

FAQ 17-05

Watts Bar 2 MSPI MS09 Effectiveness Date – Withdrawn, Final NRC Response

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

Date of Event: 3/23/17 (Condenser Failure)

Submittal Date: 11/2/2017

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NRC Contact: Jared Nadel Tel/email: 423-365-1776

Performance Indicator:

MS09 WBN U2 Mitigating System Performance Index (Residual Heat Removal System)

Site-Specific FAQ (Appendix D)? Yes

FAQ requested to become effective when approved.

Question Section:

TVA requests the effective date of Residual Heat Removal (RHR) MS09 MSPI indicator be extended until sufficient data is available to provide an accurate assessment value. This date has been determined to be the First quarter of 2019. The extension gives WBN Unit 2 RHR sufficient data and allows enough time to develop a trend.

The NRC documented the full transition of WBN Unit 2 to the Reactor Oversight Process (ROP) and the effective dates of the ROP indicators. The NRC also approved using the FAQ process if the information shows that the ROP indicators do not provide an accurate assessment value (Reference NRC Letters to TVA dated November 21, 2016 and October 22, 2015). This scheduled the indicators to be effective four quarters after the cornerstone is transitioned to the ROP. This MSPI indicator becomes effective the first quarter of 2018.

NEI 99-02 Guidance needing interpretation (include page and line citation):

Items:

1. FAQ 14-02
2. NRC Letters to TVA dated November 21, 2016 and October 22, 2015.

Event or circumstances requiring guidance interpretation:

During March 2017 during the first operating cycle Watts Bar U2 Condenser zone B failed and required extensive rework. The unit was not critical during this time resulting in a loss of 3100 critical hours. The cause of the failure was inadequate vendor design (1970's) of the condenser wall support structure leading to support and wall failure. In addition a 35 day refueling outage is planned for fourth Quarter of 2017 with an additional loss of 840 critical hours.

The RHR MSPI value will not have an accurate assessment value at four quarters due to the reliability value associated with the Motor Operated Valve (MOV) group. The group failure value is dominated by two MOVs that provide Loss of Coolant Containment Sump recirculation flow. The INPO CDE failure value as of September, 2017 is 6.4E-07.

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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. No feedback was provided by the resident.

Potentially relevant existing FAQ numbers:

1. FAQ 14-02 Fort Calhoun MSPI startup from extended shutdown. White paper discussed during the February 21, 2013 ROP WB Public Meeting -“Simulation of MSPI Indicator Reaction to Plant in Long Shutdown and Initial Startup.”
2. FAQ 17-00 Watts Bar U2 extension of MSPI 1 quarter due to loss of critical hours.

Response Section:

Proposed Resolution of FAQ:

Extend the effective date of the Watts Bar U2 Residual Heat Removal MSPI indicator 1 quarter due to the loss of critical hours and 3 quarters based on an inaccurate assessment value.

Details are contained in Watts Bar FAQ 17-00 due to the loss of critical hours associated with U2 condenser failure 1 additional quarter will be added before this indicator is effective.

The following details are provided to justify additional 3 quarters due to assessment value inaccuracy:

The additional 3 quarters is needed due to high risk ($X_d = 6.44E-7$) and low demands of RHR MOV valve group. The group is made up of the same 9 valves for both units with similar risk values. Based on MSPI calculation methods each failure of a MOV is evaluated at the same risk value. The U2 valve group has had 118 demands presently. The U1 RHR MOVs group, monitored over 12 quarters, has 271 demands and $X_d = 5.7E-7$. Based on the proposed effective date of the indicator, being January 2019 the demands for U2 is forecast to be same as U1. This would lower the U2 X_d to a value similar to U1.

The table below shows U1 and U2 Actual Data from INPO CDE.

Residual Heat Removal Actual September 2017

Measured Element	U2 Margin	U1 Margin
Residual Heat Removal Pump FTS	2	3
Residual Heat Removal Pump FTR	4	4
Motor Operated Valve	1	2
UA Residual Heat Removal Pump 2A	333	1644
UA Residual Heat Removal Pump 2B	333	1644
MSPI Results	-4.8E-08	-2.1E-07

Both units' data does not include any failures and the only difference is the time frame of the monitoring period (Critical hours, demands, and run hours). This table shows that U2 can have only one failure while U1 can have two failures and remain green. This is considered an inaccurate assessment (false positive condition) because if U2 was using data from three years like U1, then the indicator would be green with two failures instead of white.

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TVA had a contractor (author of NUREG 1816) prepare a report to document the basis for a three-year monitoring period used in NEI 99-02 for MSPI, which is attached. The report notes that false positives are possible during short monitoring periods. RHR MOVs are a good example where a four-quarter monitoring period does not provide an accurate assessment tool.

To determine when U2 data could tolerate two MOV failures like U1, the actual U2 data from September 2017 was placed in spread sheet. The monitoring period was increased in the spread sheet to determine when two MOV failures and 100 hours of unavailability would maintain the indicator green. This resulted in a January 2019 implementation date for RHR. The data results are shown below:

U2 Residual Heat Removal Case Forecast January 2019.

Quarters	No failures	1 MOV failures plus 60hrs UU	2 MOV failures plus 100hrs UU
Measured Element			
Residual Heat Removal Pump FTS	2 failure	1 failures	0 failures
Residual Heat Removal Pump FTR	4 failure	2 failures	0 failures
Motor Operated Valve	2 failures	1 failure	0 failure
UU Residual Heat Removal Pump 2A	986 hours	507 hours	10 hours
UU Residual Heat Removal Pump 2B	986 hours	507 hours	10 hours
MSPI Results	-1.7E-07	3.9E-06	9.9E-07

The RHR indicator evaluation determined that a January 2019 implementation date is needed to have an accurate assessment value.

Recommend the new effective date for Watts Bar U2 RHR indicator MS07 be set at January 1, 2019. The NRC will continue to gray out the affected Watts Bar U2 indicators on NRC web site for the through the fourth quarter of 2018.

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

NRC Response

The NRC approved the one quarter extension request for MS09 as a part of the approval of FAQ 17-04.

The three quarter extension request was withdrawn at the January 31, 2018 ROP public meeting. The basis for the withdrawal was that the valve demands projected for January 2019 were accrued during a refueling outage in fall 2017, which mitigated the concern about false positives with low critical hours.