

FAQ 18-02

Watts Bar Critical Hours – Proposed NRC Response

Plant: Watts Bar Nuclear Plant, Unit 2 (WBN 2)

Date of Event: 12/31/2017

Submittal Date: 2/21/2018

Engineer/Licensee Contact: Kim Hulvey/Beth Wetzel

Tel/email: (423) 365-7720/(423)751-2403

NRC Contact Jared Nadel Watts Bar Tel/email: (423) 365-1776

Performance Indicators:

IE01 WBNU2 Unplanned Scrams per 7000 Critical Hours (automatic and manual scrams during the previous four quarters)

IE03 WBNU2 Unplanned Power Changes per 7000 Critical Hours (over previous four quarters)

Site-Specific FAQ (Appendix D)? - Yes

FAQ to become effective when approved.

Question Section:

TVA requests the effective date of Watts Bar Unit 2 Unplanned Scrams per 7000 Critical Hours (IE01) and (IE03) Unplanned Power Changes per 7000 Critical Hours be extended until 3Q18 (through Jun 30, 2018) to allow sufficient data for an accurate assessment value. This request is based upon a October 22, 2015 NRC letter to TVA stating “If, as the licensee approaches four quarters after either the IE or MS cornerstones become monitored, new information shows that a PI may still not provide accurate assessment value, the Frequently Asked Questions process will be utilized in accordance with NEI 99-02 to reach a conclusion on how to proceed.”

NEI 99-02 Guidance needing interpretation:

NRC Letters to TVA dated November 21, 2016 (ML16326A210) and October 22, 2015 (ML15295A253).

NEI 99-02 Page 10 line 25

The number of unplanned scrams during the previous four quarters, both manual and automatic, while critical per 7,000 hours.

NEI 99-02 Page 14 line 9

The number of unplanned changes in reactor power of greater than 20% of full-power, per 7,000 hours of critical operation excluding manual and automatic scrams.

NEI 99-02 Page E-1 line 12

There are several reasons for submitting an FAQ:

NEI 99-02 Page E-1 line18

3. To request an exemption from the guidance for plant-specific circumstances, such as design features, procedures, or unique conditions.

Event or circumstances requiring guidance interpretation:

This FAQ concerns the Watts Bar Unit 2 new plant startup and subsequent March 23, 2017 Main Condenser failure that resulted in an estimated loss of 3100 critical hours for repair. The

FAQ 18-02

Watts Bar Critical Hours – Proposed NRC Response

reactor was shut down from March 23, 2017 until July 30, 2017 while extensive repairs were completed to the Main Condenser. The cause of the failure was inadequate vendor design (1970's vintage) of the condenser wall support structure leading to support and wall failure. In addition, an extended 39 day refueling outage was completed in the fourth Quarter of 2017. This resulted in an additional estimated loss of 930 critical hours. Being the first refueling outage following WBN Unit 2 commercial operation, many additional tests were required to meet commitments as dictated by the operating license. This resulted in a longer than baseline outage.

The main condenser repairs coupled with the extended refueling outage has resulted in a low number of critical hours (approximately 4588) for the period defined in the Oct 22, 2015 letter. For related background, WBN Unit 2 experienced two scrams and one unplanned power change for the previous 4 quarters. Details are as follows:

- A 1Q17 scram was caused when workers inadvertently depressed a local trip pushbutton on a Hotwell Pump. The pump trip resulted in a secondary plant transient and subsequent reactor scram. The event was attributed to human performance in that workers failed to practice situational awareness around scram sensitive equipment. Corrective actions included coaching Operations personnel on the need to control work activities near operating equipment and installation of bump guard covers on local pushbuttons for a number of Unit 2 secondary pumps.
- A 4Q17 scram was caused by an intermittent circuit card connection in the 2AC Rod Control Power Cabinet. The equipment malfunction resulted in 4 dropped control rods and a subsequent manual reactor scram by control room operators. Corrective actions included a 100% inspection of circuit card connections in the Rod Control Power Cabinets and replacement of suspect cards. No common cause was assessed to exist between the two scrams.
- A 3Q17 unplanned power change was caused by a Main Turbine steam leak.

If licensee and NRC resident/region do not agree on the facts and circumstances explain:

The NRC Watts Bar Site Resident Inspector was informed of this FAQ.

Potentially relevant FAQ's:

FAQ 13-01 Turkey Point Unplanned Scrams per 7000 Hours Critical
FAQ 17-04 Watts Bar Unit 2 MSPI Effectiveness Date

Response Section:

Proposed Resolution of FAQ:

Due to the uniqueness of new construction and starting-up a new unit, TVA requests a two quarter extension to the effective date for WBN Unit 2 IE01 and IE03 indicators (July 1, 2018) due to the loss of a significant number of critical hours. The IE01 indicator objective is to limit the frequency of those events that upset plant stability and challenge critical safety functions during power operations. The IE03 indicator monitors the number of unplanned power changes that could challenge safety functions. NEI 99-02 states that the indicators are based on 7000 critical hours which provides allowance for a routine outage. As of December 31, 2017, the total number of reported critical hours for 2017 was 4588. Extending the effective date to July 1, 2018 will allow four quarters of operation after the extended main condenser repair shutdown to provide a representative assessment result.

FAQ 18-02

Watts Bar Critical Hours – Proposed NRC Response

Additionally and unique to WBN Unit 2 as a newly licensed plant and in an NRC letter dated October 22, 2015 titled “Watts Bar Nuclear Plant, Unit 2 - Reactor Oversight Process Implementation and Partial Cornerstone Transition - Docket No. 50-0391,” the NRC provided a ROP transition plan. The plan stated IE01, IE03 and some MS performance indicators will not become valid (monitored only) until at least four (4) quarters after the cornerstone has been transitioned to the ROP. WBN Unit 2 transitioned to full ROP oversight on November 21, 2016. The 2015 letter also stated “If, as the licensee approaches four quarters after either the IE or MS cornerstones become monitored, new information shows that a PI may still not provide accurate assessment value, the Frequently Asked Questions process will be utilized in accordance with NEI 99-02 to reach a conclusion on how to proceed.”

Similar to this FAQ request, FAQ 17-04, Watts Bar Unit 2 MSPI Effectiveness Date, was recently approved by the NRC to grant an extension for MS01 (Emergency AC Power System), MS07 (High Pressure Injection System), MS08 (Heat Removal System) and MS10 (Cooling Water Systems). The basis for this extension was the loss of critical hours within the first 12 months of operation due to the main condenser repair outage.

If appropriate, provide proposed rewording of guidance for inclusion in next revision:
None

PRA update required to implement this FAQ? No

MSPI Basis Document update required to implement this FAQ? No

Proposed NRC Response:

Both the IE01 and IE03 performance indicators are baselined to an occurrence rate per 7,000 critical hours and include a built-in lower limit of 2,400 critical hours, under which the indicator output is “N/A” to preclude misleadingly high values at low critical hours. The ROP transition letter dated October 22, 2015, noted that, in order to establish the necessary baseline of critical hours to prevent falsely inflating the data, the IE01 and IE03 performance indicators would become valid after four full calendar quarters have passed following cornerstone transition to the ROP. Since the IE cornerstone was transitioned in November 2016, the IE01 and IE03 performance indicators became effective when 4Q2017 data was submitted. As of the end of 4Q2017, Watts Bar Unit 2 had accumulated more than 6,200 critical hours since initial startup, almost 2,700 critical hours following the main condenser maintenance outage, and the IE01 and IE03 performance indicator calculations for 4Q2017 included nearly 4,600 critical hours in the prior four quarters. Given that the 2,400 critical hour lower limit to preclude unreasonably high performance indicator values was vastly exceeded by both critical hours accrued since initial startup and the number of critical hours included in the 4Q2017 IE01 and IE03 reporting period, the staff views the IE01 and IE03 performance indicators as providing reasonable assessment values.

As noted by the licensee in this FAQ, the NRC previously approved an extension request of the MSPI performance indicators in FAQ 17-04. The ROP transition letter from October 22, 2015, referred to a sensitivity study on the impact of low critical hours on MSPI. The study concluded that MSPI, which nominally uses the prior 36 months of data in its calculation, would produce relatively normal values after 12 months of data. The ROP transition letter used this information in determining that the MSPI performance indicators would become valid for Watts Bar Unit 2 after 12 months of operation. Because of the roughly three months of lost critical hours, the

FAQ 18-02

Watts Bar Critical Hours – Proposed NRC Response

licensee requested an extension of the MSPI performance indicators by one quarter. The staff approved that request since the plant had not yet accrued the 12 months of minimum critical hours necessary for the performance indicators to provide a reasonably accurate assessment value.

The NRC reviewed FAQ 13-01, in which a similar request was made to extend the effective date of the IE01 performance indicator due to low critical hours following an extended outage. The final NRC response to that FAQ denied the request, noted that the IE01 performance indicator already had a built-in minimum limit before it became effective to preclude misleadingly high values, and concluded that low critical hours does not represent a unique condition that would warrant an exemption. Furthermore, the staff does not view the three month maintenance outage as an outage of sufficient length to reset performance indicator effective dates. An extended shutdown is defined in IMC 0608 as a condition in which a nuclear power reactor has been subcritical for at least six months. Additionally, the MSPI sensitivity study, while silent on the IE cornerstone, recommended that MSPI performance indicators be grayed out after a six month shutdown or greater. The staff also identified a recent three month refueling and maintenance outage (Grand Gulf in fall 2016) in which no performance indicators were grayed out or otherwise made invalid. The NRC has found no basis in this case to deviate from these prior staff positions.

The staff reviewed the two scrams that were included as inputs to the 4Q2017 performance indicator to determine whether they were indicative of issues unique to a new plant. In one instance workers inadvertently depressed a local trip pushbutton on a hotwell pump, with the resulting transient ultimately causing a plant scram. The second instance involved an intermittent circuit card connection that resulted in four dropped rods and a subsequent manual scram. The staff did not find these scrams to be situations unique to a new plant.

In summary, the NRC staff does not support granting Watts Bar Unit 2 a two quarter extension to the Unplanned Scrams per 7,000 Critical Hours performance indicator or the Unplanned Power Changes per 7,000 Critical Hours performance indicator.