



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 19, 2011

Mr. R. M. Krich
Vice President, Nuclear Licensing
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 — REQUEST FOR ADDITIONAL INFORMATION REGARDING AMENDMENT REQUEST TO EXTEND COMPLETION TIME FOR TECHNICAL SPECIFICATION 3.8.1 REQUIRED ACTION B.4 (TAC NOS. ME5036, ME5037, AND ME5038)

Dear Mr. Krich:

By letter dated November 12, 2010 (Agencywide Document Access and Management System Accession No. ML103210334), Tennessee Valley Authority (TVA) submitted a request to amend the technical specifications (TSs) for Browns Ferry Nuclear Plant, Units 1, 2, and 3. The amendment proposed to extend the completion time of TS 3.8.1, Required Action B.4 (one diesel generator (DG) inoperable), from 7 to 14 days.

Based on our review of your submittal, the U. S. Nuclear Regulatory Commission (NRC) staff finds that a response to the enclosed request for additional information is needed before we can complete the review. The NRC staff forwarded a draft of the enclosure to this request to TVA on December 27, 2010.

The NRC staff held a call with members of your staff on January 13, 2011, to clarify, as necessary, any questions on the draft information request, and it was agreed that a response would be provided by TVA within 30 days of this teleconference.

During the call, an NRC staff identified, and TVA agreed to respond to, the following additional items:

In the license amendment request (LAR), the licensee proposes that TS 3.8.1, Required Action B.2, read as follows: "Evaluate availability of both temporary diesel generators (TDGs)." While it is noted that the proposed TS Bases, B 3.8.1, ACTIONS B.2 provides the reason "evaluate" is used in the TS Required Action B.2, verification of the availability of the TDGs is not required to be performed to enter or remain in the Condition (B) for up to the proposed 14-days. However, elsewhere in the LAR it is stated that the TDGs will be "verified available."

R. Krich

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1. Regarding the TDG availability requirements described in the proposed TS 3.8.1 Bases, B.2 and any other differences, please explain the difference between "evaluation of TDG availability" and "verification of TDG availability."

Proposed TS Bases B.2 states that, "In order to extend the Required Action B.5 Completion Time for an inoperable DG from 7 days to 14 days inoperable, it is necessary to verify the availability of the TDGs on a more frequent basis."

2. The Completion Time for proposed TS 3.8.1, Required Action B.2, "Evaluate the availability of both temporary diesel generators (TDGs)," is "1 hour AND Once per 12 hours thereafter." Where can the stated requirement to perform (1) a verification and, (2) a verification on a more frequent basis, be found?

If you have any questions, please contact me at (301) 415-1055.

Sincerely,



Christopher Gratton, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260, and 50-296

Enclosure: Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION
BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3
LICENSE AMENDMENT REQUEST FOR
EXTENSION OF THE COMPLETION TIME FOR INOPERABLE DIESEL GENERATORS
DOCKET NOS. 50-259, 50-260, AND 50-296
TAC NOS. ME5036, ME5037, ME5038

Tennessee Valley Authority (TVA, the licensee) proposed to revise the technical specifications, based on deterministic engineering justification by including availability of two nonsafety-related temporary diesel generators (TDGs) with paralleled output to any of the eight 4.16 Kilovolts (kV) safety-related shutdown buses via the 4.16 kV Tie Bus during the proposed extended completion time of any of eight safety-related inoperable diesel generators (DGs). In order for the staff to proceed with its review of the proposed changes, the following information is required.

Electrical

1. In the license amendment request (LAR), the licensee stated that the TDGs will be started and connected to the 4.16 kV shutdown board associated with the inoperable DG by manually closing the appropriate Bus Tie Board breakers and a 4.16 kV Shutdown Board breaker, supplying power to the de-energized Shutdown Board.

Provide the estimated time it will take to manually start TDGs and power a shutdown board, following a loss of all alternating current (AC) power. Also provide a summary of the analysis performed for coping with loss of AC power until TDGs are connected to the Shutdown Board.

2. Provide a sketch or drawing showing location of the TDGs, 480V-4160V step-up transformers, Manhole "E," and 4.16 kV Bus Tie Board. Provide the routing details of interconnecting cables. Confirm provisions will be made to keep the underground cables dry.

Provide a single line diagram showing connection of TDGs to the Bus Tie Board. Confirm that the existing 4.16 kV switchgear (Tie Board) rating will be adequate for two TDGs (each 1.62 Megawatt electrical (MWe)) with a combined rating of 3.24 MWe.

3. On Page E1-18 of the LAR, it is stated that Browns Ferry Nuclear Plant (BFN) "Engineering Procedure for TDGs Initial Acceptance Testing" will direct a load test of the TDGs initially after acceptance from the TDGs rental vendor and once per 18 months

Enclosure

(while the TDGs are in TVA's custody) to ensure the TDGs' ability to accept, accelerate, and run assigned loads.

Provide a summary of the loads that will be assigned to the TDGs for a design basis loss of offsite power condition to bring the plant to a cold shutdown. Also, provide a brief description of the engineering procedure for the load test. Confirm that necessary controls will be provided so that the loads will be shared approximately equally between the two TDGs.

4. Provide a brief description of modifications that will be made to the onsite fuel oil storage tanks for an independently powered transfer pump to refuel the TDGs. Which power source will feed the independently powered transfer pump(s)?
5. Consider adding the following commitments to Enclosure 4 of the LAR, or provide a basis why these commitments are not needed:
 - a) No discretionary switchyard maintenance will be allowed during the extended DG maintenance period.
 - b) High Pressure Coolant Injection pump, Reactor Core Isolation Cooling pump, and the Residual Heat Removal pump associated with the operable DG will not be removed from service for elective maintenance activities during the planned extended DG inoperability.

Fire Protection

The licensee is required by Title 10 of the *Code of Federal Regulations (10 CFR)*, Section 50.48.b to comply with Section III.G of Appendix R. This requires the licensee to be able to achieve and maintain hot shutdown for any single fire.

BFN is currently performing corrective actions for a violation with a YELLOW risk determination issued in 2009. The violation was for using unapproved operator manual actions instead of fire barriers and separation as required by the regulations. Planned corrective actions, transitioning the units to a National Fire Protection Association (NFPA) 805 program will take several more years. The plant is operating, with compensatory measures, with a noncompliant fire protection safe shutdown program until the NFPA 805 transition is complete.

The current fire protection compensatory measure for a required piece of equipment inoperable is an hourly fire watch tour with guidance to restore the equipment within 7 days. An hourly fire watch tour enhances defense-in-depth to compensate, in part, for the lack of the required fire protection feature. If an outage exceeds 7 days, the licensee's Fire Protection Report, Revision 5, Volume 4, Section III, "Required Safe Shutdown Equipment, Compensatory Measures," states:

"Restore the equipment function in 7 days or provide equivalent shutdown capability by one of the following methods:

- 1) A temporary alteration in accordance with plant procedures that allows the equipment to perform its intended function, or
- 2) A fire watch in accordance with the site impairment program in the affected areas/zones as specified in Section III.
- 3) A temporary change to the SSI's [safe shutdown instructions] which provide safe shutdown without the required function."

In the submittal, the licensee stated, "An hourly fire watch in these areas would provide sufficient assurance that a fire would not occur or would be detected and mitigated before it progresses to an Appendix R fire event. As a result, spurious operations of critical equipment and serious plant degradation will be prevented." Unless this was approved in a licensing basis document for BFN, the Nuclear Regulatory Commission (NRC) staff does not find this statement provides acceptable basis for extending diesel outage times, in light of the recent YELLOW finding (Agencywide Document Access and Management System (ADAMS) Accession Nos. ML100201056, 1/20/10 and ML101090503, 4/19/10).

The NRC staff notes that compensatory measure method 2 of the licensee Fire Protection Report (hourly fire watch as described above), might be sufficient as an enhancement to defense-in-depth for a fire protection program impairment if the safe shutdown program were otherwise fully compliant. However, the licensee is requesting to allow the DG outage times to be extended to 14 days, thus increasing DG unavailability. Therefore, due to significant known impairments in the fire protection safe shutdown capability that will continue until the transition to NFPA 805 is complete, the additional impairments of the emergency diesel generators for the extended outage was not foreseen as a use of the hourly fire watch tours when the staff approved the fire protection program.

The licensee's November 12, 2010, submittal included a deterministic evaluation of the proposed change, so the responses to the information requests below should be deterministic. Questions 1 through 5 concern details about the safe shutdown evaluation requested above:

1. Due to known impairments in the fire protection safe shutdown capability that will continue until the transition to NFPA 805 is complete, provide a technical evaluation that the facility can achieve and maintain safe shutdown in the event of a fire when a diesel is impaired for the extended outage, or provide a justification why such an evaluation is not required. Include in this evaluation a discussion of the current impairments and associated compensatory measures in response to the YELLOW violation (ADAMS Accession Nos. ML100201056, 1/20/10 and ML101090503, 4/19/10).
2. As stated above, the licensee did not provide in the application an analysis to demonstrate safe shutdown capability should a fire occur during an extended diesel outage. The statement that hourly fire-watch tours prevent fires that could impact safe shutdown is not sufficient as an acceptable basis for extending diesel outage time. For the reasons stated above, please provide details of how post fire safe shutdown will be accomplished during the extended diesel generator outages, or provide a justification why such an evaluation is not necessary.
3. No analysis to use the TDGs for any post fire safe shutdown purpose was provided in the submittal. If TDGs are to be used for a safe shutdown function in the event of a fire,

include justification for the additional operator manual actions, circuit analysis including associated circuit effects resulting from a plant fire, and an analysis showing that the electrical busses powered by the TDGs would be unaffected by the fire. Provide a technical evaluation of how the TDGs will be used to support post fire safe shutdown. The evaluation should include a discussion of procedural changes, staffing, and thermo-hydraulic timeline that supports the use of the TDGs. If the TDGs are not used for post fire safe shutdown, provide a technical evaluation of how the plant would shutdown in the event that a fire were to occur that would challenge safe shutdown capability, specifically, a fire that would rely on an out of service DG.

4. The submittal does not provide information concerning plant post fire safe shutdown methods with an impaired DG, but states, "An hourly fire watch in these areas would provide sufficient assurance that a fire would not occur or would be detected and mitigated before it progresses to an Appendix R fire event. As a result, spurious operations of critical equipment and serious plant degradation will be prevented." Provide the basis for this statement, and demonstrate why this statement and its conclusion are true. Include in the discussion a description of how an hourly fire watch tour is effective in detecting high energy arcing faults (instantaneous) and detecting and preventing self-ignited cable fires, both are major contributors to the fire risk at BFN.
5. The licensee's submittal does not discuss any temporary changes to the SSIs needed to accomplish safe shutdown including additional operator manual actions assuming TDG operation is required. Provide a discussion of how the operators would be informed and trained to shut down the plant in the event of an SSI that relies on an out-of-service EDG.

Questions 6 and 7 concern the location and fire protection features of the additional fire hazard being brought onto the site by the TDG modification.

6. In 10 CFR 50.48(a), licensees are required to have a fire protection program that satisfies General Design Criterion 3. Normally this is demonstrated, as specified in our guidance, by complying with NRC guidance and NFPA code requirements. The licensee's analysis did not specify location of the TDGs with their fuel oil tanks or the location of the oil-filled transformer. Provide a technical analysis to specify what fire protection features will be provided to comply with NRC guidance and NFPA code fire protection requirements for the additional hazard. The evaluation should also consider the impact of smoke, either fire or exhaust smoke from the TDGs, on normal or emergency plant operations. This would include control room and other plant air intakes.
7. Although no fire probabilistic risk assessment has yet been completed for BFN, the Significance Determination Process identified some locations in the plant and yard area that may have higher risk than other locations. Provide a technical justification that these higher risk areas (pinch points) were factored into the location of the TDGs, fuel tanks, and transformer to prevent putting the additional hazard in the higher fire risk locations?

R. Krich

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Sincerely,

/RA/

Christopher Gratton, Senior Project Manager
 Plant Licensing Branch II-2
 Division of Operating Reactor Licensing
 Office of Nuclear Reactor Regulation

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Enclosure: Request for Additional Information

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