NRR-PMDAPEm Resource

From: Thompson, Russell R [rrthompson@tva.gov]
Sent: Friday, June 12, 2015 1:39 PM
To: DiFrancesco, Nicholas
Cc: Devlin-Gill, Stephanie; Wyman, Stephen
Subject: Advanced Response - SQN ESEP Clarifying Questions
Attachments: SQN ESEP Clarifying Questions Rev 1.pdf; SQN Equipment 40' above grade.xlsx

Per our conversation, attached are the advanced responses to the clarifying questions on the SQN ESEP.

The formal response will be submitted in the near future.

Please call me if you have any questions.

Russell Thompson

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Sequoyah ESEP Clarifying Questions

1) The licensee described in Section 7.1 that four (4) Cold Leg accumulator Isolation Valves were inaccessible for walkdowns but are acceptable based on similarity of these components to those in Unit 2. The licensee listed these four (4) Cold Leg Accumulator Isolation Valves as "screened" with HCLPF values in Attachment B, Table B-1. However, the licensee provides regulatory commitments in Section 8.4 to perform seismic walkdowns, generate HCLPF calculations, and design and implement any necessary modifications for Unit 1 inaccessible items listed in Section 7.1. Therefore, the licensee is requested to remove these four (4) items in Attachment B, Table B-1, or explain the "similarity basis" per EPRI NP-6041-SL for screening out.

Response: Section 7.1 states that the Unit 2 items were acceptable and that it is expected that the same conclusion can be made for Unit 1; however these items were not accepted based on similarity. In Section 7.2, TVA committed to walk down these items during the Unit 1 outage. These walkdowns were completed in April 2015, and as anticipated, the results were confirmatory, the same as Unit 2. The walkdown is documented in TVA calculation CDQ0009992014000140, Revision 1.

2) The ESEP report provides the elevations for the ESEL items, but does not explicitly provide their mounting heights above grade level. EPRI NP-6041-SL describes that elements shall be mounted less than 40 feet above grade level, otherwise, care shall be excised in using this guidance. The licensee is requested to identify all ESEL items with mounting height of 40 feet or higher above grade level, their mounting heights and explain how these ESEL items are evaluated.

Response: The Table provides a listing of all components mounted 40 feet or higher than grade level. For the components above base elevation, the Table 2-4 of EPRI NP-6041-SL screening capacities were conservatively interpreted as applicable for comparison with in-structure response spectra (ISRS). That is, the 5% damped spectral acceleration capacity was taken as 1.5 x 1.2g = 1.8g for the center capacity column of Table 2-4 of EPRI NP-6041 SL, and used for comparison to ISRS, in accordance with Section B.2 of EPRI 1019200 (Seismic Fragility Applications Guide Update) The SQN ESEP HCLPF evaluations are performed in TVA Calculation CDQ 0009992014000140.

3) Section 4.1 of the submittal defines the SSE control point at the base of the containment structures, which corresponds to a depth of 64 ft (Elevation 641 ft). As noted in Section 5.2, the NRC took exception to the approach used for Sequoyah Nuclear Plant in that TVA defined the RLE as being in the free-field at the top of soil surface, whereas the NRC concluded the RLE should have been defined on rock. In Section 6.1, Figure 6-1

represents the input motion assuming the target spectrum is at the top of free field on the soil surface, yet Figure 6-2 notes that both spectra are rock input motions at the base of the containment structure. However, in the letter from TVA to NRC, "Highlights of Improvements to the Sequoyah Nuclear Plant IPEEE Seismic Analysis Results and IPEEE Adequacy Review Report" dated April 18, 2014, the SQN IPEEE RLE was redefined from the free-field soil surface to rock outcrop with newly established IPEEE RLE input motion as 0.2g. The licensee is requested to clarify the elevation/location of where the RLE is defined and explicitly state whether the control points for the IPEEE RLE and GMRS are at the same location, and provide an explanation if they are not.

Response: Figure 6-1 does not show amplitudes and is intended to only illustrate the good fit of the ensemble of 30 time histories to the target CR-0098 spectrum. As described in the letter from TVA to NRC, "Highlights of Improvements to the Sequoyah Nuclear Plant IPEEE Seismic Analysis Results and IPEEE Adequacy Review Report" dated April 18, 2014, the SQN IPEEE RLE was redefined from the free-field soil surface to rock outcrop. The SQN IPEEE RLE and the ESEP GMRS are defined on rock at the base of the containment structure.

4) Clarification is requested for the justification that the IPEEE-related submittal (resulting in a reduced HCLPF capacity from 0.3g to 0.2g) is appropriate for ESEP screening. Section 6.2 notes that components were screened using an RLGM (NUREG/CR-0098 curve) anchored at 0.3g PGA. The components that meet the screening criteria in EPRI 6041 have a HCLPF of 0.3g and thus may not meet the 0.36g HCLPF value corresponding to the RLGM PGA. The licensee does not use the minimum capacity established of 0.2g. The licensee is requested to clarify why 0.2g is not used in the ESEP process and why the use of IPEEE RLE PGA 0.3g is appropriate and sufficient for the ESEP screening process.

Response: As described in the letter from TVA to NRC, "Highlights of Improvements to the Sequoyah Nuclear Plant IPEEE Seismic Analysis Results and IPEEE Adequacy Review Report" dated April 18, 2014, the SQN IPEEE RLE was redefined from the free-field soil surface to rock outcrop. As further described in that letter, TVA made plant upgrades and performed more refined analysis to increase the SQN HCLPF capacity to more than 0.30g (defined on rock). SQN minimum upgrade IPEEE HCLPF capacity is now 0.35g. The plant modifications and additional analyses are documented in TVA calculation CDQ0009992013000034. As described in Section 5.2, an IPEEE HCLPF capacity of 0.30g is sufficient for enveloping 2xSSE for ESEP evaluation purposes.

Grade is approximately elevation 705'

Plant Eq. ID	DESCRIPTION	FLEX Safety Function
VLV-1-512	Steam Generator #3 Main Steam Safety Valve	Maintain Core Cooling and Heat Removal
VLV-1-517	Steam Generator #2 Main Steam Safety Valve	Maintain Core Cooling and Heat Removal
VLV-1-522	Steam Generator #1 Main Steam Safety Valve	Maintain Core Cooling and Heat Removal
VLV-1-527	Steam Generator #4 Main Steam Safety Valve	Maintain Core Cooling and Heat Removal
PCV-1-5	Steam Generator #1 Atm Relief Valve (SG PORV)	Maintain Core Cooling and Heat Removal
PCV-1-12	Steam Generator #2 Atm Relief Valve (SG PORV)	Maintain Core Cooling and Heat Removal
PCV-1-23	Steam Generator #3 Atm Relief Valve (SG PORV)	Maintain Core Cooling and Heat Removal
PCV-1-30	Steam Generator #4 Atm Relief Valve (SG PORV)	Maintain Core Cooling and Heat Removal
PCV-068-0340A	RCS Pressurizer Power Relief Valve	Maintain RCS Inventory Control
Multi	Hydrogen Igniters	Maintain Containment
1-XFA-268-1A-A	PHMS Xfrm 1A	Maintain Containment
2-XFA-268-2A-A	PHMS Xfrm 2A	Maintain Containment
1-PNL-268-YA	120V AC PHMS Distribution Panel 1A	Maintain Containment
2-PNL-268-YC	120V AC PHMS Distribution Panel 2A	Maintain Containment
1-OXF-202-DL	480V Shutdown Transformer 1B1	Safety Function Support
1-OXF-202-DM	480V Shutdown Transformer 1B2	Safety Function Support
1-OXF-202-DJ	480V Shutdown Transformer 1A1	Safety Function Support
1-OXF-202-DK	480V Shutdown Transformer 1A2	Safety Function Support
2-OXF-202-DN	480V Shutdown Transformer 2A1	Safety Function Support
2-OXF-202-DO	480V Shutdown Transformer 2A2	Safety Function Support
2-OXF-202-DP	480V Shutdown Transformer 2B1	Safety Function Support

2-OXF-202-DQ	480V Shutdown Transformer 2B2	Safety Function Support
BDC-201-GG	480V Reactor MOV Board A1-A	Safety Function Support
BDC-201-GJ	480V Reactor MOV Board B1-B	Safety Function Support
2-BDC-201-GL	480V Reactor MOV Board 2A1-A	Safety Function Support
2-BDC-201-GN	480V Reactor MOV Board 2B1-B	Safety Function Support
0-BATB-250-QV	125V DC Vital Battery I	Safety Function Support
0-BATB-250-QW	125V DC Vital Battery II	Safety Function Support
0-BATB-250-QX	125V DC Vital Battery III	Safety Function Support
0-BATB-250-QY	125V DC Vital Battery IV	Safety Function Support
0-CHGB-250-QE	125V DC Vital Battery Charger I	Safety Function Support
0-CHGB-250-QG	125V DC Vital Battery Charger II	Safety Function Support
0-CHGB-250-QH	125V DC Vital Battery Charger III	Safety Function Support
0-CHGB-250-QJ	125V DC Vital Battery Charger IV	Safety Function Support
1-INVB-250-QL	120V AC Vital Inverter 1-I	Safety Function Support
1-INVB-250-QN	120V AC Vital Inverter 1-II	Safety Function Support
1-INVB-250-QR	120V AC Vital Inverter 1-III	Safety Function Support
1-INVB-250-QT	120V AC Vital Inverter 1-IV	Safety Function Support
2-INVB-250-QM	120V AC Vital Inverter 1-I	Safety Function Support
2-INVB-250-QP	120V AC Vital Inverter 1-II	Safety Function Support
2-INVB-250-QS	120V AC Vital Inverter 1-III	Safety Function Support
2-INVB-250-QU	120V AC Vital Inverter 1-IV	Safety Function Support
0-DG-360-000A	480V FLEX Diesel Generator	Maintain Core Cooling and Heat Removal

BLDG	ELEV
EVVR	740
EVVR	740
WVVR	740
WVVR	740
WVVR	744
EVVR	744
EVVR	744
WVVR	744
Reactor Bldg	760
Reactor Bldg	SCV Dome
Aux Bldg MG Set Room	759
Aux Bldg MG Set Room	759
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Aux Bldg	763