



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-13-123

December 2, 2013

10 CFR 50.54(f)

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

Browns Ferry Nuclear Plant, Units 1, 2, and 3
Facility Operating License Nos. DPR-33, DPR-52, and DPR-68
NRC Docket Nos. 50-259, 50-260, and 50-296

Subject: Tennessee Valley Authority (TVA) - Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding the Browns Ferry Nuclear Plant Seismic Walkdown Results of Recommendation 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident

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 (ML12053A340)
2. NRC Letter, "Endorsement of Electric Power Research Institute (EPRI) Draft Report 1025286, "Seismic Walkdown Guidance," dated May 31, 2012 (ML12145A529)
3. TVA Letter to NRC, "Tennessee Valley Authority - Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding the Seismic Aspects for Recommendation 2.3 of the Near-Term Task Force (NTTF) Review of Insights from the Fukushima Dai-ichi Accident," dated July 10, 2012 (ML12193A509)

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4. TVA Letter to NRC, "Tennessee Valley Authority (TVA) - Response to NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding the Browns Ferry Nuclear Plant Seismic Walkdown Results of Recommendation 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated November 27, 2012 (ML13002A487)
5. NRC Letter, "Request for Additional Information Associated with Near-Term Task Force Recommendation 2.3, Seismic Walkdowns," dated November 1, 2013 (ML13304B418)

On March 12, 2012, the NRC issued Reference 1 to all power reactor licensees and holders of construction permits in active or deferred status. Enclosure 3 of Reference 1 contains specific Requested Actions, Requested Information, and Required Responses associated with Near Term Task Force (NTTF) Recommendation 2.3: Seismic.

The Electric Power Research Institute (EPRI) subsequently developed guidance for the performance of seismic walkdowns, and the NRC endorsed this guidance on May 31, 2012 (Reference 2). On July 10, 2012, TVA provided a required response to item 1 in Enclosure 3 of Reference 1 (Reference 3), informing the NRC that it intended to perform the seismic walkdown in accordance with the EPRI guidance.

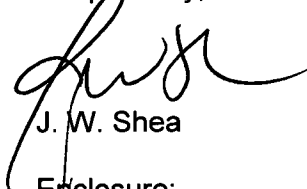
TVA completed the seismic walkdowns in accordance with the EPRI guidance and provided the Seismic Walkdown Reports for the Browns Ferry Nuclear Plant, Units 1, 2, and 3, to the NRC on November 27, 2012 (Reference 4). On November 1, 2013, the NRC issued a Request for Additional Information (RAI) letter related to the seismic walkdown reports (Reference 5). Reference 5 requested a response no later than 30 days from the date of the letter, which would be December 1, 2013.

The purpose of this letter is to provide a response to the RAI letter. The Enclosure to this letter provides TVA's response to the RAIs for BFN, Units 1, 2, and 3.

There are no new regulatory commitments in this letter. If you have questions regarding this matter, please contact Kevin Casey at (423) 751-8523.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 2nd day of December 2013.

Respectfully,



J. W. Shea

Enclosure:
cc: See Page 3

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Enclosure

Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Response to Additional Information
Associated with Near-Term Task Force Recommendation 2.3, Seismic Walkdowns

cc (Enclosure):

NRC Regional Administrator - Region II

NRR Director - NRC Headquarters

NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

NRR Project Manager - Browns Ferry Nuclear Plant

ENCLOSURE

**BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, and 3
RESPONSE TO ADDITIONAL INFORMATION ASSOCIATED WITH
NEAR-TERM TASK FORCE RECOMMENDATION 2.3: SEISMIC WALKDOWNS**

REQUEST FOR ADDITIONAL INFORMATION

Seismic Walkdowns

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff issued a letter requesting additional information per Title 10 of the Code of Federal Regulations, Section 50.54(f) (hereafter called the 50.54(f) letter). The 50.54(f) letter requested that licensees conduct seismic hazard walkdowns to verify the plant configuration with the current licensing basis (CLB). The licensees stated by letter that the seismic walkdowns would be performed in accordance with Electric Power Research Institute EPRI-1025286, "Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic" (walkdown guidance). Following the NRC staff's initial review of the walkdown reports, regulatory site audits were conducted at a sampling of plants. Based on the walkdown report reviews and site audits, the staff identified additional information necessary to allow the staff to complete its assessments.

RAI 1. Conduct of the walkdowns, determination of potentially adverse seismic conditions (PASCs), dispositioning of issues, and reporting

As a result of the audits and walkdown report reviews, the NRC staff noted that licensees' interpretations of the seismic walkdown guidance varied, which resulted in meaningful differences in the process used to disposition identified issues and in the documentation that was provided to the NRC staff. In particular, the application of engineering judgment in determining what constituted a potentially adverse seismic condition (PASC), the threshold for conducting licensing basis evaluations (LBEs), and determining what information was to be reported to the NRC staff varied.

The NRC staff intended that conditions initially marked No (N) or Unknown (U) in the field by the seismic walkdown engineers (SWEs) for which an analysis or calculation was performed would be considered as PASCs and that an analysis or calculation constituted an LBE. The walkdown guidance allows for analysis as part of engineering judgment; however, the intent was to allow for only simple analyses that could be readily performed in support of engineering judgment. Further, the walkdown activities were intended to allow for transparency in the licensee's process to demonstrate that PASCs were appropriately identified, that they were addressed in an appropriate manner, and the basis documented such that the current condition of the plant was clearly consistent with the CLB with regard to seismic capability.

During the audits, the NRC staff identified examples of field observations that were deemed not to be PASCs. However, the basis for the determination was not clearly recorded. In some cases, the field checklists were amplified by noting that the basis was engineering judgment. During site audit discussions, the staff was able to trace the basis for the engineering judgments and found that in many cases they were appropriate. It is expected that these situations would not be included in the walkdown report.

There were other situations that a PASC and LBE were not reported; however, the NRC staff found during the audit that a calculation, analysis (more than just simple), or evaluation was conducted but informally. An example is a confirmatory calculation performed to demonstrate that six anchor bolts out of eight was not a seismically adverse condition. Another example would be an analysis to demonstrate that an existing, slightly short weld was as seismically sound as the prescribed weld length in the plant design documentation. The staff expected

these types of conditions and evaluations to be captured in the licensee's normal plant processes (e.g., condition report or corrective action program (CAP)), and also reported in the walkdown report, since they were potentially adverse seismic conditions that required more than applying judgment or simple analysis to address.

The NRC staff also found that the process that was used to deal with a field observation that was deemed to be a PASC was also not completely described or captured in the report. In many cases, the licensee reported that an LBE was not performed. However, during the audits, it was clear that an LBE (or an equivalent determination method) was performed and used in determining whether a PASC should be entered into the CAP. The staff expects that these conditions would be reported in the walkdown report.

On the whole, through the audits, the NRC staff found that it was able to conclude that the intent of the guidance was met when the licensee's overall process was completely explained, the information was updated to reflect the actual process, and results were updated. The self-assessments conducted by the licensees of the audited plants also identified the lapse in the description of the process used by the licensee to identify a PASC and disposition it.

Therefore, in order to clarify the process that was followed, please provide a description of the overall process used by the licensee (and its contractors) to evaluate observations identified in the field by the SWEs. The process should include how a field observation was determined to be a PASC or not and how the bases for determinations were recorded. Once a determination was made that an observation was a PASC, describe the process for creating a condition report (or other tracking mechanism), performing the LBE (or other determination method), and the resultant action, such as entering it into the CAP, or documenting the result and basis.

Also, in order to confirm that the reported information supports concluding that the plant meets the CLB, please follow one of the following three acceptable alternatives:

- (a) Provide a supplement to the table or text from the original walkdown report, if needed, to include similar conditions as the above examples and situations and for conditions for which a calculation, analysis (if more than a simple analysis), or evaluation was used for a determination. The supplement should include a short description of each condition, how it was dispositioned and the basis for the disposition, as follows: 1) for each condition that was entered into the CAP, provide the CAP reference number, initiation date, and (if known) the planned completion date, or 2) for all other conditions, provide the result of the LBE (or other determination method), the basis for the result, and how (or where) the result was captured in the plant's documentation or existing plant process.*
- (b) Following the plant's standard procedures, confirm that a new CAP entry has been made to verify if appropriate actions were taken when reporting and dispositioning identified PASCs (including conditions for which a calculation, analysis (if more than a simple analysis), or evaluation was used for a determination). The eventual CAP closeout, including the process followed and actions taken should be in sufficient detail to enable NRC resident inspectors to follow up.*
- (c) If no new conditions are identified for addition to the supplement or the CAP entry mentioned above is deemed not necessary, provide a statement of confirmation that all potentially seismic adverse conditions (including conditions for which a calculation, analysis (if more than a simple analysis), or evaluation was used for a determination) identified during the walkdowns and walk-bys were addressed and included in the report to the NRC.*

TVA Response

The walkdowns and walk-bys performed at Browns Ferry Nuclear Plant (BFN) were conducted in accordance with EPRI 1025286, "Seismic Walkdown Guidance for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic" (hereafter "Seismic Walkdown Guidance") and TVA procedure CTP-SWD-100 which included the full scope of the Seismic Walkdown Guidance along with additional TVA specific CAP procedural requirements.

The walkdowns and walk-bys were conducted in accordance with the Seismic Walkdown Guideline and each was given a final status. Each walkdown or walk-by was completed by a team of 2 seismic walkdown engineers (SWEs) that met experience and training requirements per the Seismic Walkdown Guidance and were accompanied by operations personnel. Walkdown packages were assembled prior to each walkdown and included the seismic walkdown checklists (SWCs), area walk-by checklists (AWCs), anchorage verification drawings, and other design basis documentation including Unresolved Safety Issue (USI) A-46, "Seismic Qualification of Equipment in Operating Plants," analysis documentation and Institute of Electrical and Electronics Engineers (IEEE) 344, "IEEE Recommended Practice for Seismic Qualification of IE Equipment for Nuclear Power Generating Stations," documentation as necessary.

If no potentially adverse seismic conditions were noted during a walkdown or walk-by, a "YES" status was given to the selected piece of equipment or area. If a potentially adverse seismic condition was noted, a "NO" status was given and a CAP entry was written. If any equipment was inaccessible an "UNKNOWN" status was given and the selected piece of equipment or area is scheduled to be walked down in the next schedule refueling outage. (Note: All unit 1 and 2 walkdowns are complete. Four pieces of equipment will be walked down in the Unit 3 spring 2014 refueling outage.)

The walkdown teams performed the inspections and any questionable observations were compared to the design basis documentation that was brought with the team into the field. In some cases, engineering judgment was used to determine if an observation qualified as a PASC. The engineering judgments were documented on the SWCs and AWCs. The judgments were then validated by the peer review team and documented in the Peer Review Report which was incorporated as an appendix to each unit's seismic walkdown reports. Those observations that could not be justified with existing documentation or sound engineering judgment were entered into the BFN CAP and qualified as a PASC.

When a PASC was identified at BFN, the condition was entered into the BFN CAP. No licensing basis evaluations were performed by the walkdown team per TVA expectations to communicate any potential operability concerns as soon as they were identified. All licensing basis determinations were performed by BFN engineering on each CAP entry.

The CAP Process at TVA is defined in TVA NPG Standard Program and Processes SPP-22.300, "Corrective Action Program." The CAP program at all TVA nuclear facilities consists of five key phases:

- Initiation
- Screening
- Analysis
- Implementation
- Monitoring

To confirm that the reported information supports concluding that the plant meets the CLB, TVA submits the following response using acceptable alternative (b) listed above for each Unit as described below:

BFN Unit 1

Multiple CAP entries were generated during the seismic walkdown process at BFN. There were a total of two CAP entries for Unit 1 that were considered PASCs. These CAP entries and their status are summarized in Table 1 on page E-5. No conditions outside the licensing basis were found during the course of this walkdown process.

BFN Unit 2

Multiple CAP entries were generated during the seismic walkdown process at BFN. There were a total of three CAP entries for Unit 2 that were considered PASCs. These CAP entries and their status are summarized in Table 2 on pages E-6 and E-7. No conditions outside the licensing basis were found during the course of this walkdown process.

BFN Unit 3

Multiple CAP entries were generated during the seismic walkdown process at BFN. There were no CAP entries for Unit 3 that were considered PASCs. No conditions outside the licensing basis were found during the course of this walkdown process.

Table 1
Browns Ferry Nuclear Plant Unit 1: Potentially Adverse Seismic Conditions

No.	Component ID & Description OR Area Walk-by	Identified Condition	PER	Action Taken	Planned Completion Date	Status
1	Reactor Building - EL 565 - Above U1 Clean Room	A fire protection sprinkler was noted in close proximity to an electrical conduit which posed a seismic interaction concern.	606930	<p>An evaluation of the identified condition was performed by site civil and fire protection engineers. It was determined that the fire protection piping is well supported and will have limited seismic deflection.</p> <p>Additionally, the FP piping is part of a preaction sprinkler system. The headers and branch lines are dry with a slight positive air pressure. The header and branch lines are charged with water upon actuation of the FP system. Water spray concerns in the area are unwarranted because the FP system will contain water only after a fire has been sensed and equipment in the area has already been reviewed for the effect of the FP spray. Also, redundant safe shutdown equipment is protected against simultaneous water spray damage since it is located in another fire zone.</p>	Complete	Closed
2	BFN-1-PNLA-009-0036A - Aux Instrument Room Panel 1-9-36A	The cage around the interior light bulb inside panel BFN-1-PNLA-009-0036A is missing.	591051	<p>A field inspection of the interior of the panel was performed and it was determined that the light bulb is mounted in a fixed receptacle and no internal panel features are considered sensitive features with regard to the mass of the light bulb.</p> <p>Work order is planned to install missing light cage.</p>	08/18/2014	Open

**Table 2
Browns Ferry Nuclear Plant Unit 2: Potentially Adverse Seismic Conditions**

No.	Component ID & Description OR Area Walk-by	Identified Condition	PER/SR	Action Taken	Planned Completion Date	Status
1	BFN-0-STN-067-0926 - EECW strainer	A corner of the concrete pad on which the EECW strainer is sitting was observed to be cracked.	PER 587747	<p>A design review was performed by site civil engineering and it was determined that the concrete anchor is embedded into the 565.0' floor slab of the B RHRSW pump room, the actual point of restraint. Additionally, review of the design calculation indicates that the anchors are loaded to approximately 10% of their capacity. Therefore operability is maintained.</p> <p>A work order is planned to repair the concrete pad.</p>	04/01/2014	Open
2	BFN-2-PNLA-009-0015 - Aux Instrument Room Panel 9-15	The cage around the interior light bulb inside panel BFN-2-PNLA-009-0015 is missing.	SR 595732	<p>A field inspection of the interior of the panel was performed and it was determined that the light bulb is mounted in a fixed receptacle and no internal panel features are considered sensitive features with regard to the mass of the light bulb.</p> <p>Work order is planned to install missing light cage.</p>	09/22/2014	Open

Table 2
Browns Ferry Nuclear Plant Unit 2: Potentially Adverse Seismic Conditions

No.	Component ID & Description OR Area Walk-by	Identified Condition	PER/SR	Action Taken	Planned Completion Date	Status
3	BFN-2-PNLA-009-0005 - Aux Instrument Room Panel 9-05	The cage around the interior light bulb inside panel BFN-2-PNLA-009-0005 is missing.	SR 596227	A field inspection of the interior of the panel was performed and it was determined that the light bulb is mounted in a fixed receptacle and no internal panel features are considered sensitive features with regard to the mass of the light bulb. Work order is planned to install missing light cage.	09/22/2014	Open

RAI 2 Conduct of the Peer Review Process

As a result of the walkdown report reviews, the NRC staff noted that some descriptions of the peer reviewers and the peer review process that was followed were varied and, in some cases, unclear. In some cases, the staff could not confirm details of the process, such as if the entire process was reviewed by the peer review team, who were the peer reviewers, what was the role of each peer reviewer, and how the reviews affected the work, if at all, described in the walkdown guidance.

Therefore, in order to clarify the peer review process that was actually used, please confirm whether the following information on the peer review process was provided in the original submittal, and if not, provide the following.

- (a) Confirmation that the activities described in the walkdown guidance on page 6-1 were assessed as part of the peer review process.*
- (b) A complete summary of the peer review process and activities. Details should include confirmation that any individual involved in performing any given walkdown activity was not a peer reviewer for that same activity. If there were cases in which peer reviewers reviewed their own work, please justify how this is in accordance with the objectives of the peer review efforts.*

Also, if there are differences from the original submittal, please provide a description of the above information. If there are differences in the review areas or the manner in which the peer reviews were conducted, describe the actual process that was used.

TVA Response

A peer review was performed in accordance with the March 12, 2012, 50.54(f) letter and the Seismic Walkdown Guidance. The peer review process involved considerable interaction with the review teams, and was performed throughout all phases of the effort including the following:

- Review of the Structures, Systems and Components (SSCs) included on the Seismic Walkdown Equipment List (SWEL)
- In-plant walkdown observations and review of completed checklists for the Seismic Walkdowns and Area Walk-Bys
- Review of potentially adverse seismic conditions, utilization of the CAP process, and associated licensing basis evaluations
- Review of submittal report

A summary of the activities performed by the Peer Review Team is shown in Table 3 on page E-9. The listed functions are taken from Section 6 of the Seismic Walkdown Guidance and are consistent with the complete peer review report which is included as Appendix G of the BFN Units 1, 2, and 3 seismic walkdown reports.

Table 3

Activity Description	Activity Performed by Peer Review Team? (YES/NO)	Notes/Comments
Review the selection of the SSCs included on the SWEL	YES	As noted in the Peer Review Report, the peer review team evaluated the SWEL to ensure a diverse sample of the equipment required to perform the five safety functions outlined in Section 4.1, including items previously identified as IPEEE outliers. The peer review team also provided needed clarification regarding equipment class designation for SWEL items (regarding instrument racks, temperature sensors, distribution panels, and medium voltage switchgear).
Review a sample of the checklists (10% to 25% required) prepared for the Seismic Walkdowns and Area Walk-Bys	YES	As noted in the Peer Review Report, in total, the peer review team performed documentation review for over 50% of the checklists completed by the SWEs. Review of the SWCs and AWCs included substantial interface with the SWEs, observation of the SWEs during performance of walkdowns / walk-bys, and independent field investigation of individual equipment components. Peer review team efforts related to this activity are summarized in the Peer Review Report.
Review the licensing basis evaluations	YES	As noted in the Peer Review Report, all potentially adverse seismic conditions were reviewed in detail to address seismic licensing basis and operability issues.
Review the decisions for entering the potentially adverse conditions into the CAP process	YES	As noted in the Peer Review Report, all potentially adverse seismic conditions were reviewed in detail to address seismic licensing basis and operability issues. The peer review team is in full concurrence with the entry of confirmed potentially adverse seismic conditions into the CAP.
Review the submittal report	YES	As noted in the Peer Review Report, the peer review team reviewed the submittal report and is in full concurrence with the documented observations and findings.
Summarize the results of the peer review process in the submittal report	YES	Results of the peer review process are summarized in the Peer Review Report

In summary, the peer review results are confirmatory and fully supportive of the evaluations and findings as described in the BFN Units 1, 2, and 3 walkdown reports. The peer reviews met the intent of the Seismic Walkdown Guidance and were effective in providing technical oversight and review of all required aspects of the process herein described.