

Industry/TSTF Standard Technical Specification Change Traveler

Revise SR 3.3.1.5, Calibration, and associated requirements for power range channels

Classification: 1) Correct Specifications

NUREGs Affected: 1430 1431 1432 1433 1434

Description:

SR 3.3.1.3 has been revised to replace the requirement to "Perform CHANNEL CALIBRATION" with "Adjust the power range channel imbalance output." The Bases associated with SR 3.3.1.3 have been revised to replace the reference to a "CHANNEL CALIBRATION" with "an adjustment" of the measured imbalance. The Note associated with SR 3.3.1.3 has been revised to correct a typographical omission by inserting a \geq symbol before 15% RTP.

SR 3.3.1.5 and its associated Bases have been deleted. SRs 3.3.1.6 and 3.3.1.7, and their associated Bases, have been renumbered to account for the deletion of SR 3.3.1.5.

Table 3.3.1-1 is modified to specify additional applicable SRs for Function 1.a, (CHANNEL FUNCTIONAL TEST every 45 days on a STAGGERED TEST BASIS and CHANNEL CALIBRATION every 18 months), Function 1.b (CHANNEL CALIBRATION every 18 months) and Function 8 (CHANNEL FUNCTIONAL TEST every 45 days on a STAGGERED TEST BASIS) and to correct the SR numbering as a result of the deletion of SR 3.3.1.5. As a result of the deletion of SR 3.3.1.5, the CHANNEL CALIBRATION formerly required by SR 3.3.1.5 for Functions 1.a, 1.b, and 8 has been deleted as an applicable SR.

Justification:

SR 3.3.1.5 currently specifies a CHANNEL CALIBRATION. However, the SR is not actually a calibration of the Function, but constitutes only an adjustment of the inputs to the Function. Since the definition of CHANNEL CALIBRATION is intended to encompass the sensor as well as the remainder of the entire channel, the use of this terminology is misleading and confusing, even with the addition of the Note to SR 3.3.1.5. SR 3.3.1.3 (performed every 31 days) measures the imbalance error and requires correction if the error is \geq [2]% RTP. The change to SR 3.3.1.3 will still require correction of the error when it is determined. The required normalization of power range channel output to the calorimetric coincident with the imbalance output being normalized to the incore output is adequately addressed by the combination of SRs 3.3.1.2 and 3.3.1.3.

A CHANNEL CALIBRATION and a CHANNEL FUNCTIONAL TEST have been added with SR frequencies consistent with the other RPS functions (i.e., 45 days staggered for the CFT and 18 months for the CHANNEL CALIBRATION). The proposed SRs are necessary to ensure the instrument drift is maintained within limits for these RPS Functions.

The proposed change results in modifying the testing requirements for three of the Functions listed in Table 3.3.1-1 as follows:

Function 1.a; The 92 day CHANNEL CALIBRATION of the power range channel is deleted. The calibration of the power range channel continues to be addressed by SR 3.3.1.2 and SR 3.3.1.3, as modified. An 18 month CHANNEL CALIBRATION is added along with a 45 day on a staggered test basis CHANNEL FUNCTIONAL TEST to ensure that instrument drift is maintained within acceptable limits for Function OPERABILITY.

Function 1.b; The 92 day CHANNEL CALIBRATION of the power range channel is deleted. The calibration of the power range channel continues to be addressed by SR 3.3.1.2 and SR 3.3.1.3, as modified. The 18 month CHANNEL CALIBRATION is added to require the Nuclear Overpower - Low setpoint function to be calibrated prior to initiating a shutdown bypass.

Function 8; The 92 day CHANNEL CALIBRATION of the power range channel is deleted. The calibration of the power range channel continues to be addressed by SR 3.3.1.2 and SR 3.3.1.3, as modified. A 45 day on a staggered test basis CHANNEL FUNCTIONAL TEST is added to ensure that instrument drift is maintained within acceptable

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limits for Function OPERABILITY.

The remainder of the changes to Table 3.3.1-1 are considered to be editorial in nature as they reflect the renumbering of the SRs due to the deletion of the requirements of SR 3.3.1.5.

The change to the SR 3.3.1.3 Note is made for consistency with the Note associated with SR 3.3.1.2.

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Revision History

OG Revision 0

Revision Status: Closed

Revision Proposed by: Oconee

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 22-Aug-1997

Owners Group Comments
ONS-001

Owners Group Resolution: Approved Date: 22-Aug-1997

TSTF Review Information

TSTF Received Date: 06-Nov-1997 Date Distributed for Review: 15-Dec-1997

OG Review Completed BWO WOG CEOG BWROG

TSTF Comments:

BWO to reevaluate the need for the change with Oconee. Compare with TSTF-131. Withdrawn.

5/13/98 - BWO still evaluating.

10/28/98 - BWO to provide revisions to justification. Return revision to TSTF for review.

TSTF Resolution: Superceded Date: 28-Oct-1998

OG Revision 1

Revision Status: Closed

Revision Proposed by: BWO

Revision Description:
Complete revision of the package.

TSTF Review Information

TSTF Received Date: 01-Nov-1998 Date Distributed for Review: 02-Nov-1998

OG Review Completed BWO WOG CEOG BWROG

TSTF Comments:

BWO only.

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OG Revision 1

Revision Status: Closed

TSTF Resolution: **Approved** Date: 07-Jul-1999

NRC Review Information

NRC Received Date: 20-Jul-1999

NRC Comments:

2/16/00 - Staff proposes adding SR 3.3.1.4 to Function 1.b in Table 3.3.1-1.

Final Resolution: **Supceded by Revision**

Final Resolution Date: 07-Mar-2000

TSTF Revision 1

Revision Status: Active

Next Action: NRC

Revision Proposed by: **BWOG**

Revision Description:

Revised to address NRC comments. Added SR 3.3.1.4 to Function 1.b in Table 3.3.1-1. Moved the requirement to adjust the power range channel imbalance output in SR 3.3.1.3 and the requirement to adjust the power range channel output in SR 3.3.1.2 to SR Notes to be consistent with the other PWR presentation. Also revised the second paragraph of the justification to address NRC comments.

TSTF Review Information

TSTF Received Date: 07-Mar-2000

Date Distributed for Review: 07-Mar-2000

OG Review Completed BWOG WOG CEOG BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: **Approved** Date: 07-Mar-2000

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.3.1	RPS Instrumentation
	Change Description: Table 3.3.1-1
SR 3.3.1.2	RPS Instrumentation
SR 3.3.1.2 Bases	RPS Instrumentation
SR 3.3.1.3	RPS Instrumentation
SR 3.3.1.3 Bases	RPS Instrumentation
SR 3.3.1.5	RPS Instrumentation
	Change Description: Deleted

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SR 3.3.1.5 Bases	RPS Instrumentation
	Change Description: Deleted
SR 3.3.1.6	RPS Instrumentation
	Change Description: Renamed SR 3.3.1.5
SR 3.3.1.6 Bases	RPS Instrumentation
	Change Description: Renamed SR 3.3.1.5
SR 3.3.1.7	RPS Instrumentation
	Change Description: Renamed SR 3.3.1.6
SR 3.3.1.7 Bases	RPS Instrumentation
	Change Description: Renamed SR 3.3.1.6

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.2</p> <p>NOTE</p> <p>Not required to be performed until [24] hours after THERMAL POWER is $\geq 15\%$ RTP.</p> <p>Compare results of $\left(\frac{\text{Calorimetric heat balance} - \text{power range channel output}}{\text{power range channel output}} \right)$ to $\pm [2]\%$ RTP.</p> <p>Adjust power range channel output if calorimetric exceeds power range channel output by $\geq [2]\%$ RTP.</p> <p>the absolute difference is $>$</p>	<p>24 hours</p>
<p>SR 3.3.1.3</p> <p>NOTE</p> <p>Not required to be performed until [24] hours after THERMAL POWER is $\geq 15\%$ RTP.</p> <p>Compare out of core measured AXIAL POWER IMBALANCE (API_0) to incore measured AXIAL POWER IMBALANCE (API_1) as follows:</p> <p>$(RTP/TP)(API_0 - API_1) = \text{imbalance error}$</p> <p>Perform CHANNEL CALIBRATION if the absolute value of the imbalance error is $\geq [2]\%$ RTP.</p> <p>Adjust the power range channel imbalance output</p>	<p>31 days</p>
<p>SR 3.3.1.4 Perform CHANNEL FUNCTIONAL TEST.</p>	<p>[45] days on a STAGGERED TEST BASIS</p>
<p>SR 3.3.1.5</p> <p>NOTE</p> <p>Neutron detectors are excluded from CHANNEL CALIBRATION.</p> <p>Perform CHANNEL CALIBRATION.</p>	<p>[92] days</p>

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.5</p> <p>-----NOTE----- Neutron detectors are excluded from CHANNEL CALIBRATION.</p> <p>-----</p> <p>Perform CHANNEL CALIBRATION.</p>	<p>[18] months</p>
<p>SR 3.3.1.6</p> <p>-----NOTE----- Neutron detectors are excluded from RPS RESPONSE TIME testing.</p> <p>-----</p> <p>Verify that RPS RESPONSE TIME is within limits.</p>	<p>[18] months on a STAGGERED TEST BASIS</p>

Table 3.3.1-1 (page 1 of 1)
Reactor Protection System Instrumentation

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FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Nuclear Overpower -				
a. High Setpoint	1,2(a)	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.3 SR 3.3.1.4	≤ [104.9]% RTP
b. Low Setpoint	2(b), 3(b) 4(b), 5(b)	E	SR 3.3.1.1 SR 3.3.1.5 SR 3.3.1.6	≤ 5% RTP
2. RCS High Outlet Temperature	1,2	D	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5	≤ [618] °F
3. RCS High Pressure	1,2	D	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5 SR 3.3.1.6	≤ [2355] psig
4. RCS Low Pressure	1,2(a)	D	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5 SR 3.3.1.6	≥ [1800] psig
5. RCS Variable Low Pressure	1,2(a)	D	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5	≥ ([11.59] * T _{out} - [5037.8]) psig
6. Reactor Building High Pressure	1,2,3(c)	D	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5	≤ [4] psig
7. Reactor Coolant Pump to Power	1,2(a)	D	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5 SR 3.3.1.6	[5]% RTP with ≤ 2 pumps operating
8. Nuclear Overpower RCS Flow and Measured AXIAL POWER IMBALANCE	1,2(a)	D	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.5 SR 3.3.1.6 SR 3.3.1.7	Nuclear Overpower RCS Flow and AXIAL POWER IMBALANCE setpoint envelope in COLR
9. Main Turbine Trip (Control Oil Pressure)	≥ [45]% RTP	F	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5	≥ [45] psig
10. Loss of Main Feedwater Pumps (Control Oil Pressure)	≥ [15]% RTP	G	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5	≥ [55] psig
11. Shutdown Bypass RCS High Pressure	2(b), 3(b) 4(b), 5(b)	E	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.5	≤ [1720] psig

(a) When not in shutdown bypass operation.

(b) During shutdown bypass operation with any CRD trip breakers in the closed position and the CRD System capable of rod withdrawal.

(c) With any CRD trip breaker in the closed position and the CRD System capable of rod withdrawal.

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SR 3.3.1.1 (continued)

the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal but more frequent checks of channel OPERABILITY during normal operational use of the displays associated with the LCO's required channels.

For Functions that trip on a combination of several measurements, such as the Nuclear Overpower RCS Flow and Measured AXIAL POWER IMBALANCE Function, the CHANNEL CHECK must be performed on each input.

SR 3.3.1.2

Note 1 to the SR states

This SR is the performance of a heat balance calibration for the power range channels every 24 hours when reactor power is > 15% RTP. The heat balance calibration consists of a comparison of the results of the calorimetric with the power range channel output. The outputs of the power range channels are normalized to the calorimetric. ~~if~~ the calorimetric ~~exceeds~~ the Nuclear Instrumentation System (NIS) channel output ~~by~~ [2]% RTP, the NIS is not declared inoperable but must be adjusted. If the NIS channel cannot be properly adjusted, the channel is declared inoperable. ~~2~~ Note clarifies that this Surveillance is required only if reactor power is \geq 15% RTP and that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. At lower power levels, calorimetric data are inaccurate.

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2

absolute difference between the

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The power range channel's output shall be adjusted consistent with the calorimetric results if the calorimetric ~~exceeds~~ the power range channel's output ~~by~~ [2]% RTP. The value of [2]% is adequate because this value is assumed in the safety analyses of FSAR, Chapter [14] (Ref. 2). These checks and, if necessary, the adjustment of the power range channels ensure that channel accuracy is maintained within the analyzed error margins. The 24 hour Frequency is adequate, based on unit operating experience, which demonstrates the change in the difference between the power range indication and the calorimetric results rarely exceeds

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SR 3.3.1.2 (continued)

a small fraction of [2] in any 24 hour period. Furthermore, the control room operators monitor redundant indications and alarms to detect deviations in channel outputs.

The SR is modified by two Notes.

SR 3.3.1.3

A comparison of power range nuclear instrumentation channels against incore detectors shall be performed at a 31 day Frequency when reactor power is > 15% RTP. A Note clarifies that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. If the absolute difference between the power range and incore measurements is \geq [2] RTP, the power range channel is not inoperable, but a CHANNEL CALIBRATION that adjusts the measured imbalance to agree with the incore measurements is necessary. If the power range channel cannot be properly recalibrated, the channel is declared inoperable. The calculation of the Allowable Value envelope assumes a difference in out of core to incore measurements of 2.5%. Additional inaccuracies beyond those that are measured are also included in the setpoint envelope calculation. The 31 day Frequency is adequate, considering that long term drift of the excore linear amplifiers is small and burnup of the detectors is slow. Also, the excore readings are a strong function of the power produced in the peripheral fuel bundles, and do not represent an integrated reading across the core. The slow changes in neutron flux during the fuel cycle can also be detected at this interval.

an adjustment of

(2)
Note 1 states

SR 3.3.1.4

A CHANNEL FUNCTIONAL TEST is performed on each required RPS channel to ensure that the entire channel will perform the intended function. Setpoints must be found within the Allowable Values specified in Table 3.3.1-1. Any setpoint adjustment shall be consistent with the assumptions of the current unit specific setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the

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SR 3.3.1.4 (continued)

surveillance interval extension analysis. The requirements for this review are outlined in BAW-10167 (Ref. 8).

The Frequency of [45] days on a STAGGERED TEST BASIS is consistent with the calculations of Reference 7 that indicate the RPS retains a high level of reliability for this test interval.

SR 3.3.1.5

This SR is the performance of a CHANNEL CALIBRATION every [92] days. This CHANNEL CALIBRATION normalizes the power range channel output to the calorimetric coincident with the imbalance output being normalized to the imbalance condition predicted by the incore neutron detector system.

The calibration for both imbalance and total power is integrated in the power imbalance detector calibration procedure. The [92] day Frequency specified for the Nuclear Overpower trip string is consistent with the drift assumptions made in the [Unit Specific Setpoint Methodology]" (Ref. 4). Furthermore, operating experience shows the reliability of the trip string is acceptable when calibrated on this interval. A Note clarifies that the neutron detectors are not required to be tested as part of the CHANNEL CALIBRATION. There is no adjustment that can be made to the detectors. Furthermore, adjustment of the detectors is unnecessary because they are passive devices with minimal drift. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration and the monthly axial channel calibration.

SR 3.3.1 ⁽⁵⁾₍₆₎

A Note to the Surveillance indicates that neutron detectors are excluded from CHANNEL CALIBRATION. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

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SR 3.3.1(5) (continued)

A CHANNEL CALIBRATION is a complete check of the instrument channel, including the sensor. The test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift to ensure that the instrument channel remains operational between successive tests. CHANNEL CALIBRATION shall find that measurement errors and bistable setpoint errors are within the assumptions of the unit specific setpoint analysis. CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint analysis.

The Frequency is justified by the assumption of an [18] month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.1(7)

This SR verifies individual channel actuation response times are less than or equal to the maximum values assumed in the accident analysis. Individual component response times are not modeled in the analyses. The analyses model the overall, or total, elapsed time from the point at which the parameter exceeds the analytical limit at the sensor to the point of rod insertion. Response time testing acceptance criteria for this unit are included in Reference 1.

A Note to the Surveillance indicates that neutron detectors are excluded from RPS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

Response time tests are conducted on an [18] month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. Therefore, staggered testing results in response time verification of these devices every [18] months. The [18] month Frequency is based on unit operating experience, which shows that random failures of

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SR 3.3.1⁶₇ (continued)

instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

REFERENCES

1. FSAR, Chapter [7].
 2. FSAR, Chapter [14].
 3. 10 CFR 50.49.
 4. "[Unit Specific Setpoint Methodology]."
 5. NUREG-0737, November 1979.
 6. BAW-1893.
 7. NRC SER for BAW-10167, Supplement 2, July 8, 1992.
 8. BAW-10167, May 1986.
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