
Watts Bar Nuclear Plant

Watts Bar Nuclear Plant (WBN)

Pre-submittal Meeting for Application to Revise the Measurement Units for the Watts Bar Nuclear Plant Unit 1 and Unit 2 Technical Specifications for the Containment Vent Isolation Instrumentation and Control Room Emergency Ventilation System Radiation Monitors

April 28, 2021

Agenda

- Opening Remarks
- Reason for the Proposed Change
- Technical Analysis
- Proposed Technical Specification Changes
- Discussion
- Conclusion
- Precedent
- Schedule Milestones
- Closing Remarks
- Background

Opening Remarks

- The purpose of this meeting is to discuss a proposed license amendment for WBN Units 1 and 2.
- TVA is requesting a change to Technical Specification (TS) 3.6.6, "Containment Vent Isolation Instrumentation" and TS 3.3.7, "Control Room Emergency Ventilation System (CREVS) Actuation Instrumentation," to delete a redundant unit of measure associated with the trip setpoint of TS Table 3.3.6-1, Function 3, "Containment Purge Exhaust Radiation Monitors" and TS Table 3.3.7-1, Function 2, "Control Room Radiation Control Room Air Intakes".
- This presentation will discuss the basis for the proposed TS changes.

Reason for the Proposed Change

- The current TS trip setpoint contains units of both microcuries per cubic centimeter ($\mu\text{Ci/cc}$) and counts per minute (cpm).
- The cpm units are specific to the installed radiation monitors and would require a change to the TSs if or when the radiation monitors were replaced with a different type.
- The unit of $\mu\text{Ci/cc}$ is consistent with the units assumed in the TVA calculation for the safety limit and is independent of the unit of measure based on a specific radiation monitor type or manufacturer.

Technical Analysis

Containment Air Purge Exhaust Monitors

- The primary containment exhaust is monitored by redundant radiation detectors which provide automatic Reactor Building Purge Ventilation System isolation upon detecting the setpoint radioactivity in the exhaust air stream.
- Allowable Value (AV) limits for these monitors are provided in the plant TS and is based on expected concentrations for a small break loss of coolant accident (LOCA) and ensures the dose is well below the regulatory limits.
- The cpm for the WBN Unit 2 containment purge exhaust radiation monitors (i.e., $2.8E+04$ cpm) is different from the cpm for WBN Unit 1 containment purge exhaust radiation monitors (i.e., $1.14E+04$ cpm) due to differences in the detector sensitivities for the instruments in Units 1 and 2.
 - Future design change planned to make the monitors consistent for both units.

Technical Analysis

Main Control Room Air Intake Monitors

- Two redundant safety-related radiation monitor assemblies continuously monitor the normal intake air to the main control room (MCR) for an indication of abnormal airborne activity. In the event of an alarm condition in the normal intake, the radiation monitors initiate MCR isolation and the MCR ventilation cleanup unit.
- The TS AV limits for these monitors is based on 10 CFR 50, Appendix A, Criterion 19 exposure limits considering the most limiting accident, which has been determined to be a steam generator tube rupture event.

Proposed Technical Specification Changes for WBN Unit 1

Table 3.3.6-1 (page 1 of 1)
Containment Vent Isolation Instrumentation

FUNCTION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Manual Initiation	2	SR 3.3.6.6	NA
2. Automatic Actuation Logic and Actuation Relays	2 trains	SR 3.3.6.2 SR 3.3.6.3 SR 3.3.6.5	NA
3. Containment Purge Exhaust Radiation Monitors	2	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ 2.8E-02 μCi/cc (2.8E+04 cpm)
4. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		

Proposed Technical Specification Changes for WBN Unit 1

Table 3.3.7-1 (page 1 of 1)
CREVS Actuation Instrumentation

FUNCTION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Manual Initiation	2 trains	SR 3.3.7.3	NA
2. Control Room Radiation Control Room Air Intakes	2	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.4	$\leq 1.647E-04 \mu\text{C/cc}$ (3,308 cpm)
3. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		

Proposed Technical Specification Changes for WBN Unit 2

Table 3.3.6-1 (page 1 of 1)
Containment Vent Isolation Instrumentation

FUNCTION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Manual Initiation	2	SR 3.3.6.6	NA
2. Automatic Actuation Logic and Actuation Relays	2 trains	SR 3.3.6.2 SR 3.3.6.3 SR 3.3.6.5	NA
3. Containment Purge Exhaust Radiation Monitors	2	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	$\leq 2.8E-02 \mu\text{Ci/cc}$ $(1.14 \times 10^4 \text{ cpm})$
4. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		

Proposed Technical Specification Changes for WBN Unit 2

Table 3.3.7-1 (page 1 of 1)
CREVS Actuation Instrumentation

FUNCTION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Manual Initiation	2 trains	SR 3.3.7.3	NA
2. Control Room Radiation Control Room Air Intakes	2	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.4	$\leq 1.647E-04 \mu\text{C}/\text{cc}$ (3,308 cpm)
3. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.		

Discussion

- Equivalent units of measure are shown in TS 3.3.6 and TS 3.3.7 for the Trip Setpoint Allowable Values.
- These equivalent units of measure were previously approved and placed in the TS.
- The unit of $\mu\text{Ci}/\text{cc}$ is consistent with the units assumed in the TVA calculation for the safety limit and is independent of the unit of measure based on a specific radiation monitor type or manufacturer.
- The cpm units are specific to the installed radiation monitors.
- Removal of the equivalent cpm units of measure is requested.

Conclusion

- The proposed LAR in support of removing redundant units of measure from TS Tables 3.3.6-1 and 3.3.7-1 is acceptable because the AVs of the radiation monitoring instrumentation are not being changed.
- The radiation monitors continue to perform their intended safety function as currently described in the TS.

Precedent

- This LAR is similar in nature to License Amendments 231 and 228 for the Joseph M Farley Nuclear Plant, Units 1 and 2, respectively dated October 13, 2020 (ML20224A285), which revised TS 3.3.7, "Control Room Emergency Filtration/Pressurization System (CREFS) Actuation Instrumentation," to change the unit of measure associated with the trip setpoint of TS Table 3.3.7-1, Function 3, "Control Room Radiation Control Room Air Intake (R 35A, B)," from ≤ 800 cpm to an equivalent value of $\leq 1.0 \times 10^{-5}$ $\mu\text{Ci}/\text{cc}$.
- As noted in Section 2.2.2 of ML20224A285, the purpose of this change was "to provide a universal trip setpoint value that allows for flexible changes in radiation monitoring equipment without the need for an associated TS change."
- The propose change in this LAR is similar to the Farley precedent in that the cpm units are specific to the installed radiation monitors, whereas the unit of $\mu\text{Ci}/\text{cc}$ is consistent with the units assumed in the TVA calculation for the safety limit and is independent of the unit of measure based on a specific radiation monitor type or manufacturer.

Schedule Milestones

- April 28, 2021 – LAR Pre-Submittal Meeting with NRC
- May 28, 2021 – LAR Submittal – Request NRC approval within 12 months of submittal with 30-day implementation
- May 28, 2022 – NRC Approval of LAR (Requested)

TVA

**TENNESSEE
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AUTHORITY**

Background

TS Table 3.3.6-1, Function 3

- WBN Unit 1 License Amendment 74 (Reference 1) dated January 8, 2009 (ML083380369) revised the AV for the containment purge exhaust radiation monitors in Function 3 from $\leq 8.41E-02 \mu\text{Ci/cc}$ ($8.41E+04 \text{ cpm}$) to $\leq 2.8E-02 \mu\text{Ci/cc}$ ($2.8E+04 \text{ cpm}$) in order to resolve a non-conservatism for this AV when operating in Modes 1 through 4.
 - The previous AV of $\leq 8.41E-02 \mu\text{Ci/cc}$ ($8.41E+04 \text{ cpm}$) was retained only for during movement of irradiated fuel assemblies within containment. As noted in Section 4.0 of ML083380369, the revision to the setpoint values for the containment purge exhaust radiation monitors did not change the function or operation of the Containment Purge Air Exhaust System.
- Subsequently, in WBN Unit 1 License Amendment 92 dated June 19, 2013 (ML13141A564), which implemented the alternate source term methodology, WBN Unit 1 TS Table 3.3.6-1 was revised to eliminate the requirements associated with movement of irradiated fuel in the containment or the fuel handling area. Consequently, the AV of $\leq 8.41E-02 \mu\text{Ci/cc}$ for the containment purge exhaust radiation monitors, which applied during movement of irradiated fuel assemblies within containment, was eliminated and the current AV of $\leq 2.8E-02 \mu\text{Ci/cc}$ ($2.8E+04 \text{ cpm}$) for the containment purge exhaust radiation monitors was retained.

Background

TS Table 3.3.6-1, Function 3 (cont'd)

- When WBN Unit 2 was licensed on October 22, 2015 (ML15273A064), the AV of $\leq 2.8E-02$ $\mu\text{Ci/cc}$ was also applied to Function 3 in WBN Unit 2 TS Table 3.3.6-1
- However, the cpm for the WBN Unit 2 containment purge exhaust radiation monitors (i.e., $2.8E+04$ cpm) is different from the cpm for WBN Unit 1 containment purge exhaust radiation monitors (i.e., $1.14E+04$ cpm). The rationale for this difference was described in the TVA response to Nuclear Regulatory Commission (NRC) comments on the development of the WBN Unit 2 TS (ML11174A282), which stated “The values in parentheses are different for the two units because of differences in the detector sensitivities for the instruments in Units 1 and 2.”

Background

TS Table 3.3.7-1, Function 2

- WBN Unit 1 License Amendment 41 dated November 18, 2002 (ML023240483) revised the AV for the control room radiation control room air intakes in Function 2 from the initial licensed value of $\leq 5.77\text{E-}04$ $\mu\text{Ci/cc}$ (20,199 cpm) to $\leq 9.45\text{E-}05$ $\mu\text{Ci/cc}$ (3,308 cpm) due to TVA's reanalysis of the dose calculations for the main steam line break and the steam generator tube rupture accidents.
- Subsequently, in WBN Unit 1 License Amendment 91 dated December 5, 2012 (ML12279A115), the AV for Function 2 was changed to its current value of $\leq 1.647\text{E-}04$ $\mu\text{Ci/cc}$ (3,308 cpm) due to an error correction in the calculation of the AV.
- When WBN Unit 2 was licensed, the AV of $\leq 1.647\text{E-}04$ $\mu\text{Ci/cc}$ (3,308 cpm) was also applied to Function 2 in WBN Unit 2 TS Table 3.3.7-1.