

NRR-DRMAPEm Resource

From: Haskell, Russell
Sent: Friday, July 12, 2019 2:42 PM
To: tjorf@tva.gov; Victor, William Ross
Subject: RE: FINAL RAIs re: Browns Ferry Nuclear, Units 1, 2, 3 - APPLICATION TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-542 REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2019-LLA-0010)

Mr. Orf/Mr. Victor,

By application dated January 25, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19031C826), Tennessee Valley Authority (TVA, the licensee) requested to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-542, "Reactor Pressure Vessel Water Inventory Control," Revision 2, which changes the Technical Specifications (TSs) for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3.

The NRC staff has reviewed the application and determined that additional information is required to complete its review.

On June 10, 2019, the NRC staff held a conference call with TVA staff to discuss a draft version of these RAIs. During the call several clarifications were determined. In response, the NRC staff has concluded that the FINAL version of these RAIs (submitted below) will be necessary for the evaluation to be completed.

The NRC staff considers that timely responses to these RAIs will help to ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources. As such, the NRC is requesting TVA's response to these RAI's ***NLT Monday August 12, 2019***. (Please be reminded to include corrected TS markup pages associated with the administrative edits identified by the staff).

Should circumstances result in the need to revise the requested response date, please contact me at (301) 415-1129. Thank you.

Russell S. Haskell II

United States Nuclear Regulatory Commission (NRC)

Licensing Project Manager - NRR/DORL/LPL 3

Dresden Nuclear Power Station, Units 2 and 3

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REQUEST FOR ADDITIONAL INFORMATION
APPLICATION TO REVISE TECHNICAL SPECIFICATION TO ADOPT TSTF-542
REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL"
TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
(DOCKET NOS. 50-259, -260, -296) (EPID L-2019-LLA-0010)

RAI-1:

In the cover letter of the license amendment request (LAR), dated January 25, 2019 (CNL-19- 010), TVA states:

“Because of shared-system complexity and to ensure uniform implementation across all three units, the amendments shall be implemented for all three units prior to the start of the interval beginning with the BFN Unit 3 Spring 2022 Cycle 20 refueling outage (3U20).”

Briefly explain what is meant in the LAR by “shared-system complexities” including any anticipated impacts the proposed TSTF-542 TSs would have on each of these systems. Your explanation should include:

- a. System/Subsystem (title, common name)
- b. Technical specification reference
- c. Technical specification (cross-unit) relationship or dependency

RAI-2:

BFN Updated Final Safety Analysis Report (UFSAR) Section 6.4.3, Core Spray (CS) System states:

“For Units 1 and 2, a Core Spray signal will initiate the ECCS [emergency core cooling system] preferred pump logic to trip any running RHR [residual heat removal] and Core Spray pumps in the opposite unit. In the event of a LOCA [loss of coolant accident] in conjunction with a spurious accident signal from the opposite unit, the ECCS preferred pump logic will dedicate the Division I pump (1A and 1C) to Unit 1 and the Division II pumps (2B and 2D) to Unit 2. This will ensure that the shared Unit 1/2 4KV shutdown boards are not overloaded in the event of a real and spurious accident signal.”

BFN UFSAR Section 6.4.4, Low Pressure Coolant Injection System (LPCI) states:

“For Units 1 and 2, a RHR (LPCI) signal will initiate the ECCS preferred pump logic to trip any running RHR and Core Spray pumps in the opposite unit. In the event of a LOCA in conjunction with a spurious accident signal from the opposite unit, the ECCS preferred pump logic will dedicate the Division I pump (1A and 1C) to Unit 1 and the Division II pumps (2B and 2D) to Unit 2. This will ensure that the shared Unit 1/2 4KV shutdown boards are not overloaded in the event of a real and spurious accident signal.”

Please provide the following:

- a. With respect to the above ECCS Preferred Pump Logic explain any impacts on TS operability of a low pressure ECCS subsystem credited per the proposed TS 3.5.2 in Modes 4 and 5 if a LOCA occurs in another BFN unit operating in Modes 1, 2, or 3. Specifically, describe systems and unit interactions, emergency power availability, and resulting logic time delays, as related to manual operations of a low pressure CS and LPCI pump and injection valves for the proposed changes during Modes 4/5 (TS 3.5.2) and Drain Time operations.

Also,

- b. Explain if other pump logic design (i.e., CAS Logic, Unit Priority Trip Logic, etc.) has any impact on TS operability of a low pressure ECCS subsystem credited per the proposed TS 3.5.2 in Modes 4 and 5 if a LOCA occurs in another BFN unit operating in Modes 1, 2, or 3.

RAI-3

In Attachment 1 of the LAR, subsection 2.2.2.4 (technical variations) states:

BFN TS Table 3.3.5.1-1 Function 1.c [Core Spray System Reactor Steam Dome Pressure - Low (Injection Permissive and ECCS Initiation)] specifies four RCPF [required channels per function] with two per trip system. Each trip system correlates to a single CS injection valve and has a one-out-of-two logic. As described in the Bases for this function, four channels are required to ensure that no single instrument failure can preclude ECCS initiation. However, as described in Section 3.3 of the TSTF-542 Safety Evaluation, only one ECCS injection/ spray subsystem is required to be operable in Modes 4 and 5, as no additional single failure is assumed. In developing the new BFN Table 3.3.5.2-1, that principle is carried forward in requiring only a single channel per CS subsystem be operable for Function 1.a.

The NRC staff understands how having one operable channel per subsystem supports the safety function. However, further discussion is necessary to understand how having one channel per subsystem with one-out-of-two logic will meet the LCO for new TS 3.3.5.2. In section 3.3.4.1 of the TSTF-542 technical evaluation, the instrumentation design assumption is that function 1.a (CS reactor steam dome low pressure) of TS 3.3.5.2 has four required channels with one-out-of-two taken twice logic. TSTF-542 does not change the required channels per function (i.e., the current requirement transferred from TS 3.3.5.1 would remain the same in new TS 3.3.5.2, four required channels per function.)

Please provide the following:

- a. Further technical detail regarding how LAR variation 2.2.2.4 differs from TSTF-542,
- b. Discussion of how function 1. a's "one channel per subsystem" requirement will meet LCO 3.3.5.2, and
- c. Diagrams for the CS system injection valve instrumentation logic which include loop, subsystem, and valve numbers, as applicable.

From: Haskell, Russell

Sent: Tuesday, May 28, 2019 1:05 PM

To: tjorf@tva.gov

Subject: DRAFT RAIs re: Browns Ferry Nuclear, Units 1, 2, 3 - APPLICATION TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-542 REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2019-LLA-0010)

Mr. Tracey Orf,

By application dated January 25, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19031C826), Tennessee Valley Authority, (TVA, the licensee), requested to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-542, "Reactor Pressure Vessel Water Inventory Control," Revision 2, which changes the Technical Specifications (TSs) for the Browns Ferry Nuclear Plant (BFN), Units 1, 2 and 3.

The NRC staff has reviewed the application and determined that additional information is required to complete its review. The following is a DRAFT request for additional information (RAI). If TVA would require clarification on the DRAFT RAI please contact me to schedule a teleconference between the NRC & TVA staff. If no clarification is necessary, please promptly inform me as such and DRAFT RAI will be formalized with a licensee response date within 30 days of your communication.

Thank you.

Russell S. Haskell II

United States Nuclear Regulatory Commission (NRC)
Licensing Project Manager - NRR/DORL/LPL 3
Dresden Nuclear Power Station, Units 2 and 3
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DRAFT REQUEST FOR ADDITIONAL INFORMATION
APPLICATION TO REVISE TECHNICAL SPECIFICATION TO ADOPT TSTF-542
REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL"
TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
(DOCKET NOS. 50-259, -260, -296) (EPID L-2019-LLA-0010)

(DRAFT) RAI-1

In the cover letter of the license amendment request (LAR), dated January 25, 2019 (CNL-19- 010), TVA states:

"Because of shared-system complexity and to ensure uniform implementation across all three units, the amendments shall be implemented for all three units prior to the start of the interval beginning with the BFN Unit 3 Spring 2022 Cycle 20 refueling outage (3U20)."

BFN Updated Final Safety Analysis Report (UFSAR) Section 6.4.3, Core Spray (CS) System states:

"For Units 1 and 2, a Core Spray signal will initiate the ECCS [emergency core cooling system] preferred pump logic to trip any running RHR [residual heat removal] and Core Spray pumps in the opposite unit. In the event of a LOCA [loss of coolant accident] in conjunction with a spurious accident signal from the opposite unit, the ECCS preferred pump logic will dedicate the Division I pumps (1A and 1C) to Unit 1 and the Division II pumps (2B and 2D) to Unit 2. This will ensure that the shared Unit 1/2 4KV shutdown boards are not overloaded in the event of a real and spurious accident signal."

BFN UFSAR Section 6.4.4, Low Pressure Coolant Injection System (LPCI) states:

"For Units 1 and 2, a RHR (LPCI) signal will initiate the ECCS preferred pump logic to trip any running RHR and Core Spray pumps in the opposite unit. In the event of a LOCA in conjunction with a spurious accident signal from the opposite unit, the ECCS preferred pump logic will dedicate the Division I pumps (1A and 1C) to Unit 1 and the Division II pumps (2B and 2D) to Unit 2. This

will ensure that the shared Unit 1/2 4KV shutdown boards are not overloaded in the event of a real and spurious accident signal.”

- A. Briefly explain what is meant in the LAR by “shared-system complexities” including any anticipated impacts the proposed TSTF-542 TSs would have on each of these systems. Include in your explanation:
- System/Subsystem (title, common name)
 - Technical specification reference
 - Technical specification (cross-unit) relationship or dependency
- B. With respect to the ECCS Preferred Pump Logic, CAS Logic, and Unit Priority Re- Trip Logic, describe in detail any potential impacts on TS operability or analyzed events while a BFN unit in Mode 1, 2, or 3 is sharing systems with an outage unit that has adopted the TSTF-542 TSs (e.g., reduced Low Pressure ECCS requirements from two subsystems to one subsystem)? Specifically, describe systems and unit interactions, electrical and instrumentation logic complexities, applicable logic time delays, as related to manual operations of a low pressure CS and LPCI pump and injection valves for the proposed changes during Modes 4/5 (TS 3.5.2) and Drain Time operations.

(DRAFT) RAI-2:

Proposed TS 3.5.2, Required Action C.3 states:

Verify two standby gas treatment subsystems are capable of being placed in operation in less than the DRAIN TIME.

Proposed TS 3.5.2, Required Action D.4 states:

Initiate action to verify two standby gas treatment subsystems are capable of being placed in operation.

From the LAR Attachment 1, page 14, Variation 2.2.2.8 states:

BFN is designed with three subsystems of SGT [standby gas treatment] servicing all three units. A minimum of two subsystems of SGT are required to keep the three Reactor Building Zones and the common Refueling Zone at the required negative pressure. In contrast, the reference plant for NUREG-1433 requires only a single SGTS subsystem to maintain secondary containment at negative pressure.

Accordingly, a variation is taken for new TS 3.5.2 Required Action C.3 to require verification of two SGT subsystems are capable of being placed in operation in less than the Drain Time, instead of a single SGT subsystem. Similarly, new Required Action D.4 will initiate action to establish two SGT subsystems are capable of being placed in operation, instead of a single SGT subsystem. The only time these two proposed Required Actions will be ‘true’ and are applicable is when all three BFN units are in Modes 4 and 5, all at the same time.

Describe why this is acceptable for proposed TS 3.5.2, Required Actions C.3 and D.4? Describe possible alternatives which may include (but not limited too) to direct the appropriate actions in TS 3.6.4.3 for BFN Units operating in other Modes.

Describe if this is also applicable to Secondary Containment requirements since parts of Secondary Containment is shared between the three units and Secondary Containment (TS 3.5.4.1) is required to be Operable in Modes 1, 2, and 3, proposed TS 3.5.2 Required Actions C.1, C.2, D.2 and D.3.

(DRAFT) RAI-3

In Attachment 1 of the LAR, subsection 2.2.2.4 (technical variations) states:

BFN TS Table 3.3.5.1-1 Function 1.c [Core Spray System Reactor Steam Dome Pressure - Low (Injection Permissive and ECCS Initiation)] specifies four RCPF [required channels per function] with two per trip system. Each trip system correlates to a single CS injection valve, and has a one-out-of-two logic. As described in the Bases for this function, four channels are required to ensure that no single instrument failure can preclude ECCS initiation. However, as described in Section 3.3 of the TSTF-542 Safety Evaluation, only one ECCS injection/ spray subsystem is required to be operable in Modes 4 and 5, as no additional single failure is assumed. In developing the new BFN Table 3.3.5.2-1, that principle is carried forward in requiring only a single channel per CS subsystem be operable for Function 1.a.

The NRC staff understands how having one operable channel per subsystem supports the safety function. However, further discussion is necessary to understand how having one channel per subsystem with one-out-of-two logic will meet the LCO for new TS 3.3.5.2. In section 3.3.4.1 of the TSTF-542 technical evaluation, the instrumentation design assumption is that function 1.a (CS reactor steam dome low pressure) of TS 3.3.5.2 has four required channels with one-out-of-two taken twice logic. TSTF-542 does not change the required channels per function (i.e., the current requirement transferred from TS 3.3.5.1 would remain the same in new TS 3.3.5.2, four required channels per function.)

Please provide the following:

- a. further technical detail regarding how LAR variation 2.2.2.4 differs from TSTF- 542,
- b. discussion of how function 1.a's "one channel per subsystem" requirement will meet LCO 3.3.5.2, and
- c. diagrams for the CS system injection valve instrumentation logic which include loop, subsystem, and valve numbers, as applicable.

Also,

The items below are identified by NRC staff as administrative in nature that should be reviewed by TVA and considered for correction (not RAI). (Corrected TS page markups are appreciated with above RAI responses.)

1. LAR Attachment 1, page 16 of 19, Item 2.3.1:

Missing Variation for proposed SR 3.5.2.7 (18 months to 24 months)

2. Attachment 2, Unit 1 redline strike out

New Table 3.3.5.2-1, Page 3.3-xx – footnote (a) should have a completed title for LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control", that is '(RPV)' is missing.

Page 3.6-10 – per the red line strike out, two 'ACTIONS' would appear on page 3.6-9.

3. Attachment 3, Unit 2 redline strike out

In general, a few red line strike out are too high or too low.

Page 3.3-43, extra arrows are shown, extra red lines are shown

New Table 3.3.5.2-1, Page 3.3-xx – footnote (a) should have a completed title for LCO 3.5.2, “Reactor Pressure Vessel (RPV) Water Inventory Control”, that is ‘(RPV)’ is missing.

Page 3.6-10 – per the red line strike out, two ‘ACTIONS’ would appear on page 3.6-9. Page 3.7-11

– For CONDITION H, two “OR” are not crossed off.

4. Attachment 4, Unit 3 redline strike out

In general, a few red line strike out are too high or too low.

Page 3.3-43, Condition B is not deleted for CS Function, c, dome pressure.

New Table 3.3.5.2-1, Page 3.3-xx – footnote (a) should have a completed title for LCO 3.5.2, “Reactor Pressure Vessel (RPV) Water Inventory Control”, that is ‘(RPV)’ is missing.

Page 3.6-10 – per the red line strike out, two ‘ACTIONS’ would appear on page 3.6-9. Page 3.7-11 –

For CONDITION H, two “OR” are not crossed off.

5. SR 3.5.2.4

The LAR red line markup of Surveillance Requirement SR 3.5.2.4 (Attachment 2, Page 3.5-10, Attachment 3, Page 3.5-10, and Attachment 4, Page 3.5-10) are missing punctuation.

As proposed:

Verify for the required ECCS injection/spray subsystem each manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.

In accordance with TSTF-542, this SR should state:

Verify, for the required ECCS injection/spray **subsystem, each** manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.

TS Bases changes for Unit 1

- Page B 3.3-x (SR 3.3.5.2.1): The frequency shown is **12 hours**, however, in the proposed SR 3.3.5.2.1, it is shown as **24 hours**.
- Page B 3.5-8, LCO title should be “Reactor Pressure Vessel (RPV)”.....(maybe generic)
- Page B 3.5-28, SR 3.5.2.4 - ‘each’ is missing from in front of manual, power.....
- Page B 3.5-29, SR 3.5.2.7 – missing “simulated signal”
- Page B 3.5-32, LCO title should be “Reactor Pressure Vessel (RPV)”.....(maybe generic)
- Page B 3.5-66, LCO title should be “Reactor Pressure Vessel (RPV)”.....(maybe generic)
- Page B 3.7-20 (not provided) for TS 3.7.3, Action B.1 and B.2, “in MODE 1, 2, 3” can be deleted – not needed
- Page B 3.10-3, LCO title should be “Reactor Pressure Vessel (RPV)”.....(maybe generic)

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