

NRR-DMPSPeM Resource

From: Mahoney, Michael
Sent: Thursday, October 11, 2018 1:05 PM
To: 'Hentz, Lee A'
Cc: Hutchison, Bill 'Hutch'; Jeff Thomas (Jeff.Thomas@duke-energy.com)
Subject: Request for Additional Information - McGuire Nuclear Station, Units 1 and 2 - TORMIS LAR (EPID L-2017-LLA-0412)

Lee,

By letter dated December 8, 2017, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17352A404, as supplemented by letter dated July 3, 2018 (ADAMS Accession No. ML18191B151), Duke Energy Carolinas, LLC. (Duke, the licensee), requested changes to the McGuire Nuclear Station (McGuire), Units 1 and 2, Updated Final Safety Analysis Report (UFSAR). The proposed amendment will revise the McGuire licensing bases for protection from tornado-generated missiles.

The NRC staff issued requests for additional information (RAIs) by email dated May 18, 2018 (ADAMS Accession No. ML18138A466), requesting additional details to address identified areas needed to complete the technical review and the licensee replied to these RAIs by letter dated July 3, 2018. It is not apparent how the RAI responses have addressed or provided sufficient clarity to address the staff's RAI concerns.

The NRC regulations require nuclear power plants to be designed to withstand the effects of tornado and high-wind-generated missiles so as not to adversely impact the health and safety of the public in accordance with the requirements of General Design Criterion (GDC) 2, "Design Bases for Protection against Natural Phenomena," and GDC 4, "Environmental and Dynamic Effects Design Bases," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities."

Regulatory Guide (RG) 1.117, "Protection Against Extreme Wind Events and Missiles for Nuclear Power Plants," Revision 1, includes a minimum list of systems, structures, and components (SSCs), which together with their foundations and supports, should be protected from the extreme wind events, including generated missiles, without loss of capability to perform their safety functions. This list specifically refers to Control Room to be protected as follows and RG 1.117 states, in part:

7. the control room, including all equipment needed to maintain the control room within safe habitability limits for personnel and safe environmental limits for tornado- protected equipment.

TORMIS methodology is approved by NRC (ADAMS Accession No. ML080870291) to allow an alternate approach to resolve unprotected components in noncompliance with current licensing basis. In accordance with Regulatory Issue Summary (RIS) 2008-14, "Use of Tormis Computer Code for Assessment of Tornado Missile Protection," the TORMIS methodology is an NRC-approved method for addressing identified deficiencies in complying with a plant's current licensing basis for tornado missile protection. It provides licensees the option of revising the plant's licensing basis for tornado missile protection from a purely deterministic methodology to one that includes limited use of a probabilistic approach.

The NRC staff has reviewed the application and, based upon this review, determined that additional information is needed to complete our review. Please provide a response on the docket within 30 days of this correspondence.

Request for Additional Information (RAI)-07

In its letters dated December 8, 2017 and July 3, 2018, the licensee stated that portions of the Main Steam System are included in the TORMIS analysis. Certain structures, systems, and components (SSCs) in the Main Steam System are not fully protected against tornado-missile hazard as described in the current licensing basis. UFSAR Section 3.1 Criterion 2 states that SSCs designated Category I are designed to withstand, without loss of function, the most severe natural phenomena on record for the site with appropriate margins included in the design for uncertainties in historical data.

In response to RAI 6a, the licensee defines failure criteria specifying three of four main steam lines are required for shutting down the plant, which is used to justify the logic used in TORMIS. NRC staff questions if the licensing basis requires protection of three (of four) main steam lines against tornado missiles. It appears that the licensee is relying on the adequacy of plant response (i.e., accident mitigation) in the event of tornado missiles affecting one main steam line to determine the (Boolean) event logic in TORMIS as opposed to the approach for considering the probability of damage to unprotected SSCs as found in RIS 2008-14 and Standard Review Plan, Section 2.2.3.

Please demonstrate that McGuire's current licensing basis requires protection of three out of four main steam lines against tornado missiles to maintain functional capability. Alternatively, provide TORMIS results assuming any main steam line hit is considered a failure and show that the results meet the acceptance guidelines.

RAI-08

As stated in the licensee's December 8, 2017 and July 3, 2018, letters, the Control Room Area Ventilation System (VC/YC) outside air intakes are included in the post-TORMIS analysis. These components are not fully protected and are not part of the current licensing basis for tornado missile protection. The licensee has chosen to analyze these components by combining VC/YC and Spent Fuel Pool (SFP) in post-TORMIS analysis. As indicated in the licensee's response to RAI 6 in its July 3, 2018, letter, some failure induced in post-TORMIS Boolean logic results in a loss of safety function for McGuire, Units 1 and 2, simultaneously.

TORMIS is used to justify probability of strike or failure of nonconforming SSCs is sufficiently low not require protection. The licensee defines unprotected SSCs as acceptable and screens for inclusion in TORMIS analysis. The licensee uses Boolean logic and defines or justifies Loss of Function for VC/YC as acceptable scenarios without use of TORMIS to validate overall low probability of component failure. As seen in Table 8 of the licensee's July 3, 2018, letter, loss of both units VC/YC (Combination 6) is a relatively large contributor to overall failure frequency but treated as acceptable failure combination. This is reflected as "Survive" in Table 8 of Attachment 1 of the RAI response.

In its July 3, 2018 letter, on page 34, the licensee states:

As documented in the MNS UFSAR, the analyzed tornado missile accident postulates a tornado missile penetrating the North end of one of the Spent Fuel Pool Buildings and rupturing spent fuel assemblies in Region 2 of the Spent Fuel Pool. In the worst case scenario of this accident, only one of four VC/YC Air Intakes remains intact to provide air intake to the Control Room filtration system (VC). Despite this worst case scenario, the resulting doses to the Control Room are well within the 10 CFR 50.67 limits.

In addition to loss of function, failure of all VC/YC, as indicated, is beyond worst case scenario.

The NRC staff requests the following:

- a. Please provide the basis for use of Boolean combinations that classify loss of safety function (i.e. Item 6, Control Room), as a system success and/or acceptable configuration. Provide justification or licensing basis for acceptability of loss of function (beyond worst case scenario) and its impact on overall safety.
- b. Please provide discussion on impact of the overall TORMIS results with YC/VC loss of function failure in both Units during a single Tornado event. Also, provide justification or licensing basis that reflects acceptable YC/VC loss of function failure in both Units.

Once this email is added to ADAMS, I will provide the accession number for your reference.

Thanks
Mike

Michael Mahoney

McGuire and Catawba Project Manager, Division of Operating Reactor Licensing

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