

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
Duke Energy Carolinas, LLC ) Docket Nos. 50-269/270/287 SLR  
Oconee Nuclear Station, )  
Units 1, 2 & 3 ) December 7, 2021

**PETITIONERS' RESPONSE TO DUKE ENERGY CAROLINAS LLC'S  
AND NRC STAFF'S RESPONSES TO ASLB'S NOVEMBER 22 ORDER**

**I. INTRODUCTION**

Pursuant to the Atomic Safety and Licensing Board's ("ASLB's") Order of November 22, 2021, Petitioners, Beyond Nuclear and the Sierra Club, hereby respond to Duke Energy Carolinas, LLC's ("Duke's") and the U.S. Nuclear Regulatory Commission Staff's ("NRC Staff's") responses to the ASLB's November 22, 2021 Memorandum and Order (Request to Provide Post-Initial Prehearing Conference Information) ("Order").<sup>1</sup> In the Order, the ASLB requested Duke to provide "documentary or other supporting basis" for the NRC Staff's claim in the cover letter for the 2011 Safety Evaluation, that potential failure of the Jocassee Dam from an overtopping or seismic event is "not credible."<sup>2</sup>

As discussed below, neither Duke nor the Staff has provided a citation to a single contemporaneous document to support Mr. Leeds' assertion. Thus, their Responses effectively

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<sup>1</sup> Duke Energy Carolinas, LLC's Response to the Atomic Safety and Licensing Board's November 22, 2021 Order ("Duke Response"); NRC Staff Response to the Atomic Safety and Licensing Board's November 22, 2021 Order ("Staff Response").

<sup>2</sup> Order at 1 (quoting letter from Eric J. Leeds, Director, NRC Office of Nuclear Reactor Regulation, to Preston Gillespie, Site Vice President, Oconee Nuclear Station at 1 (Jan. 28, 2011) (ADAMS Accession No. ML110280153) ("Leeds Letter"). The Leeds Letter transmitted the Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Duke Energy Carolinas, LLC Confirmatory Action Letter – Commitments to Address External Flooding Concerns Closure of Inundation Site Results Oconee Nuclear Station, Units 1, 2 and 3 (ONS) Docket Nos. 50-269, 50-270, and 50-287 (Jan. 28, 2011) ("2011 Safety Evaluation").

confirm Petitioners' assertion that "there's no technical underpinning for it, it's just a statement."<sup>3</sup>

## II. DISCUSSION

As noted by the ASLB, the Leeds Letter stated that:

The random sunny-day failure scenario was selected after evaluation of the failure modes determined that the potential failure of the Jocassee Dam from either an overtopping event or seismic event was not credible.<sup>4</sup>

Accordingly, "based on a random sunny-day failure of the Jocassee Dam," the 2011 Safety Evaluation approved the adequacy of Duke's flooding models to provide "reasonable assurance for the overall flooding scenario at the site." Safety Evaluation at 13.

In seeking to demonstrate contemporaneous technical support for the Staff's conclusion that overtopping and seismic events are "not credible," Duke and the NRC Staff focus on the NRC Staff's January 25, 2011, response to a January 10, 2011 Non-Concurrence submitted by Jeffrey T. Mitman, who was then employed by the NRC.<sup>5</sup> (Mr. Mitman has since retired from the NRC and is now serving as Petitioners' expert in this proceeding.) As discussed below in Section A, however, Duke and the NRC Staff fail to provide any contemporaneous documentation for Mr. Leeds' assertion that overtopping and seismic events are not credible. Further, as discussed in Section B, other contemporaneous documents show that in the three years prior to the issuance of the 2011 Safety Evaluation, the NRC Staff was gathering information about the potential role

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<sup>3</sup> Transcript of Initial Prehearing Conference at 100 (Curran) ("Nov. 16, 2021).

<sup>4</sup> Order at 1 (quoting 2011 Safety Evaluation at 1).

<sup>5</sup> Staff Response at 2 and notes 3 and 4 (citing Non-Concurrence on Oconee Assessment Letter (Jan. 10, 2011) (ML110260443) ("Mitman Non-Concurrence")) and Staff Response to Non-Concurrence on the Initial Starting Reservoir level of the Jocassee Dam for the Flooding Inundation Study of the Oconee Nuclear Site for Demonstrating Reasonable Assurance (Jan. 25, 2011) (ML110260443) ("NRC Staff Response to Mitman Non-Concurrence"); Duke Response at 1-2 and note 4.

of seismic and overtopping events, without ruling them out. Finally, as discussed in Section C, Duke and the Staff fail to support their claims that the Staff “revisited” or “reaffirmed” the technical basis for Mr. Leeds’ assertion that seismic and overtopping events are not credible.<sup>6</sup>

**A. Neither the Staff nor Duke Provides Contemporaneous Technical Documentation Supporting the Leeds Letter’s Assertion that Seismic and Overtopping Events Are Not Credible.**

According to the Staff, “[a]dditional details” about Mr. Leeds’ assertion that overtopping and seismic events are not credible “may be found” in the NRC Staff Response to Mitman Non-Concurrence.”<sup>7</sup> And according to the Staff, this 2011 Response “was used to inform the January 28, 2011 letter and Safety Evaluation.”<sup>8</sup> Duke also generally asserts that Section IV.1 of the NRC Staff Response to the Mitman Non-Concurrence “describes the technical basis for the Staff’s conclusions.”<sup>9</sup> But these claims are unsupported, as demonstrated by the following:

1. While the Staff states that the NRC Staff’s Response to the Mitman Non-Concurrence “was used to inform the January 28, 2011 letter and Safety Evaluation,” no document related to Mr. Mitman’s Non-Concurrence or the NRC Staff’s Response appears in the 2011 Safety Evaluation’s list of references on pages 13 to 14. Thus, there is no contemporaneous indication

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<sup>6</sup> Duke Response at 2 and notes 5 and 6 (asserting that Duke “revisited the technical basis” for the 2011 Safety Evaluation in its Flooding Hazard Reevaluation Report (“FHRR”) for Oconee Nuclear Station, §§ 2.2 through 2.3.2.9 (Jan. 29, 2015) (ML16272A217 (PDF pages 30-54) and that the Staff “independently reviewed these analyses in the Staff Assessment of FHRR § 3.4.2 (Apr. 14, 2016) (available in a FOIA response at ML20288A414) (PDF pages 22 to 30); NRC Staff Response at 3 and n.8 (asserting that the NRC Staff “reaffirmed the Staff’s prior conclusion that the failure modes of seismic and overtopping of the Jocassee Dam were not credible” in Investigative Report to the Chairman of the U.S. NRC re: OSC [Office of Special Counsel] File No. 01-15-5254 (June 2016)).

<sup>7</sup> NRC Staff Response at 1-2.

<sup>8</sup> *Id.*

<sup>9</sup> Duke Response at 2.

that the Staff's Response to the Mitman Non-Concurrence was relied on in the 2011 Safety Evaluation.

2. With respect to overtopping, the Staff Response seeks to provide support for Mr. Leeds' assertion by quoting the following passage from the NRC Staff Response to the Mitman Non-Concurrence:

[A] failure of a saddle dike would avert an overtopping failure of the Jocassee Dam. Failure of a single saddle dike would drain the lake down to an elevation of approximately 1090 ft. msl, fully averting a catastrophic draining of the entire lake, thereby protecting the Keowee Dam and [Oconee] from damage. Based on the discussion above, the NRC staff concluded that overtopping of the Jocassee Dam is not a credible event.<sup>10</sup>

But no citation is provided for this bald assertion. Furthermore, the Staff appears to have conceived the idea that a saddle dike failure would avert an overtopping failure for the purpose of responding to Mr. Mitman, because it cannot be found in any previous correspondence between Duke and the NRC Staff.

3. With respect to seismic events, the Staff Response quotes the Staff Response to Mitman Non-Concurrence for the proposition that:

NRC staff, consisting of subject matter experts in geotechnical engineering and geology, performed a qualitative evaluation of the seismic stability of the Jocassee Dam. The qualitative evaluation was based on the following: a review of the available information in the technical literature pertaining to the performance of rock filled dams; the review and certification by Duke's Consulting Board of the quality control performed during construction; and finally based on the overall condition of the Jocassee Dam as certified by FERC's annual inspections. ... The seismic attributes of the Jocassee Dam were analyzed by the NRC staff experts, and they have determined that a seismic failure of the Jocassee Dam is not a credible event."<sup>11</sup>

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<sup>10</sup> *Id.* at 2 (citing NRC Staff Response to Mitman Non-Concurrence at 5).

<sup>11</sup> *Id.* (citing NRC Staff Response to Mitman Non-Concurrence at 6).

As with the overtopping issue, however, no citation is provided to support this assertion. Thus, there is no way to evaluate the technical basis for the claim.

4. While not mentioned by the NRC Staff, the NRC Staff Response to the Mitman Non-Concurrence contains other vague references to technical evaluations by the Staff that also lack any citations to documented technical analyses. For instance, it states:

The Jocassee Reservoir level of 1110 ft msl level and Keowee Reservoir level of 800 ft msl used in the flooding inundation study of the ONS were evaluated by the staff's technical experts in hydrology and ground water hydrology, as well as the Bureau of Reclamation acting as a contractor to NRC, and determined to be appropriate for the failure scenario of concern, i.e. a random sunny day failure of the Jocassee Dam. The random sunny day failure scenario was selected after the NRC technical experts' evaluation of the failure modes determined that the potential failure of the Jocassee Dam from either an overtopping event or a seismic event was not credible."<sup>12</sup>

But the document provides no citation for these purported "technical evaluations" by the Staff and the Bureau of Reclamation. Similarly, the NRC Staff Response to the Mitman Non-Concurrence states:

The NRC staff, consisting of subject matter experts in hydrology and ground water geology, also performed an independent analysis of the potential for an overtopping event in 2010, based on the runoff model approved by FERC. This model demonstrated that a PMF with an antecedent storm can be safely contained and released in the Jocassee Reservoir without overtopping the dam.<sup>13</sup>

Again, the document provides no citation for this purported "independent analysis."

5. The NRC Staff Response to the Mitman Non-Concurrence does refer to one document that appears relevant to the credibility of Jocassee Dam failure due to overtopping and seismic events: "Oconee Nuclear Station Jocassee-Keowee Dam Breach Model Report from Duke Energy Carolinas, dated March 2009." *Id.* at 11 (Ref. 4). But this document has not been provided by the NRC Staff in response to the ASLB's Order, nor can it be found in ADAMS.

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<sup>12</sup> NRC Staff Response to Mitman Non-Concurrence at 3.

<sup>13</sup> *Id.* at 4.

Given the NRC's and Duke's failure to provide a single citation to a contemporaneous technical analysis of the credibility of seismic and overtopping events, it must be assumed that (a) the analyses have been lost; (b) the NRC has withheld them from public disclosure, without even identifying them; (c) the analyses were not written down, or (d) the analyses were never performed. Whatever the reason, Mr. Leeds' assertion that overtopping and seismic events are not credible remains unsupported by any documented technical analysis.

**B. Other Contemporaneous Documents Show That the NRC Staff was Gathering Information about the Potential Role of Seismic and Overtopping Events, Without Ruling Them Out.**

While Duke and the NRC Staff focus their Responses on statements made in the Staff's Response to the Mitman Non-Concurrence, Mr. Mitman's Non-Concurrence and other contemporaneous related documents show a consistent effort by the Staff to obtain information from Duke about a comprehensive range of potential causes of Jocassee Dam failure, including sunny-day failure, dam overtopping events, and seismic events. For instance, on August 15, 2008, the NRC Staff issued a "50.54(f)" letter requesting Duke to:

Explain the bounding external flood hazard at Oconee and the basis for excluding consideration of other external flood hazards, such as those described in the Inundation Study [prepared by the Federal Energy Regulatory Commission in 1992], as the bounding case.<sup>14</sup>

After receiving Duke's response, the NRC issued a follow-up letter on April 30, 2009, stating that Duke had not provided sufficient information to demonstrate that Oconee was adequately protected, and requesting additional information. As stated in the letter:

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<sup>14</sup> Letter from Joseph G. Giiter, NRC, to Dave Baxter, Duke Energy Carolinas, LLC, re: Information Request Pursuant to 10 CFR 50.54(f) Related to External Flooding, Including Failure of the Jocassee Dam, at Oconee Nuclear Station, Units 1, 2, and 3 (TAC Nos. MD8224, MD8225, and MD8226) (Aug. 15, 2008) (ML081640244) ("NRC 2008 50.54 Letter"). The NRC 2008 50.54 Letter is cited in Mr. Mitman's Non-Concurrence at page 2 and note 4.

In its response to the 50.54(f) letter, Duke stated that it would perform inundation studies and sensitivity analyses using the HEC-RAS model. The NRC staff agrees that a study with the more advanced model and sensitivity analyses would be beneficial because of the uncertainty involved in predicting dam failure and resultant flood levels at Oconee. Dam design operating parameters, including reservoir level, should be used as input to the inundation study to support the safety of the Oconee facility. The sensitivity analyses should include varying *key parameters* that can affect the on-site flood height (e.g., breach size, *reservoir levels*, and time to dam failure) individually and in combination over a sufficient range to provide an understanding of how changes impact the flood height estimates. As appropriate, the sensitivity analyses should also consider FERC guidelines or other applicable industry standards as potential methods for representing appropriate ranges for the sensitivity analyses. *Regarding the inundation study, Duke must provide adequate technical justification for the various input parameters used in the study. Regarding the sensitivity analyses, Duke must provide adequate technical justification for the selection of parameters to be varied and the range of variability for those parameters.*<sup>15</sup>

Thus, the NRC Staff requested Duke to identify and evaluate a comprehensive array of events that could cause failure of the Jocassee Dam.

During the NRC Staff's process of preparing the April 2009 Letter, NRC Staff member Melanie Galloway issued a Non-Concurrence, urging the Staff to request Duke to "consider more current information related to whether an overtopping event can occur at Jocassee Dam."<sup>16</sup> She also raised the concern that the draft letter "does not request that Duke answer questions on the seismic capability of the Jocassee Dam," and urged that [t]he seismic issue needs to be resolved before NRC can conclude that adequate protection against external flooding is provided."<sup>17</sup> Ms. Galloway further urged that the Staff's letter "should include the seismic

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<sup>15</sup> Letter from Joseph G. Giiter, NRC, to Dave Baxter, Duke Energy Carolinas, LLC, re: Evaluation of Duke Energy Carolinas, LLC (Duke) September 26, 2008, Response to Nuclear Regulatory Commission (NRC) Letter Dated August 15, 2008, Related to External Flooding at Oconee Nuclear Station, Units 1, 2, and 3 (Oconee) (TAC Nos. MD8224, MD8225, and MD8226) (Apr. 30, 2009) (ML090570779) ("NRC April 2009 Letter") (emphasis added). The NRC April 2009 Letter is cited at page 1 and note 2 of Mr. Mitman's Non-Concurrence.

<sup>16</sup> Non-Concurrence by Melanie Galloway at 2 (Apr. 6, 2009) (ML091170104) ("Galloway Non-Concurrence").

<sup>17</sup> *Id.* at 3.

questions that were conveyed at the December 4, 2008 meeting or refer to another communication with an indication that an adequate response is expected as part of our adequate protection determination.”<sup>18</sup>

The NRC reviewer, Mark Cunningham (NRR Division Director for the Division of Risk Analysis), did not discredit or reject Ms. Galloway’s concerns, but rather briefly summarized them, affirmed their validity, and stated that they would be addressed later:

1. I believe that the main points needing to be made in the document of concern were that:

- a. The probabilistic evaluation being performed by the licensee could not demonstrate that dam failure was an "incredible" event, and thus such a failure had to be considered in the licensee's response to the 50.54(f) letter.
- b. The licensee, therefore, had to perform deterministic evaluations of flood height. These had to consider a defensible range of key parameters affecting the predicted flood height.

*2. In my judgment, other issues noted in Ms. Galloway's non-concurrence statement could be addressed in subsequent correspondence. That is, I judged it more important that this letter be sent to make the points noted above, rather than further delay its issuance to include discussion of these other issues.*

*3. I have encouraged and will continue to encourage Ms. Galloway to communicate her thoughts on this challenging issue. I believe her thoughts will help NRC to make appropriate and defensible decisions.*<sup>19</sup>

Similarly, the NRC Staff’s more detailed Response to the Galloway Non-Concurrence concluded:

*The [April 2009] letter is intended to be a step in the resolution of this issue, as a final NRC decision has not been made on the adequacy of Oconee's external flood protection. The technical issues raised in the non-concurrence are either addressed above, or will be considered further during final resolution of this matter. Further action to resolve the overall issue is being led by the Division of Engineering. The document sponsor agrees*

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<sup>18</sup> *Id.* The Staff’s concerns regarding overtopping and seismic events were conveyed to Duke in a closed-door meeting on December 4, 2008, as documented in NRC Memorandum re: Summary of Closed 12.04.2008 Meeting to Discuss Duke’s September 26, 2008 Response to NRC’s, August 15, 2008, 50.54(f) Letter on External Flooding at ONS. (March 13, 2009) (ML090680737).

<sup>19</sup> *Id.*, cover sheet (emphasis added).

*with the non-concurring person's supervisor, that the appropriate issues can be addressed in subsequent correspondence.* Finally, in response to selected concerns in the non-concurrence, the letter has been modified to include a reference to FERC guidelines or other industry standards as potential methods to develop sensitivity analysis parameters; and the expectation that the schedule for technical resolution, including NRC review, is November 2009.<sup>20</sup>

While the April 2009 Letter requested Duke to address a range of factors that could cause failure of the Jocassee Dam, Duke responded by limiting its analysis of variations in reservoir levels to an assumed “sunny day” failure.<sup>21</sup> Mr. Mitman then submitted his Non-Concurrence, asserting that the reservoir levels evaluated by Duke were not “bounding,” and urging that:

Prior to accepting any inundation analysis results, Duke should be required, as the April 2009 letter stated, to conduct and submit additional sensitivity analysis varying Jocassee and Keowee Reservoir Levels up to and including a defensible most severe level.<sup>22</sup>

Between the spring of 2009 and early 2011, Mr. Mitman’s Non-Concurrence and Ms. Galloway’s Non-Concurrence raised essentially the same issue: that Duke had not conducted an adequate technical analysis to identify credible dam failure mechanisms, and should be required to submit more information. Yet, during this same time period, the NRC Staff’s response to the two Non-Concurrences changed dramatically. In late April 2009, in response to Ms. Galloway’s Non-Concurrence, the Staff accepted the validity of her concerns and said they would be addressed later. In late January 2011, in response to Mr. Mitman’s Non-Concurrence, the Staff rejected Mr. Mitman’s virtually identical concerns on their merits. Yet, as discussed above in Section A, the Staff provided no documented technical analysis in support of its changed position.

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<sup>20</sup> Document Sponsor Response to Non-concurrence on the Evaluation of Duke September 26, 2008 Response Related to External Flooding at Oconee at 2 (Apr. 27, 2009) (ML091170104) (emphasis added) (“NRC Staff Response to Galloway Non-Concurrence”).

<sup>21</sup> Mitman Non-Concurrence at 1.

<sup>22</sup> *Id.*

**C. Duke and the Staff Fail to Support their Claims that the Staff “Revisited” or “Reaffirmed” the Technical Basis for Mr. Leeds’ Assertion.**

The Staff asserts that a 2016 Investigative Report, prepared at the request of the NRC Chairman, “reaffirmed the Staff’s prior conclusion that the failure modes of seismic and overtopping of the Jocassee Dam were not credible.”<sup>23</sup> The Staff’s use of the word “reaffirmed” suggests that the Staff performed some additional analysis of those failure modes in 2016. But the 2016 Investigative Report contains no new mention of a previously unidentified document or any new analysis. Instead, it merely repeats what the Staff said in its Response to the Mitman Non-Concurrence. The Staff’s repetition of previous statements, without supplying any new documentation, does not provide the support that was missing in the first place.<sup>24</sup>

**III. CONCLUSION**

As demonstrated above, neither Duke nor the NRC Staff has provided the documentation requested by the ASLB for the NRC Staff’s 2011 assertion that the potential failure of the Jocassee Dam from either an overtopping event or a seismic event was not credible.

Respectfully submitted,

/signed electronically by/  
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<sup>23</sup> *Id.* at 3 (citing Investigative Report to the Chairman of the U.S. NRC Re: OSC File No. 01-15-5254 (June 2019) (“2016 Investigative Report”).

<sup>24</sup> For the same reason, Duke’s assertion that “[t]he technical basis was revisited using updated guidance and standards in Duke’s 2015 Flooding Hazard Reevaluation Report (“FHRR”)” (Duke Response at 2) is unpersuasive, because the original “technical basis” was never documented.

