



Tom Simril
Vice President
Catawba Nuclear Station

Duke Energy
CN01VP | 4800 Concord Road
York, SC 29745

o: 803.701.3340
f: 803.701.3221
tom.simril@duke-energy.com

RA-18-0162

10 CFR 50.4
10 CFR 50.54(f)

December 6, 2018

Attention: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

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

Subject: Response to March 12, 2012, Request for Information Enclosure 2,
Recommendation 2.1, Flooding, Required Response 3, Flooding Focused
Evaluation Summary Submittal

References:

1. NRC Letter, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident; dated March 12, 2012, (ADAMS Accession Number ML12053A340)
2. Duke Energy Letter, Flood Hazard Reevaluation Report, Response to NRC 10 CFR 50.54(f) Request for Additional Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated March 12, 2014 (ADAMS Accession Number ML 14077A054)
3. NRC Letter, Supplemental Information Related to Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Flooding Hazard Reevaluations for Recommendation 2.1 of the Near Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated March 1, 2013, (ADAMS Accession Number ML13044A561)
4. NRC Staff Requirements Memoranda 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 Number ML15089A236)

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5. NRC Letter, Coordination of Requests for Information Regarding Flooding Hazard Reevaluations and Mitigating Strategies for Beyond-Design-Basis External Events, dated September 1, 2015, (ADAMS Accession Number ML15174A257)
6. Nuclear Energy Institute (NEI) Report, NEI 16-05, Revision 1, External Flooding Assessment Guidelines, dated June 2016, (ADAMS Accession Number ML16165A178)
7. U.S. Nuclear Regulatory Commission, JLD-ISG-2016-01, Revision 0, Guidance for Activities Related to Near-Term Task Force Recommendation 2.1, Flood Hazard Reevaluation; Focused Evaluation and Integrated Assessment, dated July 11, 2016, (ADAMS Accession Number ML16162A301)
8. NRC Letter, Catawba Nuclear Station, Units 1 and 2 - Interim Staff Response to Reevaluated Flood Hazards Submitted in Response to the 10 CFR 50.54(f) Information Request - Flood-Causing Mechanism Reevaluation, dated October 5, 2015 (ADAMS Accession Number ML 15278A028)
9. NRC Letter, Catawba Nuclear Station, Units 1 and 2 - Staff Assessment of Response to 10 CFR 50.54(f) Information Request - Flood-Causing Mechanism Reevaluation, dated September 30, 2016, (ADAMS Accession Number ML16251A281)
10. Duke Energy Letter, Catawba Nuclear Station, Units 1 and 2 Additional Information Regarding Flood Hazard Reevaluation Report, Response to Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) regarding Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated June 23, 2016 (ADAMS Accession Number ML16179A196)
11. Duke Energy Letter, Catawba Nuclear Station Flood Hazard Mitigating Strategies Assessment (MSA) Report Submittal, dated June 20, 2017, (ADAMS Accession Number ML17177A099)

On March 12, 2012, the NRC issued Reference 1 to request information associated with Near Term Task Force (NTTF) Recommendation 2.1 for Flooding. One of the Required Responses in Reference 1 directed licensees to submit a Flood Hazard Reevaluation Report (FHRR), for the Catawba Nuclear Station. The FHRR was submitted on March 12, 2014 (Reference 2). Per Reference 3, the NRC considers the reevaluated flood hazard to be "beyond the current design/licensing basis of operating plants".

Following the Commission's directive to NRC Staff (Reference 4), the NRC issued a letter to industry (Reference 5) indicating that new guidance was being prepared to replace existing instructions, and provide for a "graded approach to flooding reevaluations" and "more focused evaluations of local intense precipitation and available physical margin in lieu of proceeding to an integrated assessment".

The Nuclear Energy Institute (NEI) prepared NEI 16-05, "External Flooding Assessment Guidelines" (Reference 6). The NRC endorsed NEI 16-05 (Reference 7) and recommended changes, which have been incorporated into NEI 16-05, Revision 1. NEI 16-05 indicates that each flood-causing mechanism not bounded by the Current Design Basis (CDB) flood (using only stillwater and/or wind-wave run-up levels) should follow one of the following five assessment paths:

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- Path 1: Demonstrate Flood Mechanism is Bounded Through Improved Realism
- Path 2: Demonstrate Effective Flood Protection
- Path 3: Demonstrate a Feasible Response to LIP
- Path 4: Demonstrate Effective Mitigation
- Path 5: Scenario Based Approach

Non-bounded flood-causing mechanisms in Paths 1, 2, or 3 would only require a Focused Evaluation to complete the actions related to external flooding required by the March 12, 2012, 10 CFR 50.54(f) letter. Mechanisms in Paths 4 or 5 require an Integrated Assessment. The enclosure to this letter provides the Flooding Focused Evaluation Summary Report for Catawba Nuclear Station.

As discussed by Reference 10, Duke Energy performed a more representative evaluation of the combined effects flooding mechanism, consistent with the Hierarchical Hazard Assessment (HHA) process. This approach allows for a progressively refined stepwise estimation of site-specific flood hazards. The HHA process allows licensees the option to refine simplified flooding evaluations, based on varying degrees of conservatism, to assess susceptibility to flooding. The results of the HHA approach was provided by Enclosure 2 of Reference 11. The flooding analysis documented in References 8, and 9, as well as Enclosure 2 of Reference 11 were utilized as input to this Flooding Focused Evaluation. The Flooding Focused Evaluation (FE) reaffirms that the Catawba Nuclear Station has reliable, passive protection of Key Structures, Systems, and Components (SSCs) to maintain Key Safety Functions (KSFs). The flooding mechanisms not bounded by the Current Design Basis (CDB), and the associated flood protection from these mechanisms determined by this FE are summarized below.

- Failure of Dams and Onsite Water Control/Storage Structures - Flood protection is provided by site topography.
- Combined Effects (CE) Probable Maximum Flooding (PMF) – Flood protection is provided by site topography.
- Local Intense Precipitation (LIP) – Flood protection is provided by the combination of flood barriers and sufficient storage volume in buildings containing systems and components that support KSFs.

This FE concludes that the strategy for maintaining KSFs has effective flood protection through the demonstration of adequate Available Physical Margin (APM) and reliable flood protection features, and that the overall site response is adequate.

Furthermore, the LIP was reanalyzed to support this FE. In accordance with NEI 16-05, Section 6.1 (Reference 6), CNS reanalyzed its LIP evaluation to improve the realism of the flood hazard evaluation by taking credit for 80 catch basins that provide storm drainage. This change improves the realism of the LIP model and is justified because the catch basins that collect storm drain runoff are periodically monitored and cleaned.

This FE follows Path 2 of NEI 16-05, Rev. 1 and utilizes Appendices B and C of that document for guidance on evaluating the site strategy. This submittal completes the actions related to External Flooding required by the March 12, 2012, 10 CFR 50.54(f) letter.

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There are no new regulatory commitments associated with this letter. Please address any comments or questions regarding this matter to Cecil A. Fletcher II, Nuclear Regulatory Affairs Manager, at (803) 701-3622.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 6, 2018.

Sincerely,

A handwritten signature in black ink that reads "Tom Simril". The signature is fluid and cursive, with the first name "Tom" and last name "Simril" clearly legible.

Tom Simril
Vice President, Catawba Nuclear Station

Enclosure: Duke Energy – Catawba Nuclear Station – Flooding Focused Evaluation

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xc (with enclosures):

Catherine Haney
Regional Administrator
U.S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, GA 30303-1257

Juan F. Uribe
U.S. Nuclear Regulatory Commission
One White Flint North, Mailstop O-13F10
11555 Rockville Pike
Rockville, MD 20852-2738

Michael Mahoney
NRC Project Manager (CNS)
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop O-8H4A
11555 Rockville Pike
Rockville, MD 20852-2738

Joseph D. Austin
NRC Senior Resident Inspector
Catawba Nuclear Station

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