



1101 Market Street, Chattanooga, Tennessee 37402

CNL-22-060

April 25, 2022

10 CFR 26.9

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

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Response to Request for Additional Information and Clarification Regarding Request for Exemption from Requirements of 10 CFR 26.205(d)(4), 26.205(d)(6) and 26.205(d)(7), "Fitness for Duty Programs - Work Hours"**

- References:
1. TVA Letter to NRC, CNL-22-054, "Request for Exemption from Requirements of 10 CFR 26.205(d)(4), 26.205(d)(6) and 26.205(d)(7), 'Fitness for Duty Programs – Work Hours'," dated April 15, 2022 (ML22105A579)
 2. NRC Electronic Mail to TVA, "Requests for Confirmation of Information and Additional Information Regarding Watts Bar Nuclear Plant, Unit 2 Exemption Request re 10 CFR Part 26 (L-2022-LLE-0017)," dated April 25, 2022 (ML22115A140)

In Reference 1, Tennessee Valley Authority (TVA) submitted an exemption request for the Watts Bar Nuclear Plant (WBN), Unit 2 from the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 26.205, "Fitness for Duty Programs – Work Hours," Sections (d)(4) and (d)(7) for Category A personnel to support activities required for the current extended WBN Unit 2 steam generator replacement (SGR) outage, for a period not to exceed an additional 60 days beyond the end of the current 60-day allowance of 10 CFR 26.205(d)(4). The letter also requested an exemption from 10 CFR 26.205(d)(6) for Category B personnel to support normal outage shutdown, startup, maintenance, fuel handling, and modification activities that are not related to the SGR project.

In Reference 2, the Nuclear Regulatory Commission (NRC) issued a Request for Confirmation of Information (RCI) and Request for Additional Information (RAI) and requested that TVA respond by April 25, 2022. The enclosure to this letter provides the TVA response to the RCI and RAI.

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As noted in the enclosure, regarding the TVA response to RCI 1, the proposed exemption from 10 CFR 26.205(d)(7) also applies to Category B personnel.

There are no new regulatory commitments associated with this submittal. Please address any questions regarding this request to Stuart L. Rymer, Senior Manager, Fleet Licensing, at slymer@tva.gov.

Respectfully,

 Digitally signed by Rymer, Stuart
Loveridge for
Date: 2022.04.25 16:23:46 -04'00'

James T. Polickoski
Director, Nuclear Regulatory Affairs

Enclosure:

Response to NRC Request for Additional Information and Clarification

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRC Project Manager - Watts Bar Nuclear Plant

Response to NRC Request for Additional Information and Clarification

NRC Introduction

By letter dated April 15, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22105A579), the Tennessee Valley Authority (TVA) requested exemptions (1) from Title 10 of the Code of Federal Regulations (10 CFR) Section 26.205(d)(7) to use the less restrictive work hour limitations described in 10 CFR 26.205(d)(4) for no more than 60 days beyond the end of the current 60-day allowance for Category A personnel, and (2) from 10 CFR 26.205(d)(6) for Category B personnel to allow them to perform normal outage shutdown, startup, maintenance, fuel handling, and modification activities that are not related to the steam generator replacement (SGR) project.

The U.S. Nuclear Regulatory Commission (Commission, NRC) staff is reviewing your submittal and has identified areas where additional information or confirmation of information is needed to complete its review.

Request for Confirmation of Information:

1. *Regarding Category B personnel, the NRC staff's understanding of TVA's request is as follows:*
 - *TVA is requesting that Category B personnel be allowed to work extended hours for a 60-day period of time that would commence upon completion of the SGR project schedule milestone for "polar crane turnover to the plant." This requested 60-day time period would be treated as administratively separate from the first 60 days of the unit outage that initially began on March 1, 2022.*
 - *During this administratively established 60-day period, Category B personnel would be permitted to resume work schedules that include more hours per week than the number of hours per week permitted during normal unit operations in accordance with 10 CFR 26.205(d)(7). However, during this 60-day period, Category B personnel would be provided the minimum number of days off that would be required during the first 60 days of a unit outage, in accordance with 10 CFR 26.205(d)(4).*
 - *TVA would potentially have the opportunity to extend the administratively established 60-day period for Category B personnel, in accordance with the limitations discussed in 10 CFR 26.205(d)(6). If TVA were to administer such an extension, then when calculating the allowed duration of the extension for these individuals, TVA would consider the hours worked by those individuals during the administratively established 60-day period (as opposed to considering the hours worked during the first 60 days of the unit outage that began on March 1, 2022).*
 - *The exemption for Category B personnel would end when the Watts Bar, Unit 2 generator is synced to the electrical grid, and TVA would resume control of work hours in accordance with 10 CFR 26.205(d)(7).*

Based on the NRC staff's understanding, as described above, an exemption would be needed from 10 CFR 26.205(d)(7) to allow for normal work hour controls to be relaxed during the administratively established 60-day time period.

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Confirm that the NRC staff's understanding, as described above, is correct regarding the exemption request, as it applies to Category B personnel.

2. *Regarding Category A personnel, the NRC staff's understanding of TVA's request is that the following condition would apply:*
 - o *When the Watts Bar, Unit 2 generator is synced to the electrical grid, the exemption for Category A personnel would end at that time, and TVA would resume control of work hours for these personnel in accordance with 10 CFR 26.205(d)(7).*

Confirm that the NRC staff's understanding, as described above, is correct regarding the exemption request, as it applies to Category A personnel.

TVA Response

1. TVA confirms that the NRC's understanding, as described above, is correct regarding the exemption request, as it applies to Category B personnel.
2. TVA confirms that the NRC's understanding, as described above, is correct regarding the exemption request, as it applies to Category A personnel.

Request for Additional Information:

1. *Section 26.9 of 10 CFR states, in part, that the Commission may grant exemption from the requirements in 10 CFR Part 26 as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.*

To support the NRC's determination as to whether the requested exemption would be otherwise in the public interest, NRC staff are seeking clarification regarding the extent to which TVA took reasonable measures to recognize and mitigate the challenges that necessitated this requested exemption from regulatory requirements. To address this consideration, provide the following information:

- a. *Explain what margin, if any, was incorporated into the scheduling of work for the SGR project to account for potential weather-related delays. Specifically, explain how seasonally expected weather conditions were considered when establishing margin within the schedule, and explain why the weather delays that occurred could not have been reasonably anticipated and planned for in the outage schedule.*
- b. *Explain why the issues that led to the emergent discovery delays listed in Table 4 could not reasonably have been identified and resolved prior to the commencement of the refueling outage.*
- c. *Describe any other factors, beyond those discussed in the responses to items a and b above, that reasonably affected TVA's ability to conduct planning in a rigorous/thorough manner to allow for identification of potential issues ahead of time.*

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2. *Section 26.9 of 10 CFR states, in part, that the Commission may grant exemption from the requirements in 10 CFR Part 26 as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.*

Section VI of the submittal states the following:

“The added flexibility will provide additional safety margin. There is no negative impact to the public interest as a result of this exemption request while the benefit to the affected employees will result in a positive impact to the public interest.”

Provide additional details to support this statement, addressing the following:

- a. *Given that the normal outage-related limits on work hours are intended to provide scheduling flexibility that is reasonable to support outage activities while still preventing the unsafe accumulation of fatigue, explain how the added flexibility under the requested exemption would provide additional safety margin.*
- b. *Discuss how the requested exemption is expected to result in benefit to the affected employees, considering that they will be working under extended work-hour conditions.*
- c. *Discuss any other factors that may have been considered that justify why the requested exemption would be in the public interest.*

TVA Response to RAI 1

- a. TVA developed a project risk register as shown below in Table 1 to this enclosure. This risk register was developed using industry and TVA fleet operating experiences with a focus on the Sequoyah Nuclear Plant (SQN) Units 1 and 2, and Watts Bar Nuclear Plant (WBN) Unit 1 steam generator (SG) replacements. The SQN Unit 2 SGs were replaced during the fall 2012 outage (U2R18), and the WBN Unit 1 SGs were replaced during the fall 2006 outage (U1R7). The SQN Unit 1 SGs were replaced in the spring 2003 outage (U1R12). TVA did not have similar experiences with significant wind or snow events during the previous SG replacement outages.

The WBN Unit 2 SGR project was originally scheduled for the fall 2023 outage (U2R5), but it was accelerated to the spring 2022 outage (U2R4) due to inservice inspection results on the original SG-3 (OSG3). Additionally, the outage start date was moved to March 1, 2022, from the planned start date of April 14, 2022, which is typical for a WBN Unit 2 18-month cycle, due to the operational assessment on OSG3, limiting its run time based on the SG inspection results during the fall 2020 outage (U2R3) and the subsequent Cycle 4 fall 2021 mid-cycle outage. Rescheduling the start date of the U2R4 SGR outage was a significant impact for a project of this magnitude in terms of preparation and schedule, while also planning the fall 2021 mid-cycle outage that included inspection of all four SGs. The focus on the risk register was around potential emergent discovery issues based on previous experience. TVA was not able to predict when wind events will occur related to the actual lifts, and it is not typical outage scheduling practice to include external weather impacts directly in the outage schedule. If the weather events are placed in the schedule and do not

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occur as scheduled, then this significantly impacts the outage schedule, job preparation, and coordination, and adversely impacts the overall outage schedule and personnel safety.

Table 1 – Summary of SGR Risk Register		
#	Risk Item	Potential Impact
1	Safety – Behavior reinforcement standdowns	1-day
2	Weather Delays – Severe weather was estimated to include multiple events, three events for a total of one day. This was related to potential tornado watches based on the SQN Unit 1 SGR in the spring.	1-day
3	Property Damage – Liquidated damages values assigned for standdowns	1/2-day
4	Radiological Conditions – Additional shielding or system flushing	1-day
5	Radiological Release – Free release of vendors equipment	8-hours
6	Polar Crane – Delays due to polar crane being returned to plant	2-day
7	Pipe Weld Rejects – Critical path push for reactor coolant system (RCS) welds	1-day
8	Steel Containment Vessel Weld Reject – Push for critical path for weld rejects	1-day
9	Loss of Containment Power – Inside containment	1-day
10	Rigging Incident - Crane related	1-day
11	Rigging incident non-crane	1-day
12	Contract Liquidated Damages - Added to ensure time for standdowns	1/2-day
13	Dropped Objects – For standdowns	1-day
14	Crane Failures – Based on pre-outage inspections and crane vendor (Simmers)	1-day
15	Concrete Form Failure or Blowout	1-day
16	Radiography Violation – For boundary violation and NRC review	1-day
Total Potential Schedule Impact		15 days, 8 hours

A cross-discipline team reviewed this risk register and based on the potential aggregate impact, determined that nine days of schedule margin would be added to the schedule, as not all items would likely be a concurrent impact. The aggregate impact on actual weather and emergent discovery items, as of April 24, 2022, is 21 days 20 hours. The heavy lifts related to SGR and the use of the large crane have been completed. However, there is still additional potential for

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emergent issues related to pipe fit-up, welding, support system/component reinstallation, duct-work replacement, and insulation work.

- b. Below is a revised Table 4 from TVA Letter CNL-22-054 (Reference) with the TVA response to RAI 1.b.

Revised CNL-22-054 Table 4 – U2R4 Emergent Discovery Delays		
Date	Description	Outage delays (hours)
3/27/2022	<p>Main steam rigging frame did not function as designed which required a modification to the frame.</p> <p>RAI 1.b response: This issue was a result of an inadequate engineered frame design. When the frame was attached to the pipe and it was rigged up to the horizontal position, the frame bowed. This was a latent design error that was not foreseeable.</p>	11
3/29/2022	<p>Supports PD-15 and PD-21 on SG-1 and SG-2 required significantly more cutting than planned.</p> <p>RAI 1.b response: The SG cubicles were mapped and modeled, and the cuts were designed based on this model. The tolerances inside ice condenser plant cubicles are restrictive, and there was not enough margin provided in the model's output resulting in additional cuts being required. This was a mapping and modeling limitation.</p>	72
4/4/2022	<p>The SG-1 main steam line pipe has ovality issues, which prevented the cutting machine from effectively cutting the pipe and caused the machine to break.</p> <p>RAI 1.b response: The ovality issues were not obvious. Previous project operating experiences did not indicate that this was an issue that TVA should have pre-measured or considered.</p>	8
4/4/2022	<p>Identified a fit-up issue between the RSGs and the support columns that required multiple columns to be relocated, template plates to be manufactured and foot bolts holes to be elongated.</p> <p>RAI 1.b response: The cold spring movement of the columns did not occur until after the SGs were cut out and removed. Previous project operating experience did not identify this significant column support movement.</p>	100
4/10/2022	<p>The setup of the equipment to machine the SG-3 cold leg reactor coolant system was delayed due to the manufactured condition of the interior of the cast pipe.</p>	136

Revised CNL-22-054 Table 4 – U2R4 Emergent Discovery Delays		
Date	Description	Outage delays (hours)
	RAI 1.b response: This was an internal condition in the piping that was not identifiable until the pipe was cut and inspected.	
4/12/2022	Center of gravity of the original steam generator is preventing the straight vertical lift required to remove the construction shims and install permanent shims. RAI 1.b response: This was an apparent manufacturing issue that changed the center of gravity from the design by a small amount, requiring a one-inch shim. The SG was shipped and maintained horizontal until the project used the upender to perform the final vertical lift into the plant. Previous trunnion design used at SQN Unit 2 did not identify similar issue.	60
4/13/2022	The lower compartment cooler ductwork around the SGs was planned to be removed in sections; however, due to interferences, the ductwork was cut into sections for removal and will require additional time and resources to weld the pipe back together. RAI 1.b response: The area around this ductwork is inaccessible for pre-inspection and walkdowns, based on the piping and insulation run over and around the area. WBN Unit 1 had room to move the ductwork aside without cutting it into pieces. Based on small differences in how piping and insulation was installed on WBN Unit 2, TVA did not have the same amount of room and had to make cuts, which requires complicated welding to be completed to repair.	217
Total Hours		604 (25.2 days)

- c. The following are qualitative issues that, in aggregate, have impacted the SGR project schedule to complete the SGR related activities under the 10 CFR 26 regulations.
1. The revisions to the SGR project schedule as discussed in the TVA response to RAI 1.a resulted in pre-outage work starting later than normal and continued through the start of the outage.
 2. The security uninterrupted power supply was out of service twice (February 8, 2022, and February 16, 2022) due to emergent issues, limiting access to the WBN north portal and requiring manual access controls. This impacted workhours during those days for pre-outage work.
 3. The SGR project received less craft resources than originally requested and planned. This limited the days off to maintain scheduled activities on-track and impacted the ability to bank hours for the post 60-day period. Additionally, the craft resources that

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were received contained an unusual number of new to nuclear workers that required additional time and effort which resulted in production losses for scheduled activities with durations originally planned based on recent fleet outage experience. Examples below.

- The background investigation data range (December 1, 2021, to April 12, 2022) for the staff-up for the SGR project showed that 52.7 percent of the population was either new to nuclear with initial background checks or updated background checks for personnel out of nuclear from one to three years.
- The SG Team (SGT) project received 30 less carpenters than originally requested, which created a delay in building scaffolding early in the outage, resulting in downstream delays to work for additional craft resources.
- Four people were needed to align and bolt up the RSG foot pad bolts. There were no more than four personnel on the crew resulting in a mixture of experienced and new to nuclear workers doing the bolting.
- Legacy issues required using people on aligning the columns and making templates for the foot pad bolting due to misalignment of the OSGs from original construction. None of the workers were familiar with the process and had to learn on the job. The manpower for this work came from the same crews setting them.

Reference

1. TVA Letter to NRC, CNL-22-054, "Request for Exemption from Requirements of 10 CFR 26.205(d)(4), 26.205(d)(6) and 26.205(d)(7), 'Fitness for Duty Programs – Work Hours'," dated April 15, 2022 (ML22105A579)

TVA Response to RAI 2

- a. The proposed exemption will provide more flexibility for scheduling personnel because covered individuals will be able to work an additional day per week. This increased flexibility will provide additional opportunity to identify and address any issues that may arise. Promptly identifying and correcting issues provides additional safety margin to plant personnel and outage craft resources. A similar response was provided by First Energy Corporation on June 9, 2010, in response to an RAI by the NRC (ML101600134) regarding a similar exemption request, which was approved by the NRC [see second bullet in Section VII, "Precedent," of the proposed exemption request (TVA Letter CNL-22-054)].
- b. The main purpose behind the work hour rule was to improve safety by managing fatigue. One of the underlying goals was to improve worker quality of life. Although not relevant to the main purpose of the rule to improve safety by managing fatigue, TVA believes that the flexibility contained in this exemption request will not only be helpful in promoting an effective and efficient startup, but the flexibility also will improve covered employee quality of life by providing additional resources while at work and potentially the opportunity to schedule the day off to a day more convenient to the employee. Furthermore, much of the SGT personnel are transient trade craft. A reduction in work hours would delay the project time and keep the employees away from home longer than expected. A similar response was provided by First Energy Corporation on June 9, 2010, in response to an RAI by the NRC (ML101600134) regarding a similar exemption request, which was approved by the NRC [see second bullet in Section VII, "Precedent," of the proposed exemption request (TVA Letter CNL-22-054)].

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- c. Approval of this exemption request would ensure that TVA has the needed resources to complete the WBN SGR outage as currently scheduled, avoiding unnecessary impacts to TVA's ability to provide safe and reliable power to the Tennessee Valley during the summer reliability period beginning May 25, 2022. Without the exemption approval, TVA will be challenged from a reliability and environmental compliance perspective, especially as its service territory moves into warmer weather and resulting higher loads. This would result in TVA committing other generators and/or acquiring off-system energy replacements. If some or all of any market replacements can only be procured on a non-firm basis, there is a reliability risk if they are not available. TVA will also be challenged by, or potentially unable to comply with, new emissions regulations limiting generation at its fossil sites, if it needs to commit fossil units to cover the energy that WBN was planned to provide for the system based on its original outage schedule.