NRR-PMDAPEm Resource

From: Jackson, Diane
Sent: Tuesday, August 25, 2015 11:19 AM
To: Shams, Mohamed
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Subject: FITZPATRICK NUCLEAR POWER PLANT - TECHNICAL REVIEW CHECKLIST RELATED TO INTERIM ESEP SUPPORTING IMPLEMENTATION OF NTTF R2.1, SEISMIC (TAC NO. MF5242)
Attachments: Fitzpatrick R2.1 Seismic ESEP NRC review.docx

August 25, 2015

MEMORANDUM TO: Mohamed K. Shams, Chief
Hazards Management Branch (JHMB)
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

FROM: Diane T. Jackson, Chief
Geosciences and Geotechnical Engineering Branch 2 (RGS2)
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SUBJECT: FITZPATRICK NUCLEAR POWER PLANT - TECHNICAL REVIEW CHECKLIST RELATED TO INTERIM EXPEDITED SEISMIC EVALUATION PROCESS SUPPORTING IMPLEMENTATION OF NTTF RECOMMENDATION 2.1, SEISMIC, RELATED TO THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT (TAC NO. MF5242)

The NRC technical staff working through the Geosciences and Geotechnical Engineering Branches 1 and 2 (RGS1 and RGS2) completed the Technical Review Checklist of the FITZPATRICK NUCLEAR POWER PLANT response to Enclosure 1, Item (6) of the March 12, 2012, request for information letter issued per Title 10 of the Code of Federal Regulations, Subpart 50.54(f), to power reactor licensees and holders of construction permits requesting addressees to provide further information to support the NRC staff's evaluation of regulatory actions to be taken in response to Fukushima Near-Term Task Force (NTTF) Recommendation 2.1: Seismic which implements lessons learned from Japan's March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami. This addresses the staff review of the interim Expedited Seismic Evaluation Process (ESEP) report in response to Requested Item (6) of Enclosure 1, "Recommendation 2.1: Seismic," of the 50.54(f) letter. Attached is a file containing the technical review checklist to prepare a response letter to the licensee.

The NRC staff reviewed the information provided and, as documented in the enclosed staff checklist, determined that sufficient information was provided to be responsive to this portion of the Enclosure 1 of the 50.54(f) letter. The application of this staff review is limited to the interim ESEP as part of NTTF R2.1: Seismic activities.

This electronic memo constitutes the DSEA concurrence provided that only editorial changes are made to the staff assessment that would not affect the technical conclusions or technical context of the assessment.

This concludes the NRC's efforts associated with TAC NO. MF5242 for the review of the interim ESEP report for the FITZPATRICK NUCLEAR POWER PLANT.

Docket No: 50-333

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TECHNICAL REVIEW CHECKLIST

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO EXPEDITED SEISMIC EVALUATION PROCESSINTERIM EVALUATION

IMPLEMENTING NTTF RECOMMENDATION 2.1 SEISMIC

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 050-333

By letter dated March 12, 2012 (USNRC, 2012a), the U.S. Nuclear Regulatory Commission (NRC) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f) "Conditions of License" (hereafter referred to as the "50.54(f) letter"). Enclosure 1 of the 50.54(f) letter requests addressees to reevaluate the seismic hazard at their site using present-day methods and guidance for licensing new nuclear power plants, and identify actions to address or modify, as necessary, plant components affected with the reevaluated seismic hazards. Requested Information Item (6) in Enclosure 1 to the 50.54(f) letter requests addressees to provide an interim evaluation and actions taken or planned to address a higher seismic hazard relative to the design basis, as appropriate, prior to completion and submission of the seismic risk evaluation.

Additionally, by letter dated April 12, 2013[1], the Electric Power Research Institute (EPRI) staff submitted EPRI TR 3002000704 "Seismic Evaluation Guidance: Augmented Approach for the Resolution of Fukushima Near-Term Task Force (NTTF) Recommendation 2.1: Seismic" (hereafter referred to as the guidance). The Augmented Approach proposed that licensees would use an Expedited Seismic Evaluation Process (ESEP) to address the interim actions as requested by Information Item (6) in the 50.54(f) letter. The ESEP is a simplified seismic capacity evaluation with a focused scope of certain key installed Mitigating Strategies equipment that is used for core cooling and containment functions to cope with scenarios that involve a loss of all AC power and loss of access to the ultimate heat sink to withstand the Review Level Ground Motion, which is up to two times the safe shutdown earthquake (SSE). Due to the expedited and interim nature of the ESEP, the assessment does not include many considerations that are part of a normal risk evaluation.These deferred items, include but are not limited to, structures, piping, non-seismic failures, and operator actions, as well scenarios such as addressing loss of coolant accidents. By letter dated May 7, 2013[2], the NRC staff endorsed the guidance. Central and eastern United States licensees with a reevaluated seismic hazard exceeding the SSE submitted an ESEP interim evaluation in December 2014

Consistent with the interim nature of this activity, the staff performed the review of the licensee's submittal to assess whether the intent of the guidance was implemented. A multi-disciplined team checked whether the identified methods were consistent with the guidance. A senior expert panel reviewed the team's questions, if any, and checklist for consistency and scope. New or updated parameters (e.g., In-Structure Response Spectra, High Confidence of Low Probability of Failure calculations) presented by the licensees were assessed only based on licensee statements for acceptability for the Item (6) response. The application of this staff review is limited to the ESEP interim evaluation as part of NTTF R2.1: Seismic activities.

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1 ADAMS Accession No. ML13102A142

2 ADAMS Accession No. ML13106A331

Technical Review Checklist for James A. Fitzpatrick Nuclear Power Plant

By letter dated December 30, 2014[3], Entergy (the licensee) provided an Expedited Seismic Evaluation Process (ESEP) report in a response to Enclosure 1, Requested Information Item (6) of the 50.54(f) letter, for the James A. Fitzpatrick Nuclear Power Plant (JAF).

I. Review Level Ground Motion

The licensee: • described the determination of the review level ground motion (RLGM) using one of the means acceptable by the guidance • identified location of the control point and is consistent with March 2014 seismic hazard and screening report submittal • compared the site ground motion response spectra used to select the ESEP RLGM to the SSE.	Yes Yes Yes
JAFused a scaled SSE at a ratio of 1.55	
Notes from the Reviewer: None **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	
The NRC staff concludes: • the licensee's RLGM meets the intent of the guidance • the RLGM is reasonable for use in the interim evaluation	 Yes Yes

II. Selection of the Success Path

The licensee: • described the success path • described normal and desired state of the equipment for the success path • ensured that the success path is consistent with the plant's overall mitigating strategies approach or provided a justification for an alternate path • stated that the selection process was in accordance with the guidance or meets the intent of the guidance • used installed FLEX Phase 1 equipment as part of the success path • included FLEX Phase 2 and/or 3 connections • considered installed FLEX Phase 2 and/or 3 equipment	 Yes Yes Yes Yes Yes Yes Yes
Notes from the Reviewer: • The staff noted that the licensee provided an overall integrated plan 6-month update for its FLEX strategies on February 27, 2015. This update indicated that its Core Cooling FLEX strategies were being revised and it appeared the revisions were significant. Thus, the staff asked the licensee for confirmation that the success path assessed in its ESEP report dated December 30, 2014, was not impacted. By letter dated, August 4, 2015 (ML15216A626), the licensee responded by stating that changes to FLEX strategy are made consistent with NEI guidance 12-06, 12-02, and 13-02 to meet NRC Orders EA-12-049, EA-12-051, and EA-13-109 and as required, updated information is submitted on these NRC orders in 6 month status reports. The licensee indicated that the ESEP report and ESEL was a one-time commitment and that any changes to these commitments are handled through the commitment change process, which includes	

3 ADAMS Accession No. ML15005A234

informing the NRC if required. The licensee's response did not provide direct confirmation as to whether the proposed revision to its core cooling FLEX strategies impacts the ESEP report dated December 30, 2014. However, the staff acknowledges the licensee's ESEP assessed the main pieces of equipment in one success path to demonstrate that it can be relied upon to provide the core cooling safety function following a RLGM seismic event. The staff notes that this is an acceptable approach because of the interim nature of the ESEP. The staff finds that the licensee response met the intent of the guidance for this interim evaluation. **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	
The NRC staff concludes that: • the selected success path is reasonable for use in the interim evaluation • the licensee considered installed Phase 2 and 3 connections or equipment in the interim evaluation.	Yes Yes

III. Selection of the Equipment List

The licensee: • developed and provided the ESEL by applying the ESEP • identified equipment considering the following functions: o Core cooling (with focus on Mode 1) function o Available, sustainable water source o Containment function and integrity	Yes Yes Yes Yes
Notes from the Reviewer: None **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	
<u>For PWR Plants ONLY</u> The licenseeincluded indicators / instrumentation for the following functions: level, pressure, temperature, that would be indicative of (but not explicitly identified to specific instruments): water level of the steam generator (SG), pressure of SG, containment, and reactor coolant system (RCS); and temperature of the RCS.	N/A
<u>For BWR Plants ONLY</u> The licenseeconsidered indicators for the following functions: level, pressure, temperature that would be indicative of (but not explicitly identified to specific instruments): Temperature of suppression pool, RCS, containment); Pressure of suppression pool, RCS, and drywell; water level of the suppression pool.	Yes

Notes from the Reviewer:

- The staff requested clarificationregarding whether HCLFP evaluations will be performed when those "non-portable" FLEX components are installed in the future. In the response letter (ML15216A626), the licensee explained that any new "non-portable" FLEX components will be designed and installed per the guidance of NEI 12-06. The staff finds that the licensee response adequate due to the interim nature of the ESEP.

- The staff requested the licensee to explain why certain components are not included in the ESEL. In its response letter(ML15216A626), the licensee explained that as a result of the timing of NRC Order EA-13-109, the ESEL did not include components for the Hardened Containment Vent. Performance of the ESEP and ESEL was a one-time commitment and any changes to these commitments are handled through the commitment change process, which includes informing the NRC if required. The staff finds that the licensee responses adequate due to the interim nature of the ESEP.

Deviation(s) or Deficiency(ies), and Resolution:

- No deviations or deficiencies were identified

Through a sampling of the ESEP key components, the NRC staff concludes that:	
• the licensee's process to develop the ESEL meets the intent of the guidance for the interim evaluation	Yes
• the desired equipment state for the success path were identified	Yes
• the licensee considered the support equipment for the ESEL	Yes
• both front-line and support systems appeared to be included in the ESEL as evidenced by inclusion of SSCs on the success path and of support systems (e.g., batteries, motor control centers, inverters).	Yes

IV. Walkdown Approach

The licensee:	
• described the walkdown screening approach, including walkbys and walkdowns performed exclusively for the ESEP, in accordance with the guidance	Yes
• credited previous walkdown results, including a description of current action(s) to verify the present equipment condition and/or configuration (e.g., walk-bys), in accordance with the guidance	Yes
• stated that the walkdown was performed by seismically trained personnel	Yes

Notes from the Reviewer: None

Deviation(s) or Deficiency(ies), and Resolution:

- No deviations or deficiencies were identified

The licensee:	
• described, if needed, adverse material condition of the equipment (e.g., material degradation)	Yes
• credited previous walkdown results, included a description of current action(s) to verify the present equipment condition (e.g., walk-bys), meeting the intent of the guidance	Yes

The licensee: • described the conditions of structural items considered for the interim evaluation, including: o spatial interactions (i.e., interaction between block walls and other items/components) o anchorage o piping connected to tanks (i.e., differential movement between pipes and tanks at connections)	 Yes Yes Yes
Notes from the Reviewer: None **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	
The licensee reported nodeviations forJAF. If deviations were identified, there is a discussion of how the deficiencies were or will be addressed in the ESEP submittal report.	 N/A
The NRC staff concludes that: • the licensee described the performed walkdown approach, including any credited previous efforts (e.g.,Individual Plant Examination of External Events (IPEEE)) consistent with the guidance • the licensee addressed identified deviations consistent with the guidance, if any	 Yes N/A

V. Capacity Screening Approach and High Confidence/Low Probability of Failure (HCLPF) Calculation Results

The licensee: • described the capacity screening process for the ESEL items, consistent with the guidance (e.g., use of EPRI NP-6041 screening table). • presented the results of the screened-out ESEL items in the ESEP report • described the development of in-structure response spectra (ISRS) based on scaling • described the development of ISRS based on new analysis consistent with the guidance • described the method for estimating HCLPF capacity of screened-in ESEL items, including both structural and functional failure modes consistent with the guidance: o use of Conservative Deterministic Failure Margin (CDFM) o use of fragility analysis (FA) o use of experience data or generic information • credited IPEEE spectral shape for HCLPF capacity estimates is similar to or envelopes the RLGM, and anchored at the same control point • presented the results of HCLPF capacities including associated failure modes for screened-in ESEL items • reviewed the ESEL items with the lowest HCLPF values to ensure that their capacities are equal or greater than the RLGM	 Yes Yes Yes N/A Yes Yes N/A Yes Yes Yes Yes
Notes from the Reviewer:	

• The staff requested clarification regarding the method used for screening items located at elevations beyond 40 ft above grade. In its response (ML15216A626), the licensee stated that three components are located more than 40 ft above grade and that these components were judged by the seismic review team (SRT) to be adequate for local accelerations as determined by scaled in-structure response spectra and was noted on walkdown forms for the subject components, which is acceptable to the staff. The staff finds that the licensee response addressed the concern and met the intent of the guidance for this interim evaluation. • The staff requested clarification regarding ESEP Report Section 5.2 statement concerning the development of verticalISRS, "The vertical direction RLGM ISRS is obtained by scaling the vertical amplified ground response spectrum." In its response(ML15216A626), the licensee acknowledged that the quoted text is not consistent with the approach used in the evaluation of ESEL components for the RLGM ISRS and stated that the approach used to develop the vertical ISRS will be clarified in the next revision to the ESEP report when the inaccessible items are evaluated for the RLGM. The staff finds the licensee's response acceptableand met the intent of the guidance for this interim evaluation. **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	
The NRC staff concludes that: • the licensee described the implementation of the capacity screening process consistent with the intent of the guidance • the licensee presented capacity screening and calculation results, as appropriate, in the ESEP report • the method used to develop the ISRS is consistent with guidance for use in the ESEP • for HCLPF calculations, the licensee used HCLPF calculation methods as endorsed in the guidance • no anomalies were noted in the reported HCLPF	Yes Yes Yes Yes Yes

VI. Inaccessible Items

The licensee: • provided a list of inaccessible items • provided a schedule of the planned walkdown and evaluation for all inaccessible items • provided Regulatory Commitment to complete walkdowns.	Yes Yes Yes
JAF will complete walkdownsof the 44 inaccessible items bythe end of the first planned refueling outage after December 31, 2014 (scheduled for September 2016).	

Notes from the Reviewer: • In the response (ML15216A626), the licensee updated its commitments and stated the inaccessible items will be walkdownby the end of the first planned JAF refueling outage after December 31, 2014. In addition, any HCLPF calculation for the innaccesible items would be generated no later than 90 days following the aforementioned outage. **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	
The NRC staff concludes that the licensee: • listed inaccessible items • committed to provide the results (e.g., walkdowns, walkbys, etc.) of the remaining inaccessible items consistent with the guidance • substitutions, if needed, were appropriately justified	Yes Yes N/A

VII. Modifications to Plant Equipment

The licensee: • identified modifications for ESEL items necessary to achieve HCLPF values that bound the RLGM (excluding mitigative strategies equipment (FLEX)), as specified in the guidance • provided a schedule to implement such modifications (if any), consistent with the intent of the guidance • provided Regulatory Commitment to complete modifications • provided Regulatory Commitment to report completion of modifications.	No Yes Yes Yes
The licenseewill: • complete modifications, if any, for inaccessible items by the end of the second planned refueling outage after December 31, 2014. • submit a letter summarizing the HCLPF results and confirming implementation of the plant modifications within 60 days following completion of JAF ESEP activities.	
Notes from the Reviewer: • No modifications were identified from the ESEP at the time that the report was submitted. However, JAF identified 44 inacessible items which the licensee committed to complete modifications, if any, by the end of the second planned refueling outage after December 31, 2014. • The staff requested clarification regarding the submittal of a supplemental letter reflecting the results related to inaccessible items when completed. In its response (ML15216A626), the licensee commited to submit a letter to the NRC within 60 days following completion of the ESEP activities summarizing the JAF HCLPF results and confirming implementation of any plant modification. The staff finds that the licensee response addressed the concern and met the intent of the guidance for this interim evaluation. **Deviation(s) or Deficiency(ies), and Resolution:** • No deviations or deficiencies were identified	

The NRC staff concludes that the licensee: • identified plant modifications necessary to achieve the target seismic capacity • provided a schedule to implement the modifications (if any) consistent with the guidance	N/A Yes

VIII. Conclusions:

The NRC staff assessed the licensee's implementation of the ESEP guidance. Due to the interim applicability of the ESEP evaluations, use of the information for another application would require a separate NRC review and approval. Based on its review, the NRC staff concludes that the licensee's implementation of the interim evaluation meets the intent of the guidance. The staff concludes that, through the implementation of the ESEP guidance, the licensee identified and evaluated the seismic capacity of certain key installed Mitigating Strategies equipment that is used for core cooling and containment functions to cope with scenarios that involve a loss of all AC power and loss of access to the ultimate heat sink to withstand a seismic event up to the Review Level Ground Motion (RLGM). In the case of JAF, in accordance with the guidance, the RLGM used a scaled SSE at the ratio of 1.55. The application of this staff review is limited to the ESEP interim evaluation as part of NTTF R2.1: Seismic activities. The licensee did not identify safety enhancing modifications at the time of issuance of their ESEP report. For the inaccessible items, the licensee committed to perform seismic walkdowns andgenerateHCLPFcalculationsno later than 90 days following the next planned refueling outage after December 31, 2014; anddesignandimplementanynecessarymodificationsno later than by the end of the second planned refueling outage after December 31, 2014. Additionally, in its response (ML15216A626), the licensee commited to submit a summary letter to the NRC with the results, confirm implementation of modifications (if any),and clarify the development of the vertical ISRS within 60 days following completion of JAF ESEP activities.

In summary, the licensee, by implementing the ESEP interim evaluation, has demonstrated additional assurance which supports continued plant safety while the longer-term seismic evaluation is completed to support regulatory decision making. The NRC staff concludes that the licensee responded appropriately to Enclosure 1, Item (6) of the 50.54(f) letter, dated March 12, 2012, for James A. Fitzpatrick Nuclear Power Plant,Unit 1.

Principle Contributors:
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