

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 239-8076
SRP Section: 16 – Technical Specifications
Application Section: 16.3.3
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Question No. 16-95

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose TS prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility.

NUREG-1432, "Standard Technical Specifications-Combustion Engineering Plants," Rev. 4, provides NRC guidance on format and content of technical specifications as one acceptable means to meet 10 CFR 50.36 requirements.

The Bases for generic TS SR 3.3.1.4, uses the following terms:

- daily heat balance calibration,
- calorimetric calculation,
- secondary calorimetric,
- calorimetric calibration, and
- daily calibration.

The Bases for generic TS SR 3.3.1.8, uses the following term:

- daily calorimetric calibration.

If all of these terms are equivalent, please revise the Bases to use a consistent term for this test, or explain and justify the differences in meaning of these terms.

Response

All of the calibration-related terms described in TS SR 3.3.1.4 and Bases for TS SRs 3.3.1.4 and 3.3.1.8 will be revised to daily power calibration for consistency. The term "daily power

calibration" is used to clarify the subject that is being calibrated.

Impact on DCD

Same as changes described in the impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

TS SR 3.3.1.4 and Bases for TS SRs 3.3.1.4 and 3.3.1.8 will be revised as indicated in the Attachment.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical or Environmental Reports.

SURVEILLANCE REQUIREMENTS

----- NOTE -----
Refer to Table 3.3.1-1 to determine which SR shall be performed for each RPS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.1.1	Perform CHANNEL CHECK of each RPS instrument channel.	12 hours
SR 3.3.1.2	<p>----- NOTE -----</p> <p>The performance shall be completed within 12 hours after THERMAL POWER \geq 80 % RTP.</p> <p>Verify total reactor coolant system (RCS) flow rate indicated by each CPC is less than or equal to the RCS total flow rate.</p> <p>If necessary, adjust CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to RCS flow rate.</p>	12 hours
SR 3.3.1.3	Check CPC system event log.	12 hours
SR 3.3.1.4	<p>----- NOTE -----</p> <ol style="list-style-type: none"> The performance shall be completed within 12 hours after THERMAL POWER \geq 15 % RTP. The daily calibration may be suspended during PHYSICS TESTS, provided calibration is performed upon reaching each major test power plateau and prior to proceeding to next major test power plateau. <p>Perform calorimetric calculation and adjust linear power, CPC ΔT, and CPC neutron flux power to agree with calorimetric calculation if any of the linear power, CPC ΔT, and CPC neutron flux power is less than calorimetric calculation by more than 0.5 %.</p>	24 hours

power calibration

the daily power calibration

the daily power calibration

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.4

power calibration

A daily ~~heat balance calibration~~ is performed when THERMAL POWER is greater than or equal to 15%. The linear power level signal and the CPC addressable constant multipliers are adjusted to make the CPC ΔT power and CPC nuclear power ~~calculations~~ agree with the calorimetric ~~calculation~~ if the absolute difference is greater than or equal to 0.5%. The value of 0.5% is adequate because this value is assumed in the safety analysis. These checks (and if necessary, the adjustment of the linear power level signal and CPC addressable constant coefficients) are adequate to ensure that the accuracy of these CPC calculations is maintained within the analyzed error margins. The power level must be greater than 15% RTP to obtain accurate data. At lower power levels, the accuracy of calorimetric data is questionable.

power

The Frequency of 24 hours is based on plant operating experience and takes into account indications and alarms located in the MCR to detect deviations in channel outputs. The Frequency is modified by Note 1 indicating this Surveillance need only be performed within 12 hours after reaching 15% RTP. The 12 hours after reaching 15% RTP is required for plant stabilization, data taking, and flow verification. The secondary calorimetric is inaccurate at lower power levels. A second note in the SR indicates the SR may be suspended during PHYSICS TESTS.

power

The conditional suspension of the daily ~~calibrations~~ under strict administrative control is necessary to allow special testing to occur.

power calibration

SR 3.3.1.5

The RCS flow rate indicated by each CPC is verified to be less than or equal to the RCS total flow rate every 31 days. The Note indicates the Surveillance is performed within 12 hours after THERMAL POWER is greater than or equal to 80% RTP. This check (and if necessary, the adjustment of the CPC addressable flow constant coefficients) ensures that the DNBR setpoint is conservatively adjusted with respect to actual flow indications as determined by a ~~calorimetric calculation~~. Operating experience has shown the specified Frequency is adequate, as instrument drift is minimal, and changes in actual flow rate are minimal over core life.

daily power calibration

BASES

SURVEILLANCE REQUIREMENTS (continued)SR 3.3.1.8

A Note indicates that excore neutron detectors are excluded from CHANNEL CALIBRATION. A CHANNEL CALIBRATION of the linear power of excore neutron flux channel every 31 days ensures that the channels are reading accurately and within tolerance. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations to ensure that the channel remains operational between successive tests. CHANNEL CALIBRATION must be performed consistent with the SCP.

power calibration

The detectors are excluded from CHANNEL CALIBRATION because they are passive devices, with minimal drift, and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated by performing the daily ~~CALORIMETRIC CALIBRATION~~ (SR 3.3.1.4) and the monthly linear subchannel gain check (SR 3.3.1.6). In addition, the associated MCR indications are monitored by the operators.

SR 3.3.1.9

SR 3.3.1.9 is the performance of a CHANNEL CALIBRATION every 18 months.

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations to ensure that the channel remains operational between successive tests. CHANNEL CALIBRATION must be performed consistent with the plant protection system setpoint analysis.

The Frequency is based upon the assumption of an 18-month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis as well as operating experience and consistency with the 18-month fuel cycle.