



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

August 20, 2019

The Licensees of Operating Power Reactors  
on the Enclosed List

SUBJECT: TREATMENT OF REEVALUATED FLOOD HAZARD INFORMATION  
PROVIDED UNDER TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS*  
50.54(f) REGARDING RECOMMENDATION 2.1 OF THE NEAR-TERM TASK  
FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

This document describes the U.S. Nuclear Regulatory Commission (NRC) staff's treatment of reevaluated flood hazard information. The treatment of flood hazard information reflects the Commission's direction in the Affirmation Notice and Staff Requirements Memorandum (SRM) dated January 24, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19023A038), associated with SECY-16-0142, "Draft Final Rule – Mitigation of Beyond-Design-Basis Events [MBDBE] (RIN 3150-AJ49)," (ADAMS Accession No. ML16291A186).

Based on the staff's review of flooding mitigation strategies assessments (MSAs), flooding focused evaluations (FEs), and flooding integrated assessments (IAs), only flooding FEs and IAs that have not yet received a staff assessment could potentially lead to the staff identifying a need for modifying, suspending or revoking a license. The NRC staff has evaluated the status of each site and placed sites into one of four categories: Category 1 (no additional regulatory action is warranted); Category 2 (additional insights needed); Category 3 (ongoing review); and Category 4 (deferred). Enclosure 1, Table 1, provides the current status of sites based on the staff's review of the reevaluated flood hazard information provided to date in flooding MSAs, FEs, and IAs and the staff's backfit determination. The NRC staff has suspended its review of flooding mitigation strategies assessments (MSAs).

### Summary

By letter dated March 12, 2012 (ADAMS Accession No. ML12053A340), the NRC issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, under Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f) (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force (NTTF) report (ADAMS Accession No. ML111861807). Enclosure 2 of the 50.54(f) letter requested that licensees reevaluate flooding hazards for their sites using present-day methods and regulatory guidance used by the NRC staff when reviewing applications for early site permits and combined licenses.

The 50.54(f) letter describes a two-phase process for providing and assessing this information. Phase 1 of the process is defined in the 50.54(f) letter as licensees reevaluating the flood hazards at their sites using updated flood hazard information and present-day regulatory guidance and methodologies, and, if necessary, performing an IA.

Phase 2 of the process is outlined by the 50.54(f) letter and is defined as the NRC staff determining, after reviewing an IA, whether additional regulatory actions are necessary (e.g., update the design basis and structures, systems, and components important to safety) to provide additional protection against the updated hazards. In implementing the NRC's Phase 2 process, the staff will follow the guidance provided in a memorandum dated September 21, 2016 (ADAMS Accession No. ML16237A103), which is in accordance with the most recent Commission direction provided in SRM-SECY-18-0049, "Management of Facility-Specific Backfitting, Issue Finality, and Information Collection," (ADAMS Accession No. ML19149A294).

The staff's treatment of the reevaluated flood hazard information outlined in this document was informed by the material provided in response to the 50.54(f) letter and describes how the staff is using this information for its Phase 2 decisionmaking. Highlights of the staff's progress in this area are as follows:

- Only flooding FEs, and IAs that have not yet received a staff assessment could potentially lead to the staff identifying a need for modifying, suspending or revoking a license. The staff will continue its assessment of flooding FEs and IAs consistent with the guidance found in the September 21, 2016, memorandum. Specifically, if the staff finds a licensee's flooding FE acceptable, as documented in a staff assessment, then no further regulatory action will be considered. The staff will use the results from the IAs in the Phase 2 process to determine if further regulatory actions are warranted.
- The staff has suspended its review of flooding MSAs. The majority of these MSAs have already been evaluated by the staff. For the three MSA reviews that have not yet been completed, the staff either has evaluated, or will evaluate, mitigation strategies, as appropriate, during its review of flooding FEs or flooding IAs.
- This document bins sites according to the following four categories:
  - Category 1 – No additional regulatory action is warranted. This category groups the sites where licensees and NRC staff are done with the flooding reevaluation assessments and backfit decisions. There are 47 sites in this category.
  - Category 2 – Additional insights are needed before a backfit decision is made. There are no sites in this category.
  - Category 3 – Corresponds to sites where an FE or IA flooding submittal is under review or is expected to be submitted. The NRC staff has not made a final backfit determination on these sites. There are eight sites in this category.
  - Category 4 – Corresponds to sites that have had, or requested that, reevaluated hazard information submittals be deferred to a date after the licensee's proposed date to shut down its reactor(s). There are three sites in this category.

### Background

The reevaluated flood hazard information provided in response to the 50.54(f) letter included the following licensee submittals: 1) flooding hazard reevaluation report, 2) flooding MSAs; and 3) flooding FEs or IAs. The staff's treatment of the reevaluated hazard information that has been provided by licensees in response to the 50.54(f) letter is found in Enclosure 1 of this document.

The draft final MBDDBE rule, provided in SECY-16-0142, contained provisions that would have required mitigation strategies to address the reevaluated flooding hazard information on a generic basis. As reflected in the Affirmation Notice and SRM dated January 24, 2019, the Commission determined that addressing the reevaluated hazards in licensees' mitigation strategies on a generic basis was not needed for adequate protection of public health and safety, but would instead be assessed on a plant-specific, case-by-case basis under the requirements of 10 CFR § 50.109, "Backfitting," and § 52.98, "Finality of combined licenses; information requests."

The January 24, 2019, SRM directs the staff to use the 50.54(f) process to ensure that the NRC and its licensees will take the needed actions, if any, to ensure there is no undue risk to public health and safety due to the potential effects of the reevaluated flooding hazards. The SRM further directs that the staff should continue these efforts, utilizing existing NRC processes to determine whether an operating power reactor license should be modified, suspended, or revoked in light of the reevaluated hazard.

#### Determination

As described in Enclosure 1, the staff has reviewed the reevaluated flood hazard information that was addressed in licensees' flooding MSAs, FEs, and IAs and issued corresponding staff assessments for many sites. In four cases, licensees have recently supplemented their submittals to clarify actions or analyses that were described in a previous submittal, and the staff has considered this supplemental information in its determination. The staff has determined that the conclusions documented in the staff assessments for Category 1 sites (as supplemented) remain valid. This conclusion is based on the individual site's ability to address the reevaluated flooding hazards as demonstrated by analysis of the impact on the site or by actions (taken or planned) to address the reevaluated hazards. The staff will perform an assessment of licensee submittals for the remaining plants on a site-by-site basis and will make a separate determination on whether there is a need to modify, suspend, or revoke a license for a site.

#### Stakeholder Interactions

Treatment of the reevaluated hazard information was discussed in a February 28, 2019 (ADAMS Accession No. ML19052A511), public meeting. During this meeting, the staff provided an overview of the preliminary determination process (ADAMS Accession No. ML19037A443) and sought questions and comments from interested stakeholders. The NRC meeting materials are available under ADAMS Accession No. ML19042A683. The staff's treatment of reevaluated flooding hazards reflected in this document considers the comments received at the February 28, 2019, public meeting, as well as comments submitted to the staff by letter dated March 27, 2019 (ADAMS Accession No. ML19129A083), from the Nuclear Energy Institute.

#### Conclusion

Based on the staff's evaluation provided in Enclosure 1, the staff has determined that for sites in Category 1, the conclusions documented in the staff's assessment for the flooding MSA (as supplemented), FE (as supplemented), and IA remain valid and continue to support a determination that additional regulatory actions are not warranted. Staff assessments will continue to be performed for flooding IAs that have been received by the staff and are currently under review. Additionally, the staff will continue to use the same process to review FEs and IAs that are scheduled to be submitted. Three sites have received flood hazard deferral approvals corresponding to planned plant closures. Of the three sites with deferrals, two sites have recently informed the staff that the plants will continue to operate. As such, the staff anticipates that it will restart its reviews of the flooding FE information for these two sites.

Enclosure 1, Table 1, provides the current status of the staff's review of the reevaluated flooding hazard information and the binning for each site.

If you have any questions, please contact Joseph Sebrosky at 301-415-1132, or by e-mail at [Joseph.Sebrosky@nrc.gov](mailto:Joseph.Sebrosky@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'M. J. Ross-Lee', written in a cursive style.

Mary Jane Ross-Lee, Acting Director  
Division of Licensing Projects  
Office of Nuclear Reactor Regulation

Enclosures:

1. Treatment of Reevaluated Flooding Hazard Information
2. List of Licensees

cc w/encls: Distribution via list serv

**Treatment of Reevaluated Flooding Hazard  
Information**

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## 1.0 Introduction and Summary

This document describes the U.S. Nuclear Regulatory Commission (NRC) staff's process for reviewing reevaluated flood hazard information in backfit determinations. The process reflects the Commission's direction in the Affirmation Notice and Staff Requirements Memorandum (SRM) dated January 24, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19023A038), associated with SECY-16-0142, "Draft Final Rule – Mitigation of Beyond-Design-Basis Events [MBDBE] (RIN 3150-AJ49)," (ADAMS Accession No. ML16291A186). The preliminary process was first described in a discussion paper (ADAMS Accession No. ML19037A443), which was the subject of a public meeting held on February 28, 2019 (ADAMS Accession No. ML19052A511). Stakeholder feedback from that meeting submitted in a letter dated March 27, 2019 (ADAMS Accession No. ML19129A083), has been considered in this process for reviewing reevaluated flood hazard information.

By letter dated March 12, 2012 (ADAMS Accession No. ML12053A340), the NRC issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, under Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f) (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force (NTTF) report (ADAMS Accession No. ML111861807). Enclosure 2 of the 50.54(f) letter requested that licensees reevaluate flood hazards for their sites using present-day methods and regulatory guidance used by the NRC staff when reviewing applications for early site permits and combined licenses.

The 50.54(f) letter describes a two-phase process for providing and assessing this information. Phase 1 of the process is defined in the 50.54(f) letter as licensees reevaluating the flood hazards at their sites using updated flood hazard information and present-day regulatory guidance and methodologies, and, if necessary, performing an integrated assessment (IA). The evaluations associated with the requested information do not revise the design basis of the plant. Phase 2 of the process is outlined by the 50.54(f) letter and is defined as the NRC staff determining whether additional regulatory actions are necessary (e.g., update the design basis and structures, systems, and components important to safety) to provide additional protection against the updated hazards. In implementing the NRC's Phase 2 process, the staff will follow the guidance provided in a memorandum dated September 21, 2016 (ADAMS Accession No. ML16237A103), which is in accordance with the most recent Commission direction provided in SRM-SECY-18-0049, "Management of Facility-Specific Backfitting, Issue Finality, and Information Collection," (ADAMS Accession No. ML19149A294).

The process outlined in this document used information provided in response to the 50.54(f) letter and describes how the staff used this information for its Phase 2 decisionmaking. Highlights of the staff's progress in this area are as follows:

- Only flooding FEs, and IAs that have not yet received a staff assessment could potentially lead to the staff identifying a need for modifying, suspending or revoking a license. The staff will continue its assessment of flooding FEs and IAs consistent with the guidance found in the September 21, 2016, memorandum. Specifically, if the staff finds a licensee's flooding FE acceptable, as documented in a staff assessment, then no further regulatory action will be considered. The staff will use the results from the IAs in the Phase 2 process to determine if further regulatory actions are warranted.
- The staff has suspended its review of flooding MSAs. The majority of these MSAs have already been evaluated by the staff. For the three MSA reviews that have not yet been completed, the staff either has evaluated, or will evaluate, mitigation strategies, as appropriate, during its review of flooding FEs, or flooding IAs.

- This document bins sites according to the following four categories:
  - Category 1 – No additional regulatory action is warranted. This category groups the sites where licensees and NRC staff are done with the flooding reevaluation assessments and backfit decisions. There are 47 sites in this category.
  - Category 2 – Additional insights are needed before a backfit decision is made. There are no sites in this category.
  - Category 3 – Corresponds to sites where an FE or IA flooding submittal is under review or is expected to be submitted. The NRC staff has not made a final backfit determination on these sites. There are eight sites in this category.
  - Category 4 – Corresponds to sites that have had, or requested that, reevaluated hazard information submittals be deferred to a date after the licensee's proposed date to shut down its reactor(s). There are three sites in this category.

## 2.0 Background

The reevaluated flood hazard information provided in response to the 50.54(f) letter and reviewed by the staff included the following licensee submittals: 1) flooding hazard reevaluation report, 2) flooding MSAs; and 3) flooding FEs or IAs. The staff's detailed assessment of the reevaluated flood hazard information that has been provided in response to the 50.54(f) letter is found in Section 4 of this Enclosure. A key guidance document that was used by the staff to evaluate flooding MSAs was Appendix G of Nuclear Energy Institute (NEI) 12-06, Revision 4, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" (ADAMS Accession No. ML16354B421). The NRC's endorsement of NEI 12-06, Revision 4, is described in Japan Lessons-Learned Division (JLD) Interim Staff Guidance (ISG) 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" (ADAMS Accession No. ML17005A182).<sup>1</sup>

Section 6 of JLD-ISG-2012-01, Revision 2, provides guidance regarding the treatment of reevaluated flood hazard information in mitigation strategies developed in response to Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). The draft final MBDBE rule, provided in SECY-16-0142 contained provisions that would have required mitigation strategies to address the reevaluated flood hazard information on a generic basis. As reflected in the Affirmation Notice and SRM dated January 24, 2019, the Commission determined that addressing the reevaluated hazards in licensees' mitigation strategies on a generic basis was not needed for adequate protection of public health and safety, but would instead be assessed on a plant-specific, case-by-case basis under the requirements of 10 CFR § 50.109, "Backfitting," and § 52.98, "Finality of combined licenses; information requests."

The January 24, 2019, SRM directs the staff to use the 50.54(f) process to ensure that the NRC and its licensees will take the needed actions, if any, to ensure there is no undue risk to public health and safety due to the effects of the reevaluated flooding hazards. The SRM further directs that the staff should continue these efforts, utilizing existing NRC processes to determine whether an operating power reactor license should be modified, suspended, or revoked in light of the reevaluated hazard.

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<sup>1</sup> Appendix G was first introduced in Revision 2 of NEI 12-06, endorsed by revision 1 of the ISG

### 3.0 Process

The process for reviewing the reevaluated flood hazard information began with the staff confirming the status of licensee's commitments or actions described in the flooding MSA and flooding FE/IA. The staff considered the confirmation of commitments necessary for the following reasons:

- The staff considered guidance provided in a September 1, 2015, letter to licensees titled, "Coordination of Requests for Information Regarding Flooding Hazard Reevaluations and Mitigating Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15174A257). This letter described a graded approach for completion of the 50.54(f) flooding activities that leveraged, among other things a site's capability to demonstrate that the mitigating strategies developed under NRC Order EA-12-049 could address the reevaluated flooding hazards.

The guidance provided in the September 21, 2015, letter was developed in response to Commission direction provided in an SRM dated March 30, 2015 (ADAMS Accession No. ML15089A236), to COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256). In this SRM, the Commission stated that, in developing its Phase 2 acceptance criteria and guidance, the NRC staff should "Take into account the fact that licensees are protecting mitigating strategies equipment from the reevaluated hazard developed in accordance with the 50.54(f) letter and associated guidance."

The September 1, 2015, letter is also consistent with the Commission direction provided in an SRM dated July 28, 2015 (ADAMS Accession No. ML15209A682), to COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants," (ADAMS Accession No. ML15153A104). In this SRM, the Commission approved the staff's closure plan that assumed, where additional measures are necessary to reasonably demonstrate that a site can protect against the reevaluated flooding mechanism, a licensee may make regulatory commitments to implement procedural or hardware changes that will allow the site to screen out of a flooding IA.

- The staff's treatment of regulatory commitments is discussed in the September 21, 2016, Phase 2 decisionmaking process memorandum that notes that the staff may consider requiring the escalation of the regulatory treatment of an issue from one tier of the licensing basis (e.g., regulatory commitment) to another tier (e.g., regulatory requirement).
- Licensees may not have originally identified plant changes in some of their submittals as regulatory commitments (per NEI 99-04, "Guidelines for Managing NRC Commitment Changes," Revision 0, dated July 1999 (ADAMS Accession No. ML003680088)), given the anticipated regulatory treatment called out in the draft final MBDBE rule.

This assessment documents the status and path forward to complete the staff's 50.54(f) backfit decisionmaking, in accordance with the Phase 2 determination process described in the 50.54(f) letter. The proposed path forward in this assessment follows the approach outlined in a memorandum dated September 21, 2016, associated with regulatory decisionmaking for reevaluated flood hazards.

The binning is based on existing and proposed plant capabilities, as reflected in the licensee submittals and staff assessments associated with the reevaluated flood hazards. In their submittals, some licensees have stated that changes would be pursued to mitigate the impact



that the reevaluated flooding hazard could have at their sites and these changes were not identified as regulatory commitments. Other licensees identified such changes as regulatory commitments as defined in Section 4.2 of NEI 99-04. Depending on the site-specific details, the staff appropriately credited changes that licensees have planned or implemented at the site such as:

- Physical modifications to the plant that have been planned or implemented that would address a reevaluated flood hazard.
- Site topography and expected conditions of the plant prior to a reevaluated flood event.
- Changes to procedures to predeploy FLEX equipment based on warning time such that FLEX implementation is not impeded by a flood event.

The staff binned sites based on one of the following four categories.

- Category 1: Corresponds to sites where no additional regulatory action is warranted. This category includes sites that have all the flood hazard mechanisms bounded by the current design basis, or sites where the licensee has demonstrated that effective or feasible flood protection will address the unbounded reevaluated hazards. This means that both licensees and staff are finished with the 50.54(f) letter flooding reevaluation assessments and backfit decisions for these sites. There are 47 sites in this category.
- Category 2: Corresponds to sites where additional insights are needed before a backfit determination is made. There are no sites in this Category. As stated in the discussion paper that supported the February 28, 2019 public meeting (ADAMS Accession No. ML19037A443) the staff had preliminarily placed 21 sites in this Category. After the February 28, 2019, public meeting the staff engaged these sites to better understand the status of the activities described in their flooding MSA and FE submittals. The staff moved all of the sites that were preliminarily in Category 2 to Category 1 based on one of the following reasons:
  - The licensee provided a reference to a letter that included the regulatory commitment to address the reevaluated hazard and confirmed that the regulatory commitment was still being tracked in accordance with process outlined in NEI 99-04.
  - The licensee provided the engineering modification package that documented the modification(s) that were made to address the reevaluated hazard that were described in a licensee's flooding MSA or FE submittal.
  - The licensee supplemented a flooding MSA or FE submittal or provided information that superseded previous information provided to the NRC. The following four licensees provided such letters or information:
    - In a June 27, 2019, letter (ADAMS Accession No. ML19204A179), Florida Power and Light Company (the licensee) supplemented the June 29, 2017 (ADAMS Accession No. ML17212B180), Turkey Point Nuclear Generating, Units 3 and 4 (Turkey Point) flooding FE evaluation. Specifically, the licensee noted that the June 29, 2017, FE included a list of planned changes to be implemented to ensure available physical margin and reliability of flood protection features credited for the reevaluated levels during a probable maximum storm surge and planned changes to manholes and conduit penetrations to address the reevaluated local intense precipitation (LIP) flood mechanism. The June 27, 2019, letter provides a regulatory commitment and an implementation plan for completing the planned changes for the identified flood protection

features. Based on this regulatory commitment and the staff's previous assessment of the licensee's flooding FE dated July 3, 2018 (ADAMS Accession No. ML181581548), the staff concludes that additional regulatory actions associated with Enclosure 2 of the 50.54(f) letter are not warranted for Turkey Point, and that this site is properly characterized as a Category 1 site (i.e., no additional regulatory actions are warranted) in Table 1 of this document.

- In a July 23, 2019, letter (ADAMS Accession No. ML19206A073) Vistra Operations Company LLC (the licensee) supplemented the September 7, 2017 (ADAMS Accession No. ML16041A228), Comanche Peak Nuclear Power Plant Units 1 and 2 (Comanche Peak) flooding FE. Specifically, the licensee noted that the September 7, 2017, FE included a list of procedure changes and analysis to address the reevaluated probable maximum flood and LIP flood mechanisms. The July 23, 2019, letter provides regulatory commitments and an implementation date for completing these activities. Based on these regulatory commitments and the staff's previous assessment of the licensee's flooding FE dated March 26, 2018 (ADAMS Accession No. ML18051A809), the staff concludes that additional regulatory actions associated with Enclosure 2 of the 50.54(f) letter are not warranted for Comanche Peak, and that this site is properly characterized as a Category 1 site (i.e., no additional regulatory actions are warranted) in Table 1 of this document.
- In a July 24, 2019, letter (ADAMS Accession No. ML19211B172) Virginia Electric and Power Company (the licensee) supplemented the December 16, 2016 (ADAMS Accession No. ML16357A405), North Anna Power Station, Units 1 and 2 (North Anna) flooding MSA, and June 29, 2017 (ADAMS Accession No. ML17186A084) flooding FE. Based on the revised LIP hazard provided in the flooding FE and pending the completion of the FE regulatory commitments documented in the June 29, 2017, letter, the licensee stated that actions described in the December 16, 2016, flooding MSA related to LIP are no longer necessary. The licensee's basis for this conclusion is that key safety functions are maintained without having to rely on FLEX should a flood from a LIP event occur. Based on the information provided in the July 24, 2019, letter and the staff's previous assessment of the licensee's flooding FE dated December 15, 2017 (ADAMS Accession No. ML17325B644), the staff concludes that additional regulatory actions associated with Enclosure 2 of the 50.54(f) letter are not warranted for North Anna, and that this site is properly characterized as a Category 1 site (i.e., no additional regulatory actions are warranted) in Table 1 of this document.
- In a June 22, 2017, letter (ADAMS Accession No. ML17173A082) NextEra Energy Point Beach (the licensee) provided the flooding FE for Point Beach Nuclear Plant, Units 1 and 2 (Point Beach). The Point Beach flooding FE was reviewed by the staff as documented in a letter dated May 30, 2018 (ADAMS Accession No. ML18136A700). The approach outlined in the Point Beach FE included reliance on mitigation strategies (FLEX) to address the unbounded LIP flood hazard. The licensee also provided a regulatory commitment to provide flood protection for the Train B emergency diesel generator (EDG) exhaust stacks to ensure availability of emergency alternating current power during a LIP event. This commitment is tracked in the site's commitment tracking database under identification number 14656. The modification was implemented under Engineering Change 287652, which was completed on November 20, 2017. This modification ensures effective flood protection for LIP, without reliance on FLEX. Based on the modification to the Train B EDG exhaust stack being completed and the staff's previous assessment of the licensee's flooding FE dated May 30,

2018, the staff concludes that additional regulatory actions associated with Enclosure 2 of the 50.54(f) letter are not warranted for Point Beach, and that this site is properly characterized as a Category 1 site (i.e., no additional regulatory actions are warranted) in Table 1 of this document.

- **Category 3:** Corresponds to sites where an FE or IA flooding submittal is under review or is expected to be submitted. Therefore, the staff's review is ongoing and will be conducted in accordance with the recent Commission direction and will be documented in the appropriate staff assessment. There are currently eight sites in this category.
- **Category 4:** Corresponds to sites that have had, or requested that, reevaluated hazard information submittals be deferred to a date after the licensee's proposed date to shut down its reactor(s). The staff concluded that each site's corresponding deferral letter adequately addressed the site's plan to address the flood hazard up to the period of plant closure. The NRC staff issued assessments for each deferral. In these assessments, the staff stated that if a deferred site remains in operation longer than previously communicated, the licensee would be expected to respond to the 50.54(f) letter by completing the deferred flooding reevaluation assessment(s). There are three sites in this category (Indian Point Nuclear Generating Unit Nos. 2 and 3 (Indian Point), Davis-Besse Nuclear Power Station, Unit 1 (Davis-Besse), and Perry Nuclear Power Plant, Unit 1 (Perry)). Of these three sites the licensee (FirstEnergy Solutions Corp.) for two sites (Davis-Besse and Perry) informed the staff in a July 26, 2019, letter (ADAMS Accession No. ML19207A097) that these plants will continue to operate. As such, the staff anticipates that the licensee will request to restart the reviews of the flooding FE information for these two sites.

The staff's binning of sites is intended to confirm the completion of the 50.54(f) flooding activities for Category 1 sites and the path forward for sites in Categories 3, and 4. Also, the binning process considers reevaluated flood hazard MSA, FE and IA submittals, the respective staff assessments, and the final MBDDBE rule. Category 4 (deferred) sites will follow the process described in the site's corresponding deferral letter, and either provide a submittal by the deferred date that the 50.54(f) activities are no longer necessary based on the conditions of the plant (e.g., fuel being permanently removed from the reactor vessel in accordance with 10 CFR 50.82(a)(1)(ii), and SFP capabilities) or provide the remaining information should they decide to remain in operation past the planned shutdown date. At such a point, the staff would evaluate those sites based on the process described in this document.

#### 4.0 Flooding Reevaluated Hazards

For flooding reevaluations, the staff has assessed sites using existing information provided in the flooding submittals (flood hazard reports, MSAs, FEs, and IAs) and has binned them into four categories. The staff notes that all of the sites in Table 1 provided a flooding hazard reevaluation report (FHRR) in response to the 50.54(f) letter. If a reevaluated flood hazard mechanism exceeded the current design basis for the plant then the FHRR also provided the interim actions taken or planned to address the mechanism consistent with the direction provided in the 50.54(f) letter. The staff previously reviewed these interim actions, however, because the MSAs, FEs and IAs provide more up-to-date information the staff did not believe it was necessary, or appropriate, to reconfirm the interim actions described in the FHRRs. Table 1 summarizes the sites and their corresponding categorization.

#### 4.1 Flooding Mitigation Strategies Assessments

Figure 4.1-1 provides a breakdown of the flooding reevaluated hazard assessments that were performed in accordance with NEI 12-06, Appendix G. In accordance with Appendix G, MSAs were evaluated following one of five different paths. The numbers of sites for each path is



shown below the path. The staff has reviewed licensee's submittals and the associated staff assessments.

The staff's determination for Category 1 sites was based on the information provided by the licensee. For some sites, licensees supplemented a previous flooding submittal, and this information was considered by the staff in its determination as described in Section 3 of this Enclosure.

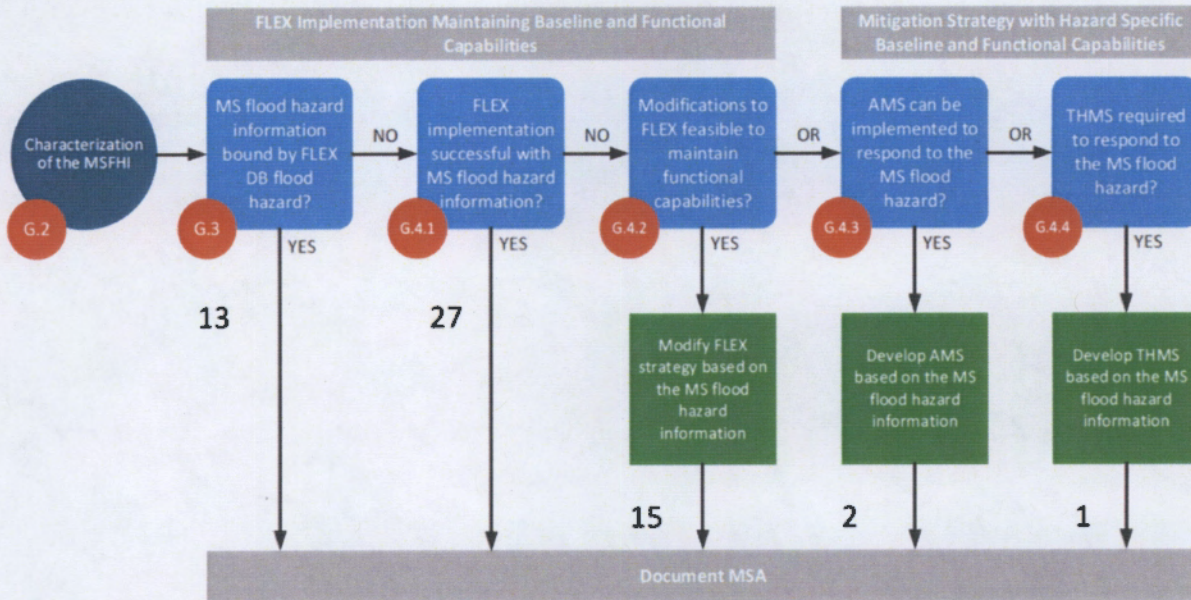


Figure 4.1-1 Flooding Mitigating Strategies Assessment Flow Chart

The staff considered information provided in the flooding MSAs that have been reviewed by the staff as part of the Phase 2 process for the 50.54(f) letter response. In the SRM to COMSECY 14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated March 30, 2015 (ADAMS Accession No. ML15089A236), the Commission provided the following direction:

"In developing the Phase 2 acceptance criteria and guidance, the staff should:

- a. Add clarity on how Phase 2 decisions about whether further regulatory actions are necessary will be made within the current regulatory process, including the Backfit Rule.
- b. Allow flexibility in the way in which licensees address vulnerabilities identified through the IA process that relied on hazards developed using guidance for new plants. That flexibility should include the opportunity for licensees to demonstrate that vulnerabilities identified may be less risk significant when more realistic assumptions are applied in the analyses.
- c. Take into account the fact that the licensees are protecting mitigating strategies equipment from the reevaluated flood hazard developed in accordance with the 50.54(f) letter and the associated guidance.
- d. Consider an appropriate balance between protection and mitigation based on the principle of defense-in-depth."



Therefore, the staff considered information from the MSAs as part of the Phase 2 process in the following manner:

- The MSAs outline the preservation of the defense-in-depth feature, on a voluntary basis, of ensuring that mitigation strategies will be adequately protected against the reevaluated flooding hazard conditions, if implemented as described.
- For the MSA reviews that have been completed to date, most of the licensees were either able to demonstrate that the mitigation strategies were not affected by the reevaluated hazard or that modifications have been implemented or are being tracked by a regulatory commitment such that the mitigation strategies will work under the reevaluated hazard conditions.
- The staff used qualitative and quantitative information, based on licensee's analysis (including commitments) found in the flooding MSAs, and considered such statements as part of the Phase 2 determination.
- There are three sites where a licensee submitted an MSA, but the staff did not complete the assessment. For two of these sites the staff determined additional regulatory actions were not warranted based on information provided in the licensee's flooding FE. For the remaining site, the staff will consider mitigation strategies, as appropriate, in its assessment of the licensee's IA.

#### 4.2 Flooding Focused Evaluations/Integrated Assessments

Figure 4.2-1 provides a breakdown of the flooding reevaluated hazard assessments (i.e., FEs or IAs) that were performed in accordance with NEI 16-05, "External Flooding Assessment Guidelines" (ADAMS Accession No. ML16165A178), which has been endorsed by the NRC in JLD-ISG-2016-01 (ADAMS Accession No. ML16162A301).

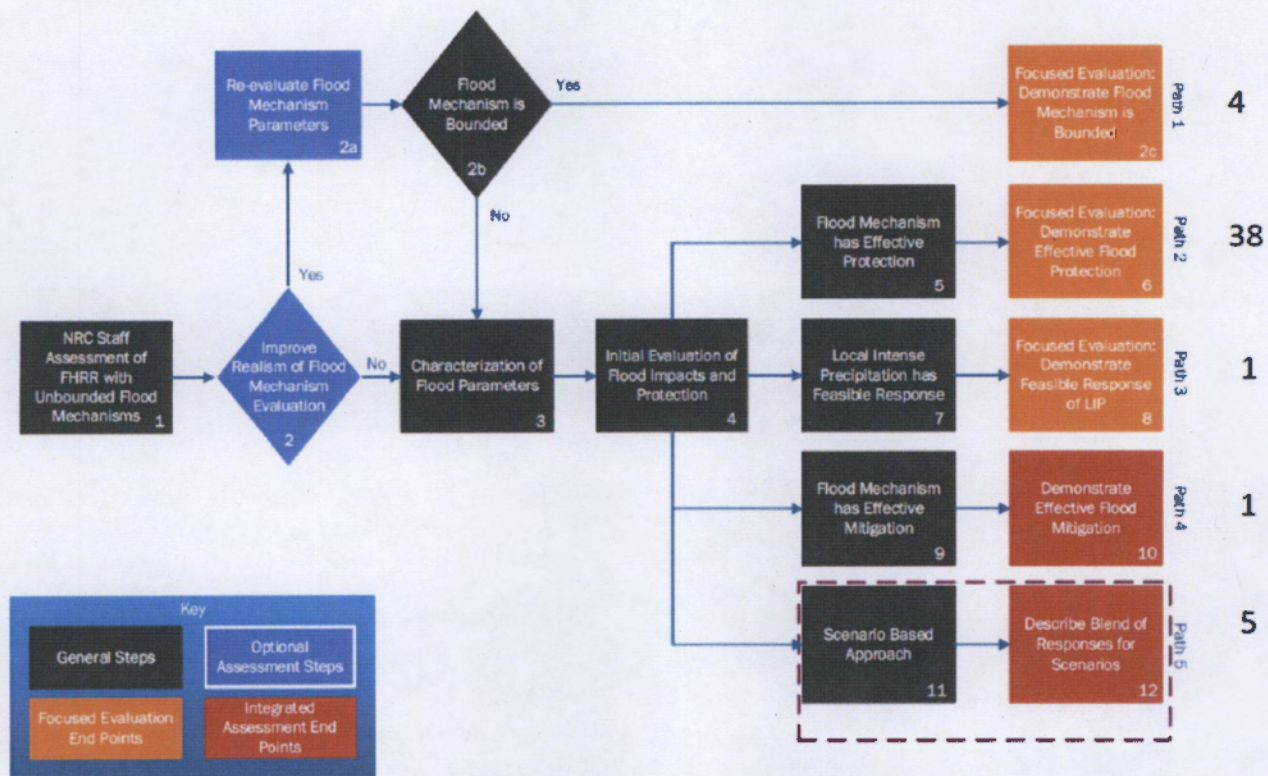


Figure 4.2-1 NEI 16-05 Flooding Impact Assessment Process Flowchart

In accordance with NEI 16-05, 43 sites submitted (or are expected to submit) an FE and 6 sites submitted (or are expected to submit) an IA. The staff notes that for six sites the reevaluated flooding mechanisms were bounded by the current design basis, and these sites screened out from any further evaluations. As noted above, three sites have received a deferral related to the planned permanent shutdown of those sites. Of these three sites the staff anticipates restarting its review of the FE for two sites (Davis-Besse and Perry). The staff expects these reviews to be Path 2 FE reviews which would change the number in Figure 4.2-1 for these reviews from 38 to 40.

The staff has reviewed licensee's submittals and the associated staff assessments. Table 1 of this document reflects the appropriate bin for each site based on statements made or analysis performed that are described in a licensee's flooding FE or IA.

## 5.0 Conclusion

Based on the staff's evaluation provided in Enclosure 1, the staff has determined that for sites in Category 1 the conclusions documented in the staff's assessment for the flooding MSA (as supplemented), FE, and IA remain valid and additional regulatory actions are not warranted. Reviews will continue to be performed for flooding IAs that have been received by the staff and are currently under review. Additionally, the staff will continue to use the same process to review IAs and FEs that are scheduled to be submitted. Three sites have received flood hazard deferral approvals corresponding to planned plant closures. As noted above the staff anticipates restarting its review for two of these sites. Table 1 provides the current status of the staff's review of the reevaluated flooding hazard information as described in Section 3 of this Enclosure.

Table 1 – Status of 50.54(f) Letter (Flood) – Site Binning

<i>Site</i>	<i>No additional regulatory action is warranted (Category 1)</i>	<i>Additional Insights Needed - (Category 2)</i>	<i>Ongoing Review (Category 3)</i>	<i>Deferred (Category 4)</i>
Arkansas Nuclear	X			
Beaver Valley	X			
Braidwood	X			
Browns Ferry			X	
Brunswick	X			
Byron	X			
Callaway	X			
Calvert Cliffs	X			
Catawba	X			
Clinton	X			
Columbia	X			
Comanche Peak	X			
Cooper			X	
Davis-Besse				X
DC Cook	X			
Diablo Canyon	X			
Dresden	X			
Duane Arnold	X			
Farley	X			
Fermi	X			
FitzPatrick	X			
Ginna	X			
Grand Gulf	X			
Harris	X			
Hatch	X			
Hope Creek	X			
Indian Point				X
LaSalle	X			
Limerick	X			
McGuire	X			
Millstone			X	
Monticello	X			
Nine Mile Point	X			
North Anna	X			
Oconee	X			
Palisades	X			
Palo Verde	X			
Peach Bottom	X			
Perry				X

<i>Site</i>	<i>No additional regulatory action is warranted (Category 1)</i>	<i>Additional Insights Needed - (Category 2)</i>	<i>Ongoing Review (Category 3)</i>	<i>Deferred (Category 4)</i>
Point Beach	X			
Prairie Island	X			
Quad Cities			X	
River Bend	X			
Robinson			X	
Salem	X			
Seabrook	X			
Sequoyah			X	
St. Lucie	X			
South Texas	X			
Summer	X			
Surry			X	
Susquehanna	X			
TMI	X			
Turkey Point	X			
Vogle	X			
Waterford	X			
Watts Bar			X	
Wolf Creek	X			
<b>Total</b>	<b>47</b>	<b>0</b>	<b>8</b>	<b>3</b>



LIST OF APPLICABLE POWER REACTOR LICENSEES

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

ANO Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
N-TSB-58  
1448 S.R. 333  
Russellville, AR 72802

Beaver Valley Power Station, Units 1 and 2  
FirstEnergy Nuclear Operating Company  
Docket Nos. 50-334 and 50-412  
License Nos. DPR-66 and NPF-73

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FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
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P.O. Box 4, Route 168  
Shippingport, PA 15077

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

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Braidwood Station  
4300 Winfield Road  
Warrenville, IL 60555

Browns Ferry Nuclear Plant, Units 1, 2,  
and 3

Tennessee Valley Authority  
Docket Nos. 50-259, 50-260, and 50-296  
License Nos. DPR-33, DPR-52, and DPR-68

Mr. Joseph W. Shea  
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and Support Services  
Tennessee Valley Authority  
Browns Ferry Nuclear Plant  
1101 Market Street, LP 4A  
Chattanooga, TN 37402-2801

Brunswick Steam Electric Plant, Units 1  
and 2

Duke Energy Progress, LLC  
Docket Nos. 50-325 and 50-324  
Licensee Nos. DPR-71 and DPR-62

Mr. William R. Gideon  
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Brunswick Steam Electric Plant  
8470 River Rd. SE (M/C BNP001)  
Southport, NC 28461

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

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Byron Station  
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Warrenville, IL 60555

Callaway Plant, Unit 1  
Union Electric Company  
Docket No. 50-483  
License No. NPF-30

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Ameren Missouri  
Callaway Energy Center  
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Steedman, MO 65077

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

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

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Catawba Nuclear Station  
4800 Concord Road  
York, SC 29745

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

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Clinton Power Station  
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Columbia Generating Station  
Energy Northwest  
Docket No. 50-397  
License No. NPF-21

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Richland, WA 99352

Comanche Peak Nuclear Power Plant,  
Units 1 and 2  
Vistra Operations Company, LLC  
Docket Nos. 50-445 and 50-446  
License Nos. NPF-87 and NPF-89

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Comanche Peak Nuclear Power Plant  
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Cooper Nuclear Station  
Nebraska Public Power District  
Docket No. 50-298  
License No. DPR-46

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Cooper Nuclear Station  
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Brownville, NE 68321

Davis-Besse Nuclear Power Station, Unit 1  
FirstEnergy Nuclear Operating Company  
Docket No. 50-346  
License No. NPF-3

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5501 N. State Route 2  
Oak Harbor, OH 43449-9760

Diablo Canyon Power Plant, Units  
Nos. 1 and 2  
Pacific Gas and Electric Company  
Docket Nos. 50-275 and 50-323  
License Nos. DPR-80 and DPR-82

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

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

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Duane Arnold Energy Center  
NextEra Energy Duane Arnold, LLC  
Docket No. 50-331  
License No. DPR-49

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Southern Nuclear Operating Company, Inc.  
Docket Nos. 50-321 and 50-366  
License Nos. DPR-57 and NPF-5

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Fermi, Unit 2  
DTE Electric Company  
Docket No. 50-341  
License No. NPF-43

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Newport, MI 48166

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

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Entergy Operations, Inc.  
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Port Gibson, MS 39150

H. B. Robinson Steam Electric Plant, Unit No. 2

Duke Energy Progress, LLC  
Docket No. 50-261  
License No. DPR-23

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Hope Creek Generating Station

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License No. NPF-57

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PSEG Nuclear LLC – N09  
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Indian Point Nuclear Generating Unit Nos. 1, 2, and 3

Entergy Nuclear Operations, Inc.  
Docket Nos. 50-247 and 50-286  
License Nos. DPR-26 and DPR-64

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Buchanan, NY 10511-0249

James A. FitzPatrick Nuclear Power Plant

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License No. DPR-59

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Joseph M. Farley Nuclear Plant, Units 1 and 2

Southern Nuclear Operating Company, Inc.  
Docket Nos. 50-348 and 50-364  
License Nos. NPF-2 and NPF-8

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LaSalle County Station, Units 1 and 2

Exelon Generation Company, LLC  
Docket Nos. 50-373 and 50-374  
License Nos. NPF-11 and NPF-18

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Limerick Generating Station, Units 1 and 2

Exelon Generation Company, LLC  
Docket Nos. 50-352 and 50-353  
License Nos. NPF-39 and NPF-85

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McGuire Nuclear Station, Units 1 and 2

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

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McGuire Nuclear Station  
12700 Hagers Ferry Road  
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Millstone Power Station, Units 2 and 3  
Dominion Nuclear Connecticut, Inc.  
Docket Nos. 50-336 and 50-423  
License Nos. DPR-65 and NPF-49

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

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Nine Mile Point Nuclear Station, Units 1  
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Nine Mile Point Nuclear Station, LLC  
Exelon Generation Company, LLC  
Docket Nos. 50-220 and 50-410  
License Nos. DPR-63 and NPF-69

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

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

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

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Palo Verde Nuclear Generating Station,  
Units 1, 2, and 3

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

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Peach Bottom Atomic Power Station, Units  
2 and 3

Exelon Generation Company, LLC  
Docket Nos. 50-277 and 50-278  
License Nos. DPR-44 and DPR-56

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Perry Nuclear Power Plant, Unit 1

FirstEnergy Nuclear Operating Company  
Docket No. 50-440  
License No. NPF-58

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Point Beach Nuclear Plant, Units 1 and 2

NextEra Energy Point Beach, LLC  
Docket Nos. 50-266 and 50-301  
License Nos. DPR-24 and DPR-27

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Prairie Island Nuclear Generating Plant,  
Units 1 and 2

Northern States Power Company -  
Minnesota  
Docket Nos. 50-282 and 50-306  
License Nos. DPR-42 and DPR-60

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Quad Cities Nuclear Power Station, Units 1  
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Exelon Generation Company, LLC  
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License Nos. DPR-29 and DPR-30

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R. E. Ginna Nuclear Power Plant, LLC  
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Docket No. 50-244  
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River Bend Station, Unit 1  
Entergy Operations, Inc.  
Docket No. 50-458  
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Salem Nuclear Generating Station, Units 1  
and 2  
PSEG Nuclear, LLC  
Docket Nos. 50-272 and 50-311  
License Nos. DPR-70 and DPR-75

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Sequoyah Nuclear Plant, Units 1 and 2  
Tennessee Valley Authority  
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Shearon Harris Nuclear Power Plant,  
Unit 1  
Duke Energy Progress, LLC  
Docket No. 50-400  
License No. NPF-63

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

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Florida Power and Light Company  
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Surry Power Station, Unit Nos. 1 and 2  
Virginia Electric and Power Company  
Docket Nos. 50-280 and 50-281  
License Nos. DPR-32 and DPR-37

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Susquehanna Steam Electric Station, Units  
1 and 2

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

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Three Mile Island Nuclear Station, Unit 1

Exelon Generation Company, LLC  
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License No. DPR-50

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Turkey Point Nuclear Generating Units 3  
and 4

Florida Power and Light Company  
Docket Nos. 50-250 and 50-251  
License Nos. DPR-31 and DPR-41

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

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Vogtle Electric Generating Plant, Units 1  
and 2

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

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Waterford Steam Electric Station, Unit 3

Entergy Operations, Inc.  
Docket No. 50-382  
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Watts Bar Nuclear Plant, Units 1 and 2

Tennessee Valley Authority  
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Wolf Creek Generating Station  
Wolf Creek Nuclear Operating Corporation  
Docket No. 50-482  
License No. NPF-42

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SUBJECT: TREATMENT OF REEVALUATED FLOOD HAZARD INFORMATION PROVIDED UNDER TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS* 50.54(f) REGARDING RECOMMENDATION 2.1 OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT  
DATE: August 20, 2019

DISTRIBUTION: See next page

ADAMS Accession No. ML19067A247                      concurred \*via email                      NRR-106

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DATE	8/15/2019	6/24/2019	8/1/2019	8/14/2019
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RidsNrrPMClinton  
RidsNrrPMColumbia  
RidsNrrPMComanchePeak  
RidsNrrPMCooper  
RidsNrrPMDCCook  
RidsNrrPMDavisBesse  
RidsNrrPMDiabloCanyon  
RidsNrrPMDresden  
RidsNrrPMDuaneArnold  
RidsNrrPMFarley  
RidsNrrPMFermi2  
RidsNrrPMFitzPatrick  
RidsNrrPMGrandGulf  
RidsNrrPMHarris  
RidsNrrPMHatch  
RidsNrrPMHopeCreek  
RidsNrrPMIndianPoint  
RidsNrrPMLaSalle  
RidsNrrPMLimerick

RidsNrrPMMcGuire  
RidsNrrPMMillstone  
RidsNrrPMMonticello  
RidsNrrPMNineMilePoint  
RidsNrrPMNorthAnna  
RidsNrrPMOconee  
RidsNrrPMPalisades  
RidsNrrPMPaloVerde  
RidsNrrPMPeachBottom  
RidsNrrPMPerry  
RidsNrrPMPPointBeach  
RidsNrrPMPrairieIsland  
RidsNrrPMQuadCities  
RidsNrrPMREGinna  
RidsNrrPMRiverBend  
RidsNrrPMRobinson  
RidsNrrPMSalem  
RidsNrrPMSeabrook  
RidsNrrPMSequoyah  
RidsNrrPMSouthTexas  
RidsNrrPMStLucie  
RidsNrrPMSummer  
RidsNrrPMSurry  
RidsNrrPMSusquehanna  
RidsNrrPMTthreeMileIsland  
RidsNrrPMTurkeyPoint  
RidsNrrPMVogle  
RidsNrrPMWaterford  
RidsNrrPMWattsBar  
RidsNrrPMWolfCreek  
RidsOgcRp Resource  
RidsRgn1MailCenter  
RidsRgn2MailCenter  
RidsRgn3MailCenter  
RidsRgn4MailCenter  
RidsEdoMailCenter Resource  
RidsNroOd  
RidsNrrOd  
RidsNsirOd