and feedback obtained from interested stakeholders through public comment on the proposed MBDBE rule. The staff looked broadly at all the orders and license conditions that the requirements of the MBDBE rule

will replace and has included as 10 CFR 50.155(i) provisions that rescind the orders and facilitate the removal of license conditions. This reduces the administrative burdens on licensees and avoids unnecessary expenses for ratepayers to remove redundant requirements.

Backfitting and Issue Finality

The staff has drafted a backfitting and issue finality assessment to support the final MBDBE rule (Enclosure 4). This assessment addresses the following changes to the final MBDBE rule:

- **Reevaluated Hazards.** As discussed above, the final MBDBE rule contains requirements for applicable licensees to address the effects of the reevaluated seismic and flooding hazards information developed in response to the NRC letter dated March 12, 2012, issued under 10 CFR 50.54(f). The underlying basis for inclusion of this requirement in the final MBDBE rule appears in COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated November 21, 2014, and its associated SRM. For the reasons provided in Enclosure 4, the staff concludes that the requirements for licensees to address the effects of the reevaluated hazards information, as incorporated within the MBDBE rule, are part of Order EA-12-049 on mitigating strategies and do not constitute a new instance of backfitting.
- **Removal of Multiple Source Term Dose Assessment.** The NRC received public comments concerning its backfitting justification under 10 CFR 50.109, "Backfitting," for the multiple source term dose assessment requirements included in the proposed MBDBE rule. The staff reexamined the backfitting justification and concluded that the supporting backfitting justification for the proposed multiple source term dose assessment requirements was not sufficient. After further consideration, the staff concluded that the requirements should be removed from the final rule for the reasons stated in Section IV.E of the MBDBE final rule FRN.
- **Relocation of, and Revision to Staffing and Communications Requirements.** As discussed above, the staff revised the staffing and communications requirements, and relocated them to 10 CFR 50.155. The requirements for both staffing and communications are linked directly to the mitigation strategy requirements of 10 CFR 50.155(b). As already discussed, this reflects the implementation of Order EA-12-049 since both staffing and communications are essential to implement that order and both were addressed as part of it. Accordingly, the staffing and communications requirements in the MBDBE rule neither constitute backfits nor violate issue finality. The staff removed the proposed staffing analysis requirement from the final MBDBE rule, although it remains part of the supporting guidance because it provides an acceptable method for initially determining staffing requirements.

Petitions for Rulemaking

As discussed in Section III of the enclosed final MBDBE rule FRN, the MBDBE rule provides the final resolution of five PRMs submitted in July 2011, by the Natural Resources Defense Council Inc., PRM-50-97, PRM-50-98, PRM-50-100, PRM-50-101, and PRM-50-102,. The dockets for these PRMs were previously closed, and the NRC notified the petitioner that the NRC would address the issues raised in the PRMs in the MBDBE rule. Each of the five PRMs relies on one of NTF Report recommendations 4.1, 7.5, 8.4, 9.1, and 9.2, as its sole basis. The MBDBE rule

addresses each of these recommendations and therefore resolves the issues raised by the PRMs, concluding the NRC's consideration of these PRMs.

An additional PRM, PRM-50-96, filed by Mr. Thomas Popik, requested that the NRC amend its regulations to require facilities licensed by the NRC to assure long-term cooling and unattended water makeup of spent fuel pools in the event of long-term losses of power due to geomagnetic storms caused by solar storms. As discussed in Section III of the enclosed final MBDBE rule FRN, the final MBDBE rule addresses this PRM, in part, but does not resolve it completely. Accordingly, PRM-50-96 remains under NRC consideration.

Implementation Guidance

As discussed in Section IX of the enclosed final MBDBE rule FRN, the staff will publish three regulatory guides concurrent with the publication of the final rule:

- (1) Regulatory Guide 1.226, "Flexible Mitigation Strategies for Beyond-Design-Basis Events," endorses with clarifications the methods and procedures promulgated by the Nuclear Energy Institute (NEI) in NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 3. This regulatory guide provides licensees and applicants with an acceptable method of implementing the provisions in the MBDBE rule for the mitigation of beyond-design-basis external events, primarily in 10 CFR 50.155(b)(1), (b)(2), (c), and (g). This regulatory guide includes the lessons learned from implementation of Order EA-12-049 and provides guidance for addressing the effects of the seismic and flooding reevaluated hazards. This regulatory guidance also addresses the Commission direction in SRM-SECY-15-0065 for coordination of voluntarily maintained Severe Accident Management Guidelines (SAMGs) with the integrated response capability under 10 CFR 50.155(b).
- (2) Regulatory Guide 1.227, "Wide-Range Spent Fuel Pool Level Instrumentation," endorses with exceptions and clarifications NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify License with Regard to Reliable Spent Fuel Pool Instrumentation,'" Revision 1. This guidance remains substantially unchanged from the guidance issued to support Order EA-12-051 and provides an acceptable method for implementing the MBDBE rule requirement in 10 CFR 50.155(f).
- (3) Regulatory Guide 1.228, "Integrated Response Capabilities for Beyond-Design-Basis Events," endorses with clarifications (1) NEI 12-01, "Guidelines for Assessing Beyond-Design-Basis Accident Response Staffing and Communications Capabilities," (2) NEI 13-06, "Enhancements to Emergency Response Capabilities for Beyond-Design-Basis Events and Severe Accidents," and (3) NEI 14-01, "Emergency Response Procedures and Guidelines for Beyond-Design-Basis Events and Severe Accidents." This regulatory guidance includes lessons learned from the implementation of Order EA-12-049 and provides guidance for addressing the requirements of 10 CFR 50.155(b)(4), (b)(5), (b)(6), (d), and (e). This regulatory guidance also addresses the Commission direction in SRM-SECY-15-0065 for coordination of voluntarily maintained SAMGs with the integrated response capability under 10 CFR 50.155(b).

Nonconcurrence on the Final MBDBE Rule

The staff received two non-concurrences associated with the MBDBE rulemaking. The first non-concurrence (NCP-2016-018), provided as Enclosure 3, concerns the final MBDBE rule requirement in § 50.155(b)(1) that licensees assume a loss of all ac power when developing the mitigation strategies and guidelines for beyond-design-basis external events. As discussed previously, the staff clarified the final MBDBE rule regarding the loss of all ac power requirement by removing the word “extended” from the rule language, and making clarifications to the supporting statement of considerations. These changes were made to address both external stakeholder confusion and the issues raised by the non-concurrence.

The second non-concurrence (NCP-2016-014), provided as Enclosure 5, is a non-concurrence on a draft Interim Staff Guidance (ISG) document, JLD-ISG-2012-01, Revision 2, “Compliance with Order EA-12-049, ‘Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events.’” JLD-ISG-2012-01, Revision 2 provides guidance for the implementation of Order EA-12-049. This ISG reflects lessons learned in the implementation of Order EA-12-049 and provides the substantive guidance that will form the basis for RG 1.226 to provide guidance for the MBDBE rule. This non-concurrence concerns the use of risk information in Appendix H to NEI 12-06, as a means to address reevaluated seismic hazard information in accordance with the § 50.155(b)(2) requirement. The staff is considering the feedback received on the draft ISG document for which the comment period ended on December 12, 2016 and is making adjustments to the supporting guidance as necessary.

Implementation and Cumulative Effects of Regulation Considerations

As discussed in Section XI of the enclosed final MBDBE rule FRN, the staff followed its CER process. The staff engaged external stakeholders throughout this rulemaking. Section II of the enclosed final MBDBE rule FRN describes the public involvement activities, including two ANPRs, two draft regulatory bases, multiple public meetings, and the 90-day public comment period on the proposed MBDBE rule. In addition, because the MBDBE rule is making Orders EA-12-049 and EA-012-051 generically applicable, the involvement of external stakeholders has been more extensive for this rule than just the MBDBE-rule-specific activities described in Section II of the enclosed final MBDBE rule FRN. A very large number of public meetings took place during the development of the supporting guidance for both EA-12-049 and EA-12-051, as well as during the development of the orders themselves. That guidance, as previously discussed, has evolved to become the supporting regulatory guidance for the MBDBE rule.

Recognizing the potential challenges associated with implementation of the MBDBE rule, the NRC included in the FRN for the proposed rule a request for feedback related to CER. It also specifically requested feedback on the cost estimates provided in the regulatory analysis (see Enclosure 6), the proposed implementation schedule and how scheduling challenges might best be addressed, and potential unintended consequences of the proposed rule. In accordance with the CER process, the staff published three draft regulatory guides for public comment together with the proposed rule.

As a result of the feedback, the final MBDBE rule contains a flexible scheduling provision. This provision provides licensees that received the 10 CFR 50.54(f) request for information issued on March 12, 2012, an option to adjust the MBDBE rule implementation schedule to enable full consideration of the effects of the seismic and flooding reevaluated hazards information, as would be required by 10 CFR 50.155(b)(2). A public meeting held on November 10, 2016,

focused on the flexible scheduling provision and sought to obtain additional CER feedback to further inform implementation of the MBDBE rule. As a result of the comments received at that meeting, the staff made further adjustments to the compliance requirements in 10 CFR 50.155(h)(1) to provide an additional year for licensees with General Electric reactors with Mark I and Mark II containments to implement the MBDBE rule. This additional time reflects issuance of Order EA-13-109, "Order Modifying License with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," in June 2013, more than a year later than Orders EA-12-049 and EA-12-051. The delay in implementation of Order EA-13-109 impacts the mitigation strategies for those licensees, and the additional time avoids licensees having to make procedure changes and perform training more than once, which would occur if they are required to meet the two year compliance date prior to completion of Order EA-13-109 activities.

Regulatory Analysis

The staff revised the regulatory analysis for the MBDBE final rule in response to public comments. The most significant revision to the final MBDBE rule regulatory analysis was to account for the costs associated with addressing the reevaluated hazard information. The revised regulatory analysis reflects the feedback obtained on these costs in response to the NRC's specific request. As a result of the revised regulatory analysis estimated costs, the MBDBE rule is a major rule.

RECOMMENDATIONS:

The NRC staff recommends that the Commission do the following:

- Approve the enclosed rulemaking package and final rule notice (Enclosure 1) for publication in the *Federal Register*.
- Note the following:
 - The staff has made the final versions of the three regulatory guides supporting this rule available to the Commission for information. The staff is not asking the Commission to approve the regulatory guides.
 - The staff will inform the appropriate congressional committees of this action.
 - The Office of Public Affairs will issue a press release when the NRC publishes the final rule in the *Federal Register*.

RESOURCES:

The MBDBE rule budgeted in the Operating Reactors Business Line. There is no need to change the budgeted resources as a result of this paper.

COORDINATION:

The Office of the General Counsel has no legal objection to this SECY paper and rulemaking package. Because budgeted resources have not changed as a result of this paper, the Office of the Chief Financial Officer has not reviewed this paper or the final rule.

Coordination with the Advisory Committee on Reactor Safeguards

As noted in Section II of the enclosed FRN, the NRC staff has met with the Advisory Committee on Reactor Safeguards (ACRS) on numerous occasions during the MBDBE rulemaking effort. Most recently, the NRC staff met with the ACRS Fukushima subcommittee on October 19, 2016 and November 16, 2016, and the ACRS full committee on November 30, 2016, to discuss the final MBDBE rule and its supporting guidance. Enclosure 7 provides the ACRS letter on the draft final rule. Enclosure 8 gives the NRC staff's response to the ACRS letter.

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Enclosures:

1. *Federal Register* Notice
2. Comment Response Document
3. Nonconcurrence NCP-2016-018
4. Backfitting and Issue Finality Assessment
5. Nonconcurrence NCP-2016-014
6. Regulatory Analysis
7. ACRS Letter
8. Staff Response to ACRS Letter

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