



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

September 23, 2019

Dr. Peter Riccardella, Chairman  
Advisory Committee on  
Reactor Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: SUPPLEMENTAL RESPONSE TO THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS LETTER, "RESPONSE TO THE JULY 5, 2016, STAFF LETTER REGARDING 'INTERIM STAFF GUIDANCE JLD-ISG-2016-01 FOR FOCUSED EVALUATIONS AND INTEGRATED ASSESSMENTS OF REEVALUATED FLOODING HAZARDS,'" DATED OCTOBER 21, 2016

Dear Dr. Riccardella:

The purpose of this letter is to update the Advisory Committee on Reactor Safeguards (ACRS) on staff activities related to flooding focused evaluation<sup>1</sup> (FE) and integrated assessment<sup>2</sup> (IA) reports. As you are aware, the ACRS provided invaluable insights and support to the staff regarding Japan Lessons-Learned Division Interim Staff Guidance 2016-1, "Guidance for Activities Related to Near-Term Task Force Recommendation 2.1; Focused Evaluation and Integrated Assessment.", as detailed in Dr. Bley's letters dated May 18, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16130A453), and September 19, 2016 (ADAMS Accession No. ML16257A526). The staff addressed the ACRS recommendations in letters dated July 5, 2016 (ADAMS Accession No. ML16166A112), and October 21, 2016 (ADAMS Accession No. ML16286A040). This letter provides the ACRS with an update on recent staff activities and includes references to several flood impact assessment reports and corresponding U.S. Nuclear Regulatory Commission (NRC) staff assessments (when completed). The staff is providing this letter in lieu of conducting previously scheduled briefings for reasons similar to those noted in an earlier letter regarding seismic probabilistic risk assessments, dated April 9, 2019 (ADAMS Accession No. ML19053A532). This approach was discussed with the Executive Director, ACRS contemporaneously with the April 9, 2019, letter.

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<sup>1</sup> A focused evaluation is the appropriate assessment to be used when a licensee can address the unbounded flood mechanism(s) at a site using Path 1, Path 2 and/or Path 3 of the Flooding Impact Assessment Process (FIAP) of Nuclear Energy Institute (NEI) guidance document NEI 16-05, "External Flooding Assessment Guidelines."

<sup>2</sup> A full-scope integrated assessment is required when a licensee must address the unbounded flood mechanism(s) at a site using Path 4 and/or Path 5 of NEI 16-05.

In Dr. Bley's September 19, 2016, letter, he noted that the ACRS would appreciate briefings on the staff's reviews of:

- Two or three sites that perform Path 3<sup>3</sup> focused evaluations of local intense precipitation (LIP) and for which key equipment is not effectively protected against the flood (i.e., which require additional considerations to mitigate the flooding damage). To better understand the Path 3 evaluations and their reviews, it is preferable that these sites do not need a Path 4<sup>4</sup> or Path 5<sup>5</sup> integrated assessment for other flooding mechanisms.
- Two or three sites that perform a Path 4 or Path 5 integrated assessment. At least one of those sites should include a Path 5 scenario-based evaluation.
- At least one site with a targeted hazard mitigating strategy<sup>6</sup> that does not maintain all three intended plant safety functions (i.e., core cooling, containment, and spent fuel cooling).

In addition to the resource challenges noted by the staff in our April 9, 2019, letter, the staff is still working to evaluate the flood impact assessments that have been received. In the staff's response on October 21, 2016, we stated that the staff anticipates receiving focused evaluation submittals in the middle of calendar year 2017 and IA submittals by the end of calendar year 2018. Those anticipated schedules have slipped, and to date we have received 4 of the 6 anticipated integrated assessments and 41 of the 45 anticipated focused evaluations. Since these assessments are being received later than previously anticipated, these assessments will need to be addressed with diminished staff resources.

It is through this lens of increased workload and diminishing staff resources that the staff re-looked at the underlying issue for the requested full-day (or longer) ACRS briefing. We understand that the ACRS's original interest was to better understand how the site-specific evaluations are performed in practice (with a particular emphasis on Path 3 evaluations) and the staff's considerations during their review.

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<sup>3</sup> Path 3 (demonstrate a feasible response to local intense precipitation (LIP)) is limited to circumstances where LIP is an unbounded flood mechanism. The objective of a Path 3 evaluation is to demonstrate a feasible response to LIP.

<sup>4</sup> Path 4 (demonstrate effective mitigation) is used when an unbounded mechanism, other than LIP, is not resolved through the implementation of flood protection features alone. The objective of Path 4 is to define the strategy for maintaining key safety functions (KSF) for the unbounded flood mechanism being evaluated and assess its effectiveness by demonstrating that flood mitigation features are reliable and flood mitigation response is adequate.

<sup>5</sup> Path 5 is a scenario-based approach. The overall goal of this evaluation is to demonstrate that scenarios with consequential flooding and higher frequencies of occurrence had an effective flood strategy. For scenarios with lower frequencies of occurrence, the goal is to demonstrate that a feasible response strategy is available to mitigate the effects of extreme flood conditions.

<sup>6</sup> A targeted-hazard mitigating strategy (THMS), as discussed in NEI 12-06, Appendix G, "Mitigating Strategies Assessment for New Flood Hazard Information," does not maintain or restore the KSF of containment integrity but will use the opening of containment as an element of the strategy. A justification for defeating the containment capability should be provided.

The staff has received the majority of the FEs and IAs. As noted in the first bullet summarizing the topics of interest, the ACRS was interested in any Path 3 focused evaluations for sites that did not need a corresponding Path 4 or 5 integrated assessment. Only one licensee performed an FE using Path 3. However, that licensee also implemented a site change which ensured effective flood protection for LIP, without reliance on mitigating strategies (i.e., Path 2). One other licensee utilized Path 3 to address LIP, but that was included with their Path 5 IA for other flooding mechanisms. Based on the staff's interactions with licensees that have not yet submitted their evaluations, no other sites are expected to utilize Path 3. Therefore, no staff evaluations meet the preferred criteria in the ACRS request.

Regarding the briefings discussed in the second and third bullets: Six sites are expected to complete a Path 4 or Path 5 IA. To date, three sites have completed a Path 5 integrated assessment, and the staff has completed its review of two of those assessments. Only one site opted to perform a targeted hazard mitigation strategy and a corresponding Path 4 IA. The staff review of that IA is not complete.

The staff no longer intends to provide a day-long briefing on FEs. With a limited number of assessments which meet the desired criteria expressed by the ACRS, we are instead providing the enclosed listing of the FE and IA reports, with the corresponding ADAMS accession numbers. In reaching this determination, the staff considered the precedent that was set by the April 9, 2019, letter related to similar briefings for seismic probabilistic risk assessments. As was done for the seismic probabilistic risk assessment reports, the staff is providing this listing of reports and assessments as an alternative to the briefings committed to under different circumstances. Consistent with Commission direction in the staff requirements memorandum to SECY-16-0142, "Final Rule: Mitigation of Beyond-Design-Basis Events" (ADAMS Accession No. ML19023A038), the staff intends to expeditiously close the remaining post-Fukushima activities and no further interaction with the ACRS is anticipated on these issues.

The staff appreciates the previous interactions with the ACRS which have supported the staff in performing an efficient and effective review of these matters.

The staff looks forward to interactions with the ACRS on other regulatory issues. If you have any questions, please contact Brett Titus at 301-415-3075 or [Brett.Titus@nrc.gov](mailto:Brett.Titus@nrc.gov).

Sincerely,

***/RA Eric Benner for/***

Ho K. Nieh, Director  
Office of Nuclear Reactor Regulation

Enclosure:  
Listing of Flood  
Impact Assessment Reports

cc: Chairman Svinicki  
Commissioner Baran  
Commissioner Caputo  
Commissioner Wright  
SECY

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**ADAMS Accession No.: ML19255E641**

**\*via e-mail**

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## **Flooding Impact Assessment Reports**

In Dr. Bley's September 19, 2016, letter (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16257A526), he noted that the Advisory Committee on Reactor Safeguards (ACRS) would appreciate briefings on the staff's reviews of three topic areas. Each of these areas is discussed below, with appropriate references to the applicable accession numbers in ADAMS. When the information is publicly available, a link is provided to the public document.

- Two or three sites that perform a Path 4 or Path 5 integrated assessment. At least one of those sites should include a Path 5 scenario-based evaluation. The two integrated assessments (with associated staff response) below contain Path 5 scenario-based evaluations for at least one flood causing mechanism.

### **Dresden Nuclear Power Station, Units 2 and 3**

For local intense precipitation (LIP), the licensee is pursuing Path 2 in order to confirm that they have adequately demonstrated that effective flood protection is provided for the unbounded mechanism. For riverine flooding, including failure of upstream dams, the licensee is pursuing Path 5, a scenario-based approach.

Flood Hazard Integrated Assessment Report: September 8, 2017 – ADAMS Accession No. ML17251A365  
(<https://www.nrc.gov/docs/ML1725/ML17251A365.pdf>)

Staff Assessment of Flood Hazard Integrated Assessment: March 6, 2019 – ADAMS Accession No. ML18138A385  
(<https://www.nrc.gov/docs/ML1813/ML18138A385.pdf>)

### **Quad Cities Nuclear Power Station Units 1 and 2**

For LIP, the licensee adequately demonstrated that effective flood protection is provided (Path 2). For the combined event flood, the licensee used a scenario-based approach (Path 5).

Flood Hazard Integrated Assessment Report: June 29, 2018 – ADAMS Accession No. ML18180A033. This report is non-public because it contains Sensitive Unclassified Non-Safeguards Information (SUNSI).

Staff Assessment of Flood Hazard Integrated Assessment: August 29, 2019 – ADAMS Accession No. ML19168A196  
(<https://www.nrc.gov/docs/ML1916/ML19168A196.pdf>)

- At least one site with a targeted hazard mitigating strategy that does not maintain all three intended plant safety functions (i.e., core cooling, containment, and spent fuel cooling). Cooper is the only site that chose to develop a targeted hazard mitigating strategy.

### **Cooper Nuclear Station**

Flood Hazard Mitigation Strategies Assessment: December 12, 2017 – ADAMS Package Accession No. ML17355A110

(<https://www.nrc.gov/docs/ML1735/ML17355A110.pdf>). Attachment 2 of the report is non-public (ADAMS Accession No. ML17355A144) because it contains security-related information. A publicly-available redacted version of attachment 2 can be found at ADAMS Accession No. ML17355A143 (<https://www.nrc.gov/docs/ML1735/ML17355A143.pdf>). *Note that* this submittal replaced in its entirety an earlier version submitted by letter dated April 27, 2017 (ADAMS Package Accession No. ML17125A328, non-public).

Flood Hazard Mitigating Strategies Assessment Staff Assessment: June 27, 2018 - ADAMS Package Accession No. ML18040A653 (Non-Public). The non-redacted version of the staff assessment is non-public (ADAMS Accession No. ML18040A654) because it contains Critical Energy Infrastructure Information (CEII). A publicly-available redacted version can be found at Accession No. ML18045A052 (<https://www.nrc.gov/docs/ML1804/ML18045A052.pdf>)

Flooding Integrated Assessment Report: December 18, 2018 – ADAMS Package Accession No. ML18365A102 (Non-Public). The enclosure of the report is non-public (ADAMS Accession No. ML18365A090) because it contains security-related information. The cover letter (ADAMS Accession No. ML18365A088) is publicly available (<https://www.nrc.gov/docs/ML1836/ML18365A088.pdf>).

Revised Flooding Integrated Assessment Report: July 18, 2019 – ADAMS Package Accession No. ML19211C046 (Non-Public). The attachment and enclosures of the report are non-public (ADAMS Accession Nos. ML19211C016, ML19211C018, and ML19211C021) because they contain security-related information. The cover letter (ADAMS Accession No. ML19255G789) is publicly available (<https://www.nrc.gov/docs/ML1925/ML19255G789.pdf>).

The staff has not completed our evaluation of this integrated assessment.

- Two or three sites that perform Path 3 focused evaluations (FE) of LIP. It is preferable that these sites do not need a Path 4 or Path 5 integrated assessment (IA) for other flooding mechanisms. Only two sites performed a Path 3 evaluation as noted below:

### **Point Beach Nuclear Plant, Units 1 and 2**

The approach outlined in the Point Beach FE included reliance on mitigation strategies to address the unbounded LIP flood hazard (i.e., a Path 3 assessment). The licensee also provided a regulatory commitment to provide flood protection for the Train B emergency diesel generator exhaust stacks to ensure availability of emergency alternating current power during a LIP event. 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 (i.e., Path 2).

Flood Hazard Focused Evaluation: June 22, 2017, letter - ADAMS Accession No. ML17173A082 (<https://www.nrc.gov/docs/ML1717/ML17173A082.pdf>).

Flood Hazard Focused Evaluation Staff Assessment: May 30, 2018 - ADAMS Accession No. ML18136A700 (<https://www.nrc.gov/docs/ML1813/ML18136A700.pdf>).

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

The licensee has chosen a Path 3 evaluation to demonstrate a feasible response to LIP. In addition, the licensee also used a scenario-based approach (i.e., Path 5) to address the streams and rivers probable maximum flood with combined effects. The staff has not completed our evaluation of this IA.

Flooding Integrated Assessment Report: December 19, 2018 – ADAMS Package Accession No. ML18360A154 (Non-Public). Enclosures 1-3 of the report are non-public (ADAMS Accession No. ML18355A970) because they contain SUNSI. The cover letter (ADAMS Accession No. ML18353A435) is publicly available (<https://www.nrc.gov/docs/ML1835/ML18353A435.pdf>).