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SBK-L-18066
10 CFR 50.12

U.S. Nuclear Regulatory Commission
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NextEra Energy, Seabrook, LLC
Seabrook Station, Docket No. 50-443

NextEra Energy Seabrook, LLC, Exemption Request to Support Updated Final Response to
NRC Generic Letter 2004-02

Reference:

1. NextEra Energy Seabrook, LLC, Updated Final Response to NRC Generic Letter 2004-02, dated January 31, 2018 (ML18031B248)

By letter dated January 31, 2018 (Reference 1), NextEra Energy Seabrook, LLC (NextEra) submitted on behalf of Seabrook Station (Seabrook) an updated final response to NRC Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors. In Reference 1, NextEra committed to submit by no later than April 2018, an exemption from the single failure criterion of General Design Criterion (GDC) applicable to Region II Loss of Coolant Accident break sizes. After further discussions with the NRC, it was determined that an exemption from the single failure criterion of 10 CFR 50, Appendix K, Section (I)(D)(1) is the appropriate approach and that submittal by April 2018 was not necessary.

This letter transmits the exemption request from the single failure criterion of 10 CFR 50 Appendix K, Section (I)(D)(1) for Seabrook.

This letter contains no new regulatory commitments.

If you have any questions please contact Mr. Kenneth Browne, Licensing Manager, at 603-773-7932.

Executed on August 30, 2018.

Sincerely,

NextEra Energy Seabrook, LLC

A handwritten signature in black ink, appearing to read "Robert Harrsch". It is positioned above a solid horizontal line.

Robert Harrsch
Acting Site Director

cc: Director, Office of Nuclear Reactor Regulation
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Enclosure:

1. Request for Exemption from 10 CFR 50 Appendix K

Enclosure 1
Request for Exemption from 10 CFR 50 Appendix K

1. Exemption Request

Pursuant to 10 CFR 50.12, NextEra Energy Seabrook, LLC ("NextEra") is submitting a request for permanent exemption from the single failure requirement in 10 CFR 50 Appendix K, Emergency Core Cooling System (ECCS) Models, Section (I)(D)(1) which states:

Single Failure Criterion. An analysis of possible failure modes of ECCS equipment and of their effects on ECCS performance must be made. In carrying out the accident evaluation the combination of ECCS subsystems assumed to be operative shall be those available after the most damaging single failure of ECCS equipment has taken place.

As discussed in the updated final response to NRC Generic Letter 2004-02 (Reference 1), this request supports closure of Generic Safety Issue 191 (GSI-191) for Seabrook.

Pursuant to 10 CFR 50.12, NextEra is submitting this request for exemption from certain requirements of 10 CFR 50 Appendix K Section (I)(D)(1), namely "Single Failure Criterion". Key limitations of the exemption request are:

1. This exemption is exclusive to the application of Appendix K Section (I)(D)(1) as it pertains to meeting the acceptance criteria of 10 CFR 50.46(b)(5), namely "Long-term cooling".
2. It is only applicable to debris impacts on strainer loading and in-vessel effects. The scope of the requested exemption is limited to the availability of both trains of the Emergency Core Cooling System (ECCS) and Containment Building Spray (CBS) during the recirculation phase for Region II breaks for the purpose of assessing the effects of debris on strainer head loss (Reference 1, p. E1-92) and in-vessel fiber loading (Reference 1, p. E1-163).
3. The exemption is for large Region II breaks only. Selection of Region II breaks is consistent with NEI 04-07 Section 6 as described in NextEra Letter SBK-L-18010. Region II breaks are defined for Seabrook as reactor coolant system (RCS) main loop piping breaks greater than 17 inches in diameter (Reference 1, p. E1-12).

Mitigation of a low probability Region II break would require both trains of the ECCS and the CBS system to be in operation with both ECCS strainers available to accommodate the postulated debris load from a break of this size (Reference 1, p. E1-13). The exemption requested is permanent in duration.

2. Regulatory Requirements Involved

NextEra is requesting exemption from the single failure requirement in 10 CFR 50 Appendix K, as stated in Section 1, above. This exemption request supports closure of GSI-191 for Seabrook for Region II breaks (breaks >17 inches). In its GSI-191 evaluation, NextEra analyzed Region II breaks using the Alternate Evaluation Methodology provided in NEI 04-07 (References 2, 3), which allows the assumption that both ECCS and CBS trains are available during the recirculation phase for Region II breaks. The single failure requirement of Appendix K cannot be met for the ECCS and CBS in NextEra's GSI-191 evaluation for Seabrook and an exemption from the single failure requirement is necessary for this limited purpose.

10 CFR 50 requires compliance with 10 CFR 50 Appendix K per 10 CFR 50.46 (a)(1). Specifically, 10 CFR 50.46 (a)(1) cites Appendix K for ECCS models for required documentation as well as required and acceptable features. 10 CFR 50.46 does not specifically direct the single failure criterion. Rather, 10 CFR 50.46 cites Appendix K which does specify single failure criterion in Section (I)(D)(1). Therefore, with a limited exemption from Appendix K Section (I)(D)(1), further exemption from 10 CFR 50.46 (a)(1) is unnecessary.

NextEra's final response to Generic Letter (GL) 2004-02 in letter SBK-L-18010 stated that it elected to use the Alternate Evaluation Methodology of NEI 04-07 Section 6. The NEI 04-07 Safety Evaluation Report (SER) Section 6.1 states, in part:

While not a component of the 10 CFR 50.46 ECCS evaluation model, the calculation of sump performance is necessary to determine if the sump and the residual heat removal system are configured properly to provide enough flow to ensure long-term cooling, which is an acceptance criterion of 10 CFR 50.46. Therefore, the staff considers the modeling of sump performance as the validation of assumptions made in the ECCS evaluation model. Since the modeling of sump performance is a boundary calculation for the ECCS evaluation model, and acceptable sump performance is necessary for demonstrating long-term core cooling capability (10 CFR 50.46(b)(5)), the requirements of 10 CFR 50.46 are applicable. Based on this, such an alternative approach might require plant-specific license amendment requests or exemption requests from the regulations, depending on each licensee's chosen resolution approach. Licensees could request, on a plant-specific basis, exemptions from the requirements associated with demonstrating long-term core cooling capability (10 CFR 50.46(b)(5)). For example, exemptions from the requirements of 10 CFR 50.46(d) may be required if a licensee chooses to classify new equipment as nonsafety related or not single-failure proof.

10 CFR 50.46(a)(1)(i) states in part:

Each boiling or pressurized light-water nuclear power reactor fueled with uranium oxide pellets within cylindrical zircaloy or ZIRLO cladding must be provided with an emergency core cooling system (ECCS) that must be designed so that its calculated cooling performance following postulated loss-of-coolant accidents conforms to the criteria set forth in paragraph (b) of this section.

As referenced in 10 CFR 50.46(a)(1)(i), 10 CFR 50.46(b)(5) is an acceptance criterion part of paragraph (b) and states:

Long-term cooling. After any calculated successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-lived radioactivity remaining in the core.

This exemption request is consistent with the NEI 04-07 SER by ensuring 10 CFR 50.46(b)(5) acceptance criterion is met through an exemption to Appendix K Section (I)(D)(1). That is, 10 CFR 50.46(a)(1) establishes that the 10 CFR 50.46(b) acceptance criteria can be met with ECCS Model described in 10 CFR 50 Appendix K. Granting of this exemption permits Appendix K to be met without the single failure criterion as it pertains to debris impacts on strainer loading and in-vessel effects for large Region II breaks only. As the exemption to Appendix K would allow for an acceptable ECCS Evaluation Model, no further exemptions are required to 10 CFR 50.46(b)(5).

10 CFR 50 Appendix K Section (I)(D)(1) contains requirements for single failure analysis as it pertains to other 10 CFR 50.46 requirements such as power distribution shape, peaking factor, and areas outside those covered in this exemption request. The exemption is exclusive to the impact of debris on strainer loading and in-vessel effects for large Region II breaks only.

The requested exemption does not result in any physical changes to the facility or changes to the operation of these systems. The exemption also does not change any of the programmatic requirements. For aspects not impacted by the exemption request, the ECCS model continues to be evaluated for compliance with Appendix K as modified by Seabrook's current licensing basis, and the CBS and ECCS systems and components continue to comply with their current design and licensing basis requirements.

In Reference 1, NextEra stated that it would submit an exemption request from 10 CFR 50, Appendix A, General Design Criterion (GDC) 35, Emergency Core Cooling; 38, Containment Heat Removal; 41, Containment Atmosphere Cleanup, for a select (Region II) range of loss-of-coolant accident (LOCA) break sizes. Following consultations with the NRC, NextEra determined that the appropriate regulation from which Seabrook requires exemption is 10 CFR 50 Appendix K Section (I)(D)(1).

3. Basis for Exemption Request

Under 10 CFR 50.12(a), a licensee may request and the NRC may grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security, and (2) when special circumstances are present.

This exemption request is submitted to support closure of GSI-191 for Seabrook and supports NextEra's use of the Alternate Evaluation Methodology provided in NEI 04-07,

Pressurized Water Reactor Sump Performance Evaluation Methodology
(References 2, 3).

3.1 Justification for the Exemption Request

10 CFR 50.12, "Specific exemptions," allows the NRC to grant exemptions from the requirements of 10 CFR 50 provided the following three conditions of 10 CFR 50.12(a)(1) are met:

- 1. The exemption is authorized by law.*

10 CFR 50.12 allows the NRC to grant exemptions from Part 50 requirements with provision of proper justification. Approval of the exemption would not conflict with any provisions of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

- 2. The exemption does not present an undue risk to the public health and safety.*

NextEra followed NEI 04-07, Section 6, Alternate Evaluation Methodology (References 2, 3), when analyzing the effects of Region II LOCA break sizes (pipe breaks > 17 inches in diameter). The methodology builds on risk insights and uses realistic inputs and assumptions considering the low probability and risk impact of these larger postulated pipe breaks. As stated in the Safety Evaluation Report (SER) for NEI 04-07, the equipment available for mitigation of the Region II breaks needs to be demonstrated as functionally reliable, even though it may not necessarily be safety related or single failure proof (Reference 3, p. xi and xii). The SER for NEI 04-07 also concludes that the Alternate Evaluation Methodology "provides an acceptable approach for evaluating PWR sump performance. Application of more realistic and risk-informed elements is technically justified based on the low likelihood of such breaks occurring" (Reference 3, p. xii). In addition, the NRC Staff pointed out that consideration of risk significance in the NEI 04-07 Alternate Evaluation Methodology is consistent with 10 CFR 50.46 rulemaking and Regulatory Guide 1.174 (Reference 3, pp. 110, 124).

Application of the Alternate Evaluation Methodology in NEI 04-07 to Seabrook demonstrates that the exemption from the single failure requirement for mitigating a Region II break will not present an undue risk to the public health and safety (see Section 4). As shown in Section 4, reasonable assurance exists that both ECCS and CBS trains will be available for mitigating a Region II break. As described in Section 4.0, the ECCS and CBS equipment is highly reliable in accordance with Technical Specifications and as monitored by 10 CFR 50.65 Maintenance Rule requirements. Further, the sump strainer performance evaluation for Region II breaks has utilized several conservatisms. Safety margins and defense-in-depth measures are available to mitigate the effects of the accidents (Reference 1 pp. E1-12 to E1-23).

3. *The exemption is consistent with the common defense and security.*

The exemption has no impact on the physical security plan or the ability to protect special nuclear material. Therefore, the exemption is consistent with the common defense and security.

3.2 Special Circumstances

In accordance with 10 CFR 50.12(a)(2), special circumstances are present when at least one of the given criteria are met. The following special circumstance is applicable to this exemption request:

- (ii) *Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule*

An objective of 10 CFR 50 Appendix K is to provide model requirements that ensure safety systems (ECCS and CBS) maintain low risk to the public health and safety. Appendix K contains model features to provide assurance that the criteria of 10 CFR 50.46(b) are met. Specifically, 10 CFR 50.46(a)(1)(i) states, in part:

Comparisons to applicable experimental data must be made and uncertainties in the analysis method and inputs must be identified and assessed so that the uncertainty in the calculated results can be estimated. This uncertainty must be accounted for, so that, when the calculated ECCS cooling performance is compared to the criteria set forth in paragraph (b) of this section, there is a high level of probability that the criteria would not be exceeded.

A high level of probability of ECCS cooling performance for ensuring long term cooling is achieved using the Alternate Evaluation Methodology from Section 6 of NEI 04-07 (Reference 2), which describes acceptable methods for evaluating containment sump requirements. For meeting the long term cooling criterion, 10 CFR 50 Appendix K is intended to maintain low risk to the public health and safety through adequate functioning of the ECCS and/or CBS with a single failure. These systems are supported by the containment sump strainers. Licensees are required to demonstrate this capability using a bounding calculation or other deterministic method assuming a single failure. As discussed

in NextEra's Updated Final Response to NRC Generic Letter 2004-02 for Seabrook (Reference 1), all ECCS Systems, Structures and Components (SSC) design functions are demonstrated deterministically to be compliant with 10 CFR 50.46 considering strainer loading, pump net positive suction head, in-vessel effects, and downstream effects for all Region I breaks while accounting for uncertainties. The Seabrook analysis for Region II breaks used deterministic methods, but credited both trains of ECCS and CBS in operation in order to accommodate the volume of debris generation postulated from a Region II break (Reference 1, p. E1-17). As discussed in Section 4 of this exemption request, given the low likelihood of these large breaks occurring, the change in risk attributed to debris in postulated Region II breaks (pipe breaks > 17 inches in diameter) is very small. Therefore, the underlying objective of the regulations to ensure adequate protection of public health and safety will remain met.

ECCS and CBS operation for mitigation of other (non-LOCA) events is not impacted. Secondary side pipe ruptures have the potential to generate some debris; however, the feedwater line breaks and main steam line breaks are mitigated without the need for ECCS to switch to sump recirculation mode. Therefore, the non-LOCA events described in the Updated Final Safety Analysis Report (UFSAR) are not affected by debris and are not impacted by this request for exemption.

The considerations discussed above demonstrate that compliance with the single failure requirement in 10 CFR 50 Appendix K, Section (I)(D)(1), for Region II breaks is not necessary to achieve the underlying purpose of the regulation, which is ensuring adequate protection of public health and safety. Consequently, the special circumstances described in 10 CFR 50.12(a)(2)(ii) apply to this exemption request.

4. Technical Justification for the Exemption

Alternate Evaluation Methodology

Section 6 of NEI 04-07 describes the Alternate Evaluation Methodology for demonstrating acceptable containment sump performance (Reference 2, pp. 6-1 - 6-18). The Alternate Evaluation Methodology proposes separate analysis methods for two distinct break size regions (Reference 3, p. 113):

- Region I:
 - Defined as all breaks up to and including Double Ended Guillotine Breaks (DEGBs) on the largest piping connected to the RCS loop piping AND partial breaks on the RCS loop piping up to an alternate break size (Reference 2, p. 6-1). The terms alternate break size and debris generation break size (DGBS) are used synonymously in the NRC Safety Evaluation associated with NEI 04-07 (Reference 3).
 - Analysis methods must meet the typical design basis rules for a deterministic evaluation.
- Region II:
 - Defined as breaks larger than the Region I alternate break size, up to and including DEGBs on the RCS loop piping (Reference 3, p. 118).
 - Mitigative capabilities must be demonstrated, but the fully deterministic design basis rules do not necessarily apply (Reference 3, p. 113).

The Alternate Evaluation Methodology can be used to demonstrate reasonable assurance of adequate long-term core cooling, as required by 10 CFR 50.46(b)(5), for the bounding breaks in Region II by allowing for the use of more realistic assumptions and methods as well as allowing credit for mitigative operator actions and defense-in-depth measures. Based on various considerations, the NRC Staff determined that the division of the pipe break spectrum proposed for evaluating debris generation is acceptable based on operating experience, application of sound engineering judgment, and consideration of risk-informed principles. Licensees using the methods described in Section 6 of NEI 04-07 can apply the DGBS for distinguishing between Region I and Region II analyses (Reference 3, p. 114).

The Region I evaluation for Seabrook considered DEGBs at Class 1 in-service inspection (ISI) welds on piping connected to the RCS main loops, which have a maximum nominal pipe diameter of 14 inches, as well as postulated 17-inch partial breaks on the main loop piping (including multiple break orientations at each main loop ISI weld location) (Reference 1, p. E1-11). These bounding Region I breaks were evaluated in accordance with NRC-approved methods for a deterministic evaluation, and were shown to meet the intent of the acceptance criteria for strainer head loss and in-vessel fiber loading (Reference 1, p. E1-12).

The Region II evaluation for Seabrook was limited to breaks larger than 17 inches in diameter on the main loop piping, and these breaks were analyzed using bounding DEGB quantities at the worst-case break locations. The bounding Region II debris quantities exceed the debris quantities that were used in the prototypical strainer head loss testing for conditions where single failure is assumed; therefore, Region II breaks were evaluated using the Alternate Evaluation Methodology (Reference 1, p. E1-12). The Alternate Evaluation Methodology assumes that both ECCS trains, including two trains of recirculation strainers, will be available to accommodate the volume of debris generated by a Region II break (Reference 1, p. E1-13). NextEra requests exemption from the single failure requirement in Appendix K, Section (I)(D)(1). The scope of the requested exemption is limited to the availability of both trains of ECCS and CBS during the recirculation phase for Region II breaks for the purpose of assessing the effects of debris on strainer head loss and in-vessel fiber loading.

Region II Risk Insights

The relaxation of requirements for mitigating a Region II break is appropriate based on the low frequency associated with breaks that are greater than 17 inches in diameter. Based on NUREG-1829, Table 7.19, the mean frequency of breaks (without steam generator tube rupture contributions) greater than or equal to 14 inches is 2.0E-07/yr (Reference 4, p. 7-55). If all Region II breaks are conservatively assumed to result in core damage, the risk associated with these failures (in terms of change in core damage frequency, or Δ CDF) would be 2.0E-07/yr, which is within the acceptance guidelines of a very small change in Regulatory Guide 1.174 (Reference 5, pp. 26-28). The use of the mean frequency of breaks greater than or equal to 14 inches as the core damage frequency associated with debris-related failures is highly conservative. The mean frequency value includes break sizes ranging from 14 through 17 inches (Reference 4, p. 7-55), which were acceptable under the deterministic evaluation for Seabrook (Reference 1, pp. E1-11 to E1-12). Additionally, the use of the mean frequency of breaks greater than or equal to 14 inches as the core damage frequency associated with debris-related failures conservatively assumes 100% failure of mitigative operator actions and defense-in-depth measures, in addition to a single train failure of the ECCS and CBS. Therefore, exemption of Seabrook from the single failure requirement in Appendix K, Section (I)(D)(1), for the limited scope requested, would not result in undue risk to the health and safety of the public.

Using accepted methodology from NEI 04-07 and the associated SER (References 2, 3) for a deterministic GSI-191 evaluation (e.g., single failure requirement and 100% recirculation transport for fine debris), the quantity of debris generated and transported for the bounding Region II breaks at Seabrook exceeds the quantity that was tested during the Seabrook large-scale head loss testing (Reference 1, p. E1-15). However, when the more realistic assumption of two-train operation is considered in parallel with the conservative application of the debris interceptor test results to the hold-up of fiber fines at the annulus debris interceptors, it can be reasonably demonstrated that the debris quantities transported to the sump strainers are bounded by the quantities tested during the large-scale head loss tests (Reference 1, p. E1-15). Similarly, when evaluating the in-vessel fiber loading for the Region II breaks, the largest transported fiber load of the Region II breaks was used and the resulting in-vessel fiber loads met the acceptance criteria when both CBS trains are in operation (Reference 1, p. E1-163 and E1-164).

The CBS system and the ECCS are designed, tested, and inspected to ensure a high level of reliability. All components in these systems that are required to function during an accident are qualified to perform their safety function in a post-accident environment and are seismic category I. The CBS system and ECCS are designed to withstand the effects of wind/tornado loading, floods, and missiles. The active components of the ECCS and CBS are powered from separate buses that are energized from offsite power supplies. In addition, redundant sources of auxiliary onsite power are available through the use of the emergency diesel generators to ensure adequate power for all ECCS and CBS requirements. ECCS and CBS train availability is monitored by 10 CFR 50.65, Maintenance Rule, and is comprised of highly reliable equipment whose out of service (OOS) time and testing type/frequency is controlled by station Technical Specifications and the Surveillance Frequency Control Program. Therefore, there is very high assurance that both trains of the ECCS and CBS will fulfill their safety functions. Additionally, no changes are proposed to the station design, current LOCA mitigation response, or safety analyses.

Additionally, as discussed in NextEra's updated final response letter, there is reasonable assurance that long-term core cooling can be provided for the bounding Region II breaks based on proceduralized operator actions, defense-in-depth measures, and substantial safety margin (Reference 1, pp. E1-12 to E1-23). Some of the operator actions include initiating hot-leg recirculation, providing Refueling Water Storage Tank (RWST) and RCS makeup from the boric acid blender and volume control tank (VCT), respectively, restarting one or two containment fan coolers and securing the CBS pumps when they are no longer needed (Reference 1, p. E1-13). Also, the ability to use additional mitigative measures, such as the Emergency Contingency Actions (ECAs) and the Severe Accident Management Guideline (SAMG) strategies, provide reasonable assurance that all Region II breaks would be successfully mitigated (Reference 1, p. E1-16 and E1-17).

Seabrook testing and analysis employed many conservatisms to enhance the safety margin discussed above. The following list summarizes the major margins and conservatisms used in the head loss testing, head loss analysis, and in-vessel analysis, as stated in the updated final response letter (Reference 1, pp. E1-18 to E1-22).

- The quantity of latent debris used to determine the strainer head loss was conservatively increased to 100 lbm, rather than using the walkdown value (40.7 lbm).
- The amount of miscellaneous debris (e.g., tags and labels) at Seabrook was conservatively increased to 133 ft², rather than using the walkdown value (39.8 ft²).
- 100% of unqualified coatings were assumed to fail for all breaks, conservatively maximizing the potential unqualified coatings load in the recirculation pool.
- Qualified epoxy inside the zone of influence (ZOI) was assumed to fail as 100% particulate, conservatively treating it as the most easily transportable debris type.
- During pool fill, the transport to the inactive reactor cavity was conservatively limited to 15% for fine debris. Note that the transport to the inactive cavity without the limitation was calculated to be 37%.
- The maximum quantity of aluminum oxyhydroxide (AlOOH) precipitate used to determine the strainer head loss was conservatively assumed to be 750.1 kg for two-train operation (Region II analysis), rather than the expected value (174 kg).
- In the chemical effects analysis, maximum pH values were conservatively used to increase the calculated aluminum release, and minimum pH values were conservatively used to decrease the calculated aluminum solubility.
- In the chemical effects analysis, maximum temperature profiles were conservatively assumed for the 30-day post-LOCA event to increase the calculated aluminum release.
- The penetration correlation curve-fit uncertainty was added to the final in-vessel debris loads. This conservatively increases the in-vessel fiber loads.
- The maximum RHR flow rate was used for the recirculation phase to increase the flow split to the reactor vessel. This results in a larger quantity of fiber transporting to the reactor vessel.

In light of these considerations, it is concluded that the underlying intent of 10 CFR 50 Appendix K to prevent undue risk to the health and safety of the public will be met by the requested exemption. Exemption of Seabrook from the single failure requirement in 10 CFR 50 Appendix K is limited to the availability of both trains of ECCS and CBS during the recirculation phase for Region II breaks for the purpose of assessing the effects of debris on strainer head loss and in-vessel fiber loading.

5. Environmental Consideration

Pursuant to the requirements of 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments," NextEra evaluated the requested exemption against the criteria for identification of licensing and regulatory actions requiring environmental assessments. It was determined that the requested exemption meets the criteria and is eligible for categorical exclusion as set forth in 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," paragraph (c)(9), as shown below.

(i) The exemption involves no significant hazards consideration.

An evaluation of the three criteria set forth in 10 CFR 50.92(c) as applied to the exemption is provided below. The evaluation is consistent with the no significant hazards consideration determination.

(1) The requested exemption does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The requested exemption from 10 CFR 50 Appendix K Section (I)(D)(1) would eliminate the single failure requirement for mitigating a Region II pipe break when evaluating effects of LOCA-generated debris on sump strainer head loss and in-vessel fiber loads. The probability of occurrence of a Region II break is very small. The Alternate Evaluation Methodology in NEI 04-07 allows the use of realistic assumptions and relaxation of the single failure criteria for mitigating a Region II break (Reference 3, p. 111).

The requested exemption does not implement any physical changes to the facility, does not change operation of the facility or accident response, and does not change any station safety analyses. The proposed change confirms that required SSCs supported by the containment sumps will reliably perform their safety functions, and does not alter or prevent the ability of SSCs to perform their intended function to mitigate the consequences of an accident previously evaluated within the acceptance limits. The safety analysis acceptance criteria in the UFSAR continue to be met for the proposed change. The proposed change does not affect initiating events because it addresses existing initiating events; i.e., loss of coolant accidents. Therefore, it is concluded that the requested exemption does not involve a significant increase in the probability or consequences of any of the accidents previously evaluated.

(2) The requested exemption does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The requested exemption would eliminate the single failure requirement when evaluating the debris effects associated with mitigating Region II LOCA breaks (pipe breaks > 17

inches in diameter). The requested exemption from the single failure requirement does not introduce any new failure mechanisms or malfunctions that can initiate an accident. The exemption does not require any physical modifications to the plant and does not affect the operation of any systems or components. Therefore, it does not create the possibility for a new or different kind of accident.

(3) The requested exemption does not involve a significant reduction in a margin of safety.

The requested exemption does not involve a change in any functional requirements or method of performing functions associated with any plant SSCs. The effects of LOCA-generated debris are analyzed for a full spectrum of LOCAs, including DEGB and partial breaks at all ISI welds within the Class 1 pressure boundary (Reference 1, p. E1-26). The requested exemption from the single-failure requirement is only applicable to larger Region II breaks (pipe breaks > 17 inches in diameter) with a very low probability of occurrence.

The requested exemption does not implement any physical changes to the facility or affect station operation or accident response. The requested exemption does not affect existing safety margins in the barriers for the release of radioactivity, and there are no changes to the safety analyses in the UFSAR. Therefore, the requested exemption does not involve a significant reduction in a margin of safety.

(ii) The requested exemption involves no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

No physical changes are made to the plant, and no changes are made to station operation or accident mitigation. There is no change to the safety analyses in the UFSAR outside of those discussed in this exemption. Therefore, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

(iii) The requested exemption involves no significant increase in individual or cumulative occupational radiation exposure.

The requested exemption does not implement any physical changes to the facility, does not change operation of the facility, and has no change on station procedures or accident response. The requested exemption does not change any existing safety analyses in the UFSAR. Therefore, approval of this exemption request will not result in significant increase in individual or cumulative occupational radiation exposure.

Based on the above, NextEra concludes that the requested exemption meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and concludes that the requested exemption would not result in a significant radiological environmental impact.

6. Precedent

On October 29, 1998, the NRC granted a similar Appendix K Section (I)(D)(1) exemption to Florida Power Corporation for Crystal River Unit 3. This exemption was with respect to the long-term cooling criterion contained in 10 CFR 50.46(b)(5). The licensee could not meet single failure because active methods of boric acid precipitation control might not have been available with the Section (I)(D)(1) criterion applied. The Crystal River exemption request was based on 10 CFR 50.12(a)(2)(ii). The limited scope exemption was granted based on the low probability of the subject scenario (Reference 6).

7. Conclusion

To support resolution of GSI-191, NextEra requests exemption from the single failure requirement in 10 CFR 50 Appendix K Section (I)(D)(1). The scope of the requested exemption is limited to the availability of both trains of ECCS and CBS during the recirculation phase for Region II breaks for the purpose of assessing the effects of debris on strainer head loss and in-vessel fiber loading. This exemption request is consistent with the Alternate Evaluation Methodology stated in NEI 04-07, Section 6 (References 2, 3). Therefore, the approval of this exemption will not present an undue risk to the public health and safety and is consistent with the common defense and security as required by 10 CFR 50.12(a)(1). Special circumstances required by 10 CFR 50.12(a)(2) are shown to exist per the criteria in 10 CFR 50.12(a)(2)(ii). The exemption will not result in a significant radiological environmental impact and meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

8. Schedule

NextEra requests review and approval of this exemption request within 12 months of the date of this submittal.

9. References

1. NextEra Energy Seabrook, LLC, Updated Final Response to NRC Generic Letter 2004-02, dated January 31, 2018 (ML18031B248)
2. NEI 04-07, Pressurized Water Reactor Sump Performance Evaluation Methodology Volume 1, Revision 0, December 2004 (ML050550138)
3. NEI 04-07, Pressurized Water Reactor Sump Performance Evaluation Methodology, Volume 2, Safety Evaluation by the Office of Nuclear Reactor Regulation Related to NRC Generic Letter 2004-02, Revision 0, December 2004 (ML050550156)
4. NUREG-1829 Volume 1, Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process, April 2008 (ML082250436)
5. Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis, Revision 3, January 2018 (ML17317A256)
6. Issuance of Exemption from the Requirements of 10 CFR Part 50, Appendix K, Section I.D.1 – Crystal River Unit 3 (TAC No. M99892) (ML020670408)