Watts Bar Nuclear Plant
Proposed License Amendment Request
Diesel Generator 14-Day AOT

November 19, 2015

Agenda

Diesel Generator 14-Day Completion Time

- Completion Time Change History
- System Overview
- Need for Future Change
- Change Analysis
- Other Changes

Summary

Questions

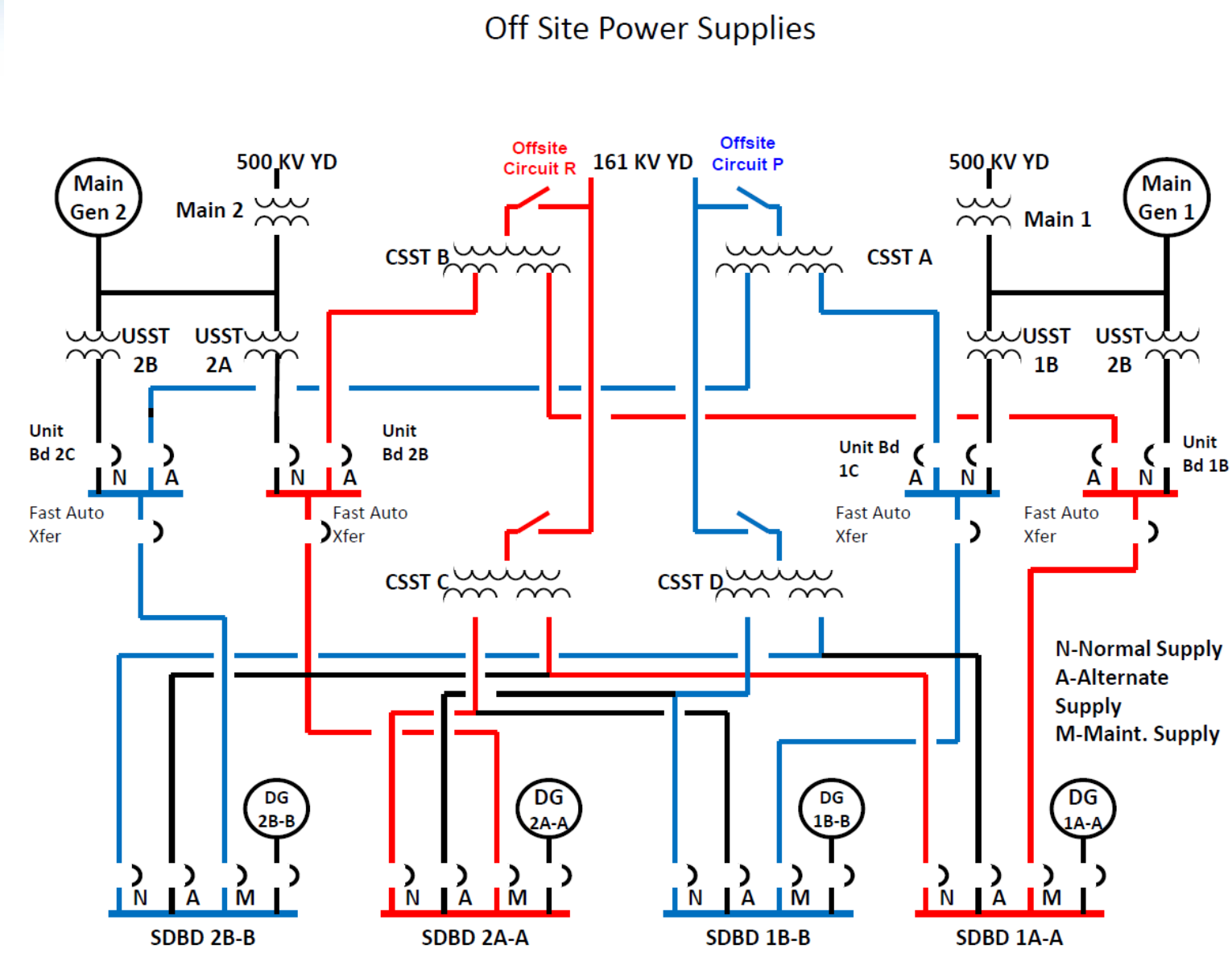
Completion Time Change History

- **Original WBN Unit 1 Technical Specification**
  - November 9, 1995
  - 72 hour Completion Time for One Inoperable Diesel Generator (DG)
- **Amendment 30**
  - December 12, 2000
  - DG 1B-B Inoperable for 10 days (One-Time)
- **Amendment 39**
  - July 7, 2002
  - 14 Day Completion Time
  - Risk-Informed Based on Unit 1 Operation Only
- **Amendment 84**
  - July 6, 2010
  - 72 Hour Completion Time
  - Implementation Delayed for Unit 1 until Prior to Unit 2 Entering MODE 4
- **WBN Unit 2 Operating License**
  - October 22, 2015
  - 72 Hour Completion Time

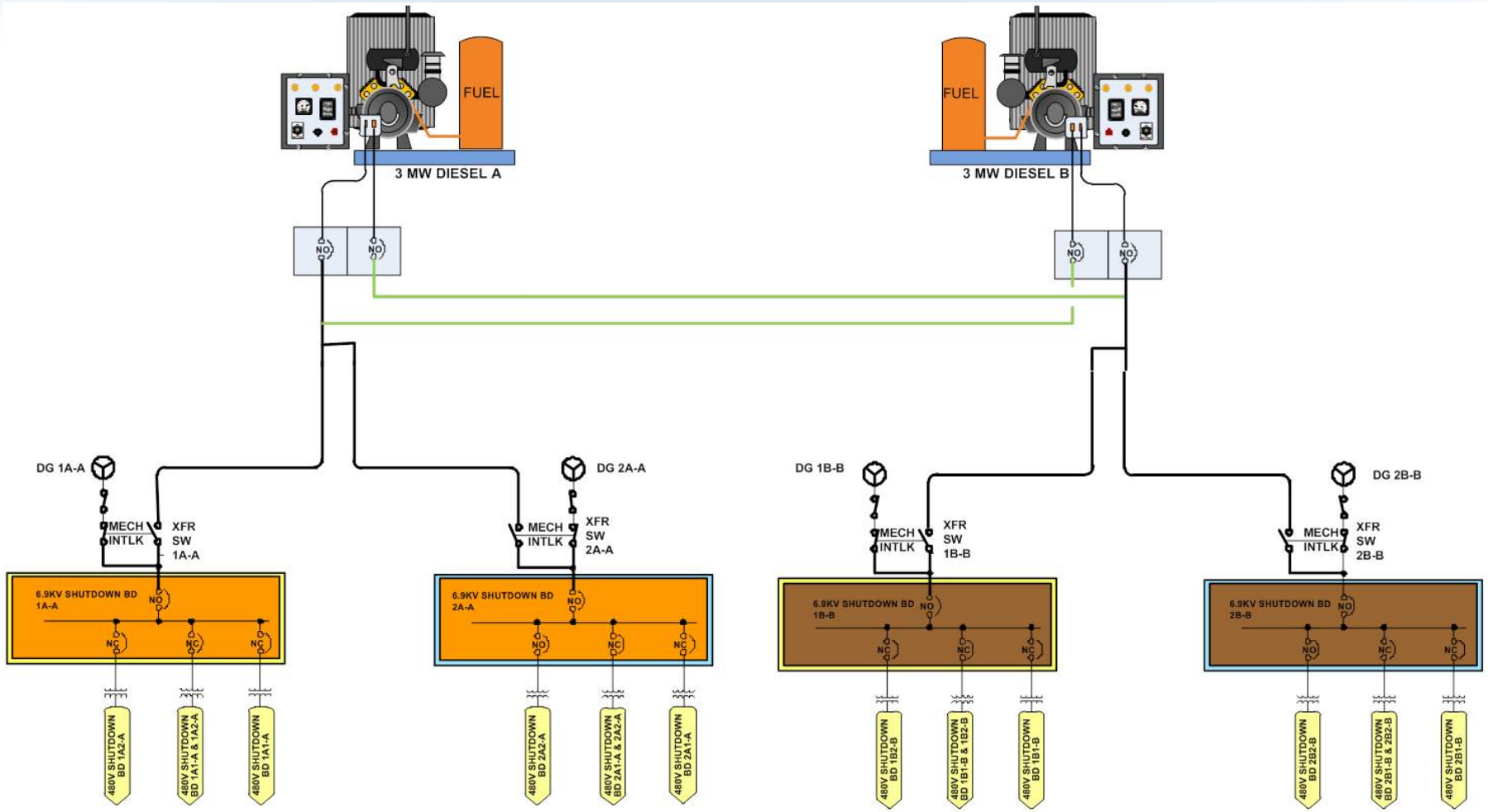
Electrical System Overview

- **Grid and Interconnections**
  - 500 kV (Power Distribution)
  - 161 kV (Preferred Power Source)
- **Plant Power System**
  - 500 kV Power Distribution
  - 161 kV Preferred Power Source
  - 6.9 kV Diesel Generators
- **Mitigating Strategies Power**
  - 6.9 kV FLEX Diesel Generators

Off Site Power Supplies



FLEX Diesel Generator Connections



Need for Completion Time Change

- Allow sufficient time to perform planned DG surveillance testing and maintenance.
- Prevent Unnecessary Dual-Unit Shutdown.
- Prevent Request for Enforcement Discretion.

Planned DG Outages	Outage Duration Each DG
Spring 2016	96 hours
Summer – Fall 2017	72 hours
2019	96 hours
2021	120 hours

Limiting Maintenance	Outage Duration
6-year maintenance	96 hours
4-year maintenance	96 hours
18-year maintenance	120 hours

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~B~~C. ~~One or more~~Two DG~~(s)~~ in Train A inoperable. OR ~~One or more~~Two DG~~(s)~~ in Train B inoperable.	~~B~~C.1 Perform SR 3.8.1.1 for the required offsite circuits. AND	1 hour AND Once per 8 hours thereafter
	~~B~~C.2 Declare required feature(s) supported by the inoperable DG~~(s)~~ inoperable when its required redundant feature(s) is inoperable. AND	4 hours from discovery of Condition ~~B~~C concurrent with inoperability of redundant required feature(s)
	~~B~~C.3.1 Determine OPERABLE DG~~(s)~~ are not inoperable due to common cause failure. OR	24 hours
	~~B~~C.3.2 Perform SR 3.8.1.2 for OPERABLE DG~~(s)~~. AND	24 hours

(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~B~~C. (continued)	~~B~~C.4 Restore ~~required~~ DG~~(s)~~ to OPERABLE status.	72 hours AND 6 days from discovery of failure to meet LCO

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore required offsite circuit to OPERABLE status.	72 hours AND ~~6~~17 days from discovery of failure to meet LCO
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the required offsite circuits. AND B.2 Evaluate availability of 6.9 kV FLEX DG. AND B.3 Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. AND	1 hour AND Once per 8 hours thereafter 2 hours AND Once per 12 hours thereafter 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) (continued)

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4.1 Determine OPERABLE DGs are not inoperable due to common cause failure. OR B.4.2 Perform SR 3.8.1.2 for OPERABLE DGs. AND B.5 Restore DG to OPERABLE status.	24 hours 24 hours 72 hours from discovery of unavailability of 6.9 kV FLEX DG AND 24 hours from discovery of Condition B entry ≥ 48 hours concurrent with unavailability of 6.9 kV FLEX DG AND 14 days AND 17 days from discovery of failure to meet LCO

(continued)

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Completion Time Change Analysis

- Regulatory Guide 1.93, R1, Availability of Electric Power Sources
  - Considered Seven Levels of System Degradation
  - Recommended 72 hours for one inoperable Diesel Generator
- Branch Technical Position 8-8, Onsite and Offsite Power Sources AOT Extensions
  - References use of RGs 1.174, 1.177, and 1.200
  - Discusses Defense-in-Depth Aspects
- Regulatory Guide 1.174, Changes to the Licensing Basis
  - Criteria Met
- Regulatory Guide 1.177, Changes to Technical Specifications
  - Criteria Met
- Regulatory Guide 1.200, Adequacy of Technical Results
  - Adequacy is Discussed In Submittal

BTP 8-8 Implementation

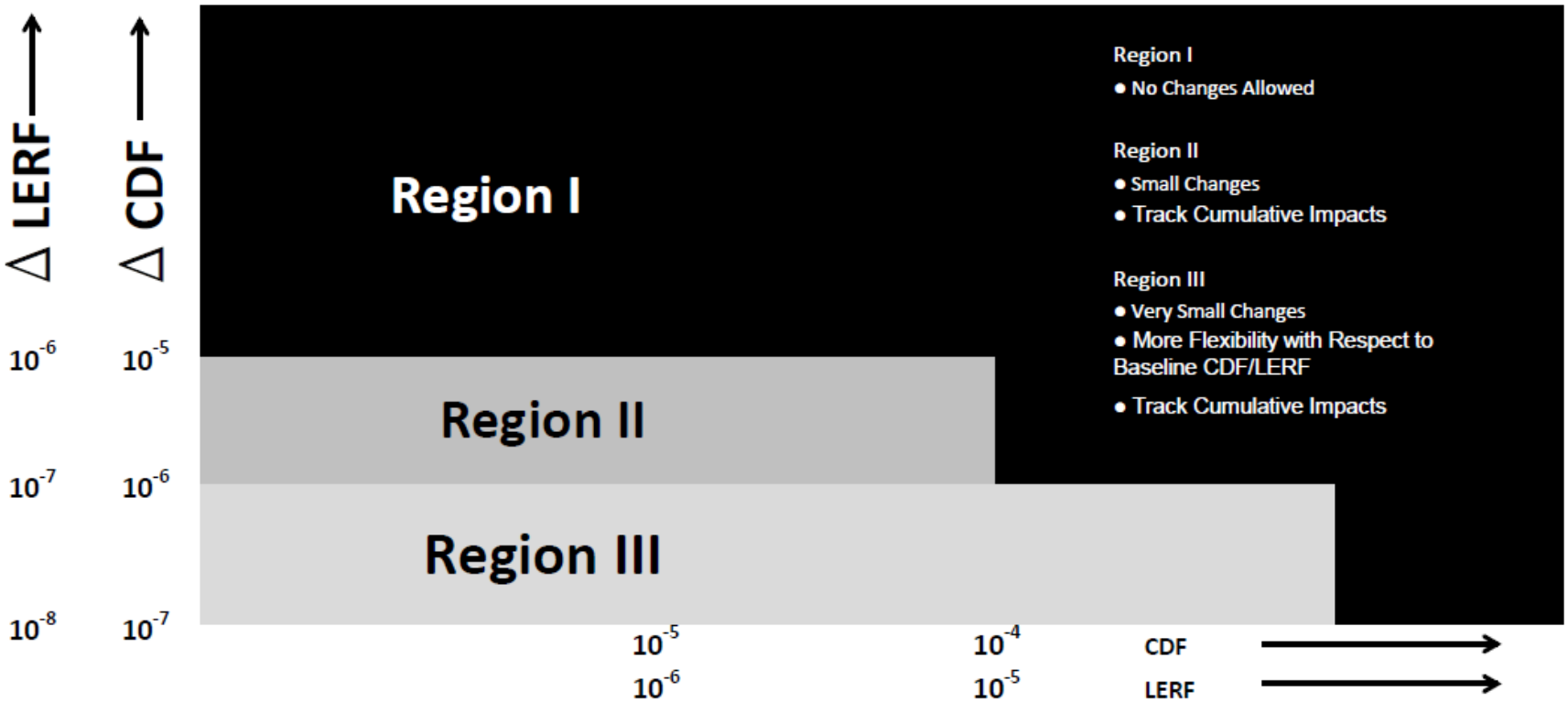
- A supplemental power source should be available as a backup to the inoperable DG or offsite power source. (FLEX DG)
- The supplemental source must have capacity to bring a unit to safe shutdown. (Section 3.3.3)
- Multi-unit sites that have installed a single AAC power source for SBO cannot substitute it for the inoperable diesel. (Not substituting SBO Source and have two FLEX DGs)
- Time to make the supplemental power source available should be approximately one hour. (Section 3.10.2)
- The availability should be verified within the last 30 days (rated voltage and frequency for 5 minutes and auxiliary support systems are available. (Commitment #7)
- Must assess ability to cope with loss of all AC power for one hour independent of an AAC power source. (Section 3.10.2)
- Formal engineering calculations for equipment sizing and protection and have approved procedures for connecting the AAC or supplemental power sources to the safety buses.
- AOT should be limited to 14 days to perform maintenance activities. (TS 3.8.1 RA B.5)
- The TS must contain RAs and CTs to verify that the supplemental AC source is available before entering extended AOT. (TS 3.8.1 RA B.2)
- The availability of supplemental power source shall be checked every 8-12 hours (once per shift). (TS 3.8.1 RA B.2)
- If the supplemental power source becomes unavailable any time during extended AOT, the unit shall enter the LCO and start shutting down within 24 hours. This 24-hour period will be allowed only once within any given extended DG AOT. (TS 3.8.1 RA B.5)

BTP 8-8 Fulfillment

Expected Regulatory Commitments (resolution)

- The extended AOT will be used no more than once in a 24-month period (or refueling interval) on a per diesel basis to perform DG maintenance activities, or any major maintenance on offsite power transformer and bus (#8)
- The preplanned maintenance will not be scheduled if severe weather conditions are anticipated. (Table 3.8.1-2 item #2)
- The system load dispatcher will be contacted once per day to ensure no significant grid perturbations (high grid loading unable to withstand a single contingency of line or generation outage) are expected during the extended AOT. (Already in-place, discussed in Section 3.8)
- Component testing or maintenance of safety systems and important non safety equipment in the offsite power systems that can increase the likelihood of a plant transient (unit trip) or LOOP will be avoided.(#3) In addition, no elective switchyard maintenance will be performed. (#4)
- TS required systems, subsystems, trains, components, and devices that depend on the remaining power sources will be verified to be operable and positive measures will be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices. (In-place, discussed in Section 3.8)
- Steam-driven emergency feed water pump(s) in case of PWR units, and Reactor Core Isolation Cooling and High Pressure Coolant Injection systems in case of BWR units, will be controlled as “protected equipment.” (#6)

NUREG 1.174 & 1.177, An Approach For Plant-Specific, Risk-Informed Decisions



Δ CDF	Unit 1	1.75×10^{-07}		Base CDF	Unit 1	1.12×10^{-05}
	Unit 2	1.56×10^{-07}			Unit 2	1.16×10^{-05}
Δ LERF	Unit 1	2.88×10^{-09}		Base LERF	Unit 1	8.95×10^{-07}
	Unit 2	3.59×10^{-09}			Unit 2	9.12×10^{-07}

ICCDP ($<10^{-06}$)	Unit 1	2.18×10^{-07}		ICLERP ($< 10^{-07}$)	Unit 1	8.55×10^{-09}
	Unit 2	2.63×10^{-07}			Unit 2	1.16×10^{-08}

Other Changes

- Requested TS Changes
  1. Amendment No. 84, in part, removed the allowance to substitute the C-S DG for any of the required DGs. With the removal of this allowance, the remaining DGs are all required. Therefore, it is no longer necessary to refer to the DGs as "required DGs"
  2. Remove a potential conflict between the requirements of SR 3.8.1.19 and the Note modifying SR 3.8.1.19
- Bases Changes
  1. Include Contingency Actions for SR 3.8.1.14 included in the WBN Unit 1 TS Bases in the WBN Unit 2 TS Bases

Summary

- The proposed Completion Time is consistent with NRC policy and will continue to provide protection of the public health and safety.
- The proposed change aligns with the objectives of the NRC's Policy Statement on the use of PRA methods, including safety decision-making enhanced by the use of PRA insights, more efficient use of resources, and reduction of unnecessary burden.
- In addition, the proposed change meets the following principles:
  1. It meets the current regulations.
  2. It is consistent with the defense-in-depth philosophy.
  3. It maintains sufficient safety margins.
  4. It results in acceptable risk metrics consistent with the criteria in RG 1.177 and RG 1.174 and is consistent with the NRC's Safety Goal Policy Statement, as implemented via the NRC Standard Review Plan, NUREG-0800.
  5. Its impact will be monitored using performance measurement strategies.

WBN DG 14-Day AOT Extension

Questions