TECHNICAL SPECIFICATIONS

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Amendment No. ~~11~~, ~~15~~, ~~27~~, ~~32,38,52,54,57,67,80,81,~~ ~~86,146,~~ ~~152~~

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CEA Drop Time

The maximum CEA drop time restriction is consistent with the assumed CEA drop time used in the accident analyses. Measurement with T_{cold} $\geq 515^{o}F$ and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

Test Exemptions

The CEA group insertion limits exemption ~~permit~~ permits individual CEA's to be positioned outside of their normal ~~group~~ heights and insertion limits during performance of such physics tests as those required to measure CEA worth and to determine the reactor stability index and damping factor under xenon oscillation conditions. The center CEA misalignment permits the center CEA to be misaligned during physics tests to determine the isothermal temperature coefficient and power coefficient.

The shutdown margin exemption provides that a minimum amount of CEA worth is immediately available for reactivity control when tests are performed for CEA's worth measurement. This special test exception is required to permit the periodic verification of the actual versus predicted core reactivity condition occurring as a result of fuel burnup or fuel cycling operations.

The moderator temperature coefficient (MTC) exemption permits measurement of more positive MTC's at the beginning of cycle and confirmation of CEA bank insertion necessary to maintain the MTC within its limits before entering power operation conditions.

(NEXT PAGE IS 2-56)

2.10.3 In-Core Instrumentation

Applies to the operability and alarm values of the rhodium detector in-core instruments system.

Objective

To specify the functional requirements on the use of the rhodium in-core instrumentation system for (1) the recalibration of the ex-core detector inputs to the axial power distribution trip calculators and (2) monitoring of kw/ft and power distribution.

Specification

(1) A minimum of four in-core locations at each detector level (or a total of 16 detectors) with at least one location in the center seven rows of fuel assemblies and at least one location outside the center seven rows of fuel assemblies shall be operable during recalibration of the ex-core detectors.

(2) The in-core detector system shall be operable with:

(a) At least 75% of all in-core detector strings, and

(b) A minimum of two in-core detector strings per full axial length quadrant whenever the in-core system is used to monitor F_{xy}^T, F_R^T, the radial power distribution and the peak linear heat rate. An operable in-core detector string shall consist of three or more operable rhodium detectors. With the in-core detector system inoperable, do not use the system for the above applicable monitoring functions.

2.10.4(1)(d) When calibration
~~(3)~~ ~~If the recalibration~~ of the ex-core detectors has not been accomplished within the previous 30 equivalent full power days, then:

Move to T.S. 2.10.4

(i) ~~(a)~~ reduce the axial power distribution monitoring trip setpoints (Figure 1-2) by 0.03 ASI units; and

(ii) ~~(b)~~ reduce the axial power distribution monitoring Limiting Condition for Operations (LCO for Excore Monitoring of LHR and LCO for DNB Monitoring Figures provided in the COLR) by 0.03 ASI units.

When calibration ~~If the recalibration~~ of the ex-core detectors has not been accomplished within the previous 200 equivalent full power days, the power shall be limited to less than that corresponding to 75% of the peak linear heat rate permitted by Specification 2.10.4.(1).

~~(4) After each fuel loading, the incore detector system shall be operable with at least 75% of the incore detector strings operable and a minimum of two quadrant symmetric incore detector string locations per core quadrant for the initial measurement of the linear heat rate, F_R^T, F_{xy}^T and the azimuthal power tilt.~~

2.10.3 In-Core Instrumentation

(a) An operable incore detector string shall consist of three operable rhodium detectors.

(b) A quadrant symmetric incore detector string location shall consist of a location with a symmetric counterpart in any other quadrant.

(c) The initial measurement of the linear heat rate, F_R^T, F_{XY}^T and azimuthal power tilt shall consist or the first full core power distribution calculation based on incore detector signals made at a power level greater then 40 percent of rated power following each fuel loading.

If an initial measurement of the linear heat rate, F_R^T, F_{XY}^T and azimuthal power tilt cannot be made with an operable incore detector system as defined above, reactor power shall be restricted to less than 75 percent of the peak allowable heat rate.

Basis

The in-core instrument system is used to monitor core performance and to insure operation within the limits used as initial conditions for the safety analysis in three ways:

(1) to verify that the radial peaking factors (F_{XY}^T and F_R^T) are less than the limits of Specifications 2.10.4(2) and 2.10.4(3), provided in the COLR.

(2) to actuate alarms set on each individual instrument to insure operation within specified kw/ft limits as provided in the Allowable Peak Linear Heat Rate vs. Burnup Figure provided in the COLR, and

(3) to determine the axial shape index for periodic verification of the calibration of the ex-core detector system.

The specification requires a minimum number of detectors and proper distribution to perform these functions. In-core rhodium detectors in conjunction with analytical computer codes calculate power distributions from which F_{xy} and F_R are determined. Alarm limits are set on each in-core instrument to insure operation within specified kw/ft limits.

Move to Basis of 2.10.4

Calibration of the ex-core detector input to the APD calculator is required to eliminate ASI uncertainties due to instrument drift and axially nonuniform detector exposure. If the recalibration is not performed in the period specified, the prescribed steps will assure safe operation of the reactor.

References

(1) Evaluation of Uncertainty in the Nuclear Form Factor Measured by Self-Powered Fixed In-Core Detector Systems - CENPD-153, August, 1974.

2.10.4 Power Distribution Limits

Applicability

Applies to power operation conditions.

Objective

To ensure that peak linear heat rates, DNB margins, and radial peaking factors are maintained within acceptable limits during power operation.

Specification

(1) Linear Heat Rate

The linear heat rate shall not exceed the limits of the Allowable Peak Linear Heat Rate vs. Burnup Figure provided in the COLR. ~~when the following factors are appropriately included:~~

~~1. Flux peaking augmentation factors are shown in Figure 2-8.~~

~~2. A measurement-calculational uncertainty factor of 1.062,~~

~~3. An engineering uncertainty factor of 1.03,~~

~~4. A linear heat rate uncertainty factor of 1.002 due to axial fuel densification and thermal expansion, and~~

~~5. A power measurement uncertainty factor of 1.02.~~

The linear heat rate shall be monitored by the incore detector system in accordance with specifications 2.10.4(1)(a) or 2.10.4(1)(b), or ~~maintain~~ the Axial Shape Index, Y_1 shall be maintained within the limits of the Limiting Condition for Operation for Excore Monitoring of LHR Figure provided in the COLR.

(a) When the linear heat rate is continuously monitored by the incore detectors, and the linear heat rate is exceeding its limits as indicated by four or more valid coincident incore detector alarms, either:

(i) Restore the linear heat rate to within its limits within one hour, or

(ii) Be in at least hot standby within the next 6 hours.

(b) If while operating under the provisions of part (a), the plant computer incore detector alarms become inoperable, operation may be continued for seven days from the date of the last valid core power distribution without reducing power provided each of the following conditions is satisfied:

(i) A core power distribution was obtained utilizing incore detectors within 7 days prior to the incore detector alarm outage and the measured peak linear heat rate was no greater than 90% of the value allowed by (1) above.

(ii) The Axial Shape Index as measured by excore detectors remains within ±.05 of the value obtained at the time of the last measured incore power distribution.

(iii) Power is not increased nor has it been increased since the time of the last incore power distribution.

(c) When the linear heat rate is continuously monitored by the excore detectors, withdraw the full length CEA's beyond the long term insertion limits of Specification 2.10.2.7 and maintain the Axial Shape Index, Y_I within the limits of Limiting Condition for Operations for the Excore Monitoring of LHR Figure provided in the COLR. If the linear heat rate is exceeding its limits as determined by the Axial Shape Index, Y_I, being outside the limits of the Limiting Condition for Operation for Excore Monitoring of LHR Figure provided in the COLR:

(i) Restore the reactor power and Axial Shape Index, Y_I, to within the limits of the Limiting Condition for Operations for Excore Monitoring of LHR Figure provided in the COLR within 2 hours, or

When the linear heat rate is continuously monitored by the incore detectors, and

(ii) Be in at least hot standby within the next 6 hours.

INSERT → INSERT CURRENT T.S. 2.10.3(3) AS NEW T.S. 2.10.4(1)(d)

(2) Total Integrated Radial Peaking Factor

The calculated value of F_R^T defined by $F_R^T = F_R (1+T_q)$ shall be within the limit provided in the COLR. F_R is determined from a power distribution map with no non-trippable CEA's inserted and with all full length CEA's at or above the Long Term Steady State Insertion Limit for the existing Reactor Coolant Pump combination. The azimuthal tilt, T_q, is the measured value of T_q at the time F_R is determined.

With $F_R^T \geq$ the limit provided in the COLR within 6 hours:

(a) Reduce power to bring power and F_R^T within the limits of the F_R^T, F_{XY}^T and Core Power Limitations Figure provided in the COLR, withdraw the full length CEA's to or beyond the Long Term Steady State Insertion Limits of Specification 2.10.2(7), and fully withdraw the NTCEA's, or

(b) Be in at least hot standby.

(3) Total Planar Radial Peaking Factor

The calculated value of F_{xy}^T defined as $F_{xy}^T = F_{xy} (1+T_q)$ shall be within the limit provided in the COLR. F_{xy} shall be determined from a power distribution map with no non-trippable CEA's inserted and with all full length CEA's at or above the Long Term Steady State Insertion Limit for the existing Reactor Coolant Pump combination. This determination shall be limited to core planes between 15% and 85% of full core height inclusive and shall exclude regions influenced by grid effects. The azimuthal tilt, T_q, is the measured value of T_q at the time F_{xy} is determined.

With $F_{xy}^T \geq$ the limit provided in the COLR within 6 hours:

(a) Reduce power to bring power and F_{xy}^T to within the limits of the F_R^T, F_{xy}^T and Core Power Limitations Figure provided in the COLR, withdraw the full length CEA's to or beyond the Long Term Steady State Insertion Limits of Specification 2.10.2(7), and fully withdraw the NTCEA's or

(b) Be in at least hot standby.

The Incore Detector Monitoring system provides a direct measure of the peaking factors and the alarms which have been established for the individual incore detector segments ensure that the peak linear heat rates will be continuously maintained within the allowable limits of the Allowable Peak Linear Heat Rate vs. Burnup Figure provided in the COLR. The setpoints for these alarms include allowances, set in the conservative directions, ~~for the factors listed in 2.10.4.(1)~~.

INSERT → INSERT PARAGRAPH FROM BASIS OF T.S. 2.10.3

Total Planar and Integrated Radial Peaking Factors (F_{xy}^T and F_R^T) and Azimuthal Power Tilt (T_q)

The limitations of F_{xy}^T and T_q are provided to ensure that the assumptions used in the analysis for establishing the Linear Heat Rate and Local Power Density - High LCO's and LSSS setpoints remain valid during operation at the various allowable CEA group insertion limits. The limitations of F_R^T and T_q are provided to ensure that the assumptions used in the analysis establishing the DNB Margin LCO, and Thermal Margin/Low Pressure LSSS setpoints remain valid during operation at the various allowable CEA group insertion limits. If F_{xy}^T, F_R^T or T_q exceed their basic limitations, operation may continue under the additional restrictions imposed by the action statements since these additional restrictions provide adequate assurance that the assumptions used in establishing the Linear Heat Rate, Thermal Margin/Low Pressure and Local Power Density - High LCO's and LSSS setpoints remain valid. An azimuthal power tilt >0.10 is not expected and if it should occur, subsequent operation would be restricted to only those operations required to identify the cause of this unexpected tilt.

The value of T_q that must be used in the equation $F_{xy}^T = F_{xy}(1 + T_q)$ and $F_R^T = F_R(1 + T_q)$ is the measured tilt.

The surveillance requirements for verifying that F_{xy}^T, F_R^T and T_q are within their limits provide assurance that the actual values of F_{xy}^T and T_q do not exceed the assumed values. Verifying F_{xy}^T and F_R^T after each fuel loading prior to exceeding 70% of rated power provides additional assurance that the core was properly loaded.

DNBR Margin During Power Operation Above 15% of Rated Power

The selection of limiting safety system settings and reactor operating limits is such that:

1. No specified acceptable fuel design limits will be exceeded as a result of the design basis anticipated operational occurrences, and

2. The consequences of the design basis postulated accidents will be no more severe than the predicted acceptable consequences of the accident analysis in Section 14.

ATTACHMENT B

DISCUSSION, JUSTIFICATION AND NO SIGNIFICANT HAZARDS CONSIDERATION

DISCUSSION AND JUSTIFICATION

The Omaha Public Power District (OPPD) proposes to revise the Fort Calhoun Station Unit No. 1 Technical Specifications (TS) to relocate the requirements for the In-Core Instrumentation (ICI) System from the TS to the Updated Safety Analysis Report (USAR).

The ICI System at Fort Calhoun Station consists of 28 neutron detector strings positioned in the center guide tube of selected fuel assemblies. Each detector string contains four rhodium neutron detector segments located at 20, 40, 60, and 80% of core height. The neutron flux parameters are calculated based on the signal from the detector segments and are processed by the CECOR and mini CECOR full-core power distribution systems.

On July 16, 1993, the NRC issued a Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors. The Final Policy Statement contains four criteria which can be used to determine which constraints on the design and operation of nuclear power plants are appropriate for inclusion in the plant's Technical Specifications. The NRC has proposed to incorporate these criteria into 10 CFR 50.36, "Technical specifications." The ICI System does not meet any of the four criteria as described below.

Criterion 1 states, "Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant system boundary." The ICI System provides no function which would indicate a degradation in the Reactor Coolant System boundary.

Criterion 2 states, "A process variable, design feature, or operating restriction that is an initial condition of a Design Basis Accident or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier." The discussion on Criterion 2 provided in the Final Policy Statement makes clear that core power distribution limits are process variables included in Criterion 2. The proposed changes would not eliminate those core power distribution limits from the TS. The proposed changes would relocate from the TS to the USAR the details of how those core power distribution limits are measured. The method of measuring a process variable is not included in Criterion 2.

Criterion 3 states, "A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a Design Basis Accident or Transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier." The ICI System does not function to mitigate any Design Basis Accident or Transient.

Criterion 4 states, "A structure, system, or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety." The ICI System is not included in the list of such structures, systems or components included in the Final Policy Statement, and operating experience and the plant-specific probabilistic safety assessment performed for Fort Calhoun Station have not shown the ICI System to have a significant impact on public health and safety.

Therefore, OPPD has concluded that the requirements on the ICI System are not constraints on design and operation which belong in the TS. This same conclusion was reached by the NRC when preparing NUREG-1432, "Standard Technical Specifications for Combustion Engineering Plants," and approval of similar proposed changes for the Calvert Cliffs Nuclear Power Plant Units 1 and 2 (Amendments 191 and 168, respectively).

Specification 2.10.3

It is proposed to relocate the requirements of TS 2.10.3. Specification 2.10.3(3), concerning calibration of the excore detectors, will be relocated to TS 2.10.4(1). Additionally, the paragraph in the basis section of 2.10.3 which describes the requirements of TS 2.10.3(3) will be relocated to the basis of TS 2.10.4. The remainder of TS 2.10.3 is to be relocated from the TS, with its requirements incorporated into the USAR and/or plant procedures. With the deletion of this TS, it is proposed that the Table of Contents be revised to delete reference to the TS accordingly. Plant procedures will control the number and distribution of incore detectors necessary to measure the core power distribution limits. Changes to procedures must be evaluated under 10 CFR 50.59 which will compare any changes to the USAR. If the proposed changes to the ICI System requirements do not meet the criteria for licensee implementation under 10 CFR 50.59, then the changes must be approved by the NRC prior to implementation.

Specification 2.10.4

It is proposed to revise TS 2.10.4 to delete the uncertainty factors stated in TS 2.10.4(1) and relocate them to the USAR and/or plant procedures, to relocate the restrictions on the excore detectors currently contained in TS 2.10.3(3), and to correct the grammar.

The statement in the basis of TS 2.10.4 which references the list of uncertainty factors currently contained in TS 2.10.4(1) is being revised since the factors will no longer be listed in the TS.

Additionally, it is proposed to revise TS 2.10.4(1)(b) to clarify its requirements. Currently TS 2.10.4(1) part (b) applies while operating under the provisions of part (a) if the plant computer incore detector alarms become inoperable. This is incorrect in that part (a) applies when the linear heat rate is being monitored by the ICI System and the linear heat rate is exceeding its limits as indicated by valid detector alarms. Part (b) of this specification should apply only if the linear heat rate is within its limits and the plant computer incore detector alarms become inoperable.

BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATION:

The proposed changes do not involve significant hazards consideration because operation of Fort Calhoun Station Unit No. 1 in accordance with these changes would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

The Incore Instrumentation (ICI) System is used to measure core power distribution for the purpose of Limiting Conditions for Operation (LCO) monitoring of Technical Specification (TS) limits on linear heat rate, unrodded planer radial peaking factor, unrodded integrated radial peaking factor, and azimuthal power tilt. The ICI System has no safety purpose itself; it measures parameters which have safety significance. No change to the monitored parameters is proposed. The proposed changes will relocate requirements on the number and distribution of incore detectors used by the ICI System when measuring these parameters from the TS to the Updated Safety Analysis Report (USAR). Changes to the requirements can be made without NRC approval when the changes meet the criteria of 10 CFR 50.59. Changes to the ICI System requirements that do not meet the criteria of 10 CFR 50.59 must be approved by the NRC by license amendment.

Relocation of the requirements on the ICI System from the TS to the USAR does not increase the probability or consequences of any accident previously analyzed because the ICI System is neither a precursor nor a mitigator for any analyzed accident. The ICI System is used to ensure that operation within the LCOs for linear heat rate, unrodded planer radial peaking factor, unrodded integrated radial peaking factor, and azimuthal power tilt is maintained. However, its operation serves no mitigation function associated with any USAR Section 14 accident analysis. The parameters measured by the ICI System are important parameters in many accident analyses; however, this proposed change does not remove or revise the limits on these parameters.

Additionally, it is proposed to revise TS 2.10.4(1)(b) to clarify its requirements. Currently TS 2.10.4(1) part (b) applies while operating under the provisions of part (a) if the plant computer incore detector alarms become inoperable. This is incorrect in that part (a) applies when the linear heat rate is being monitored by the ICI System and the linear heat rate is exceeding its limits as indicated by valid detector alarms. Part (b) of this specification should apply only if the linear heat rate is being monitored by the ICI System, is within its limits, and the plant computer incore detector alarms are inoperable.

Administrative changes are also proposed which correct grammar and renumber/relocate portions of the TS and bases to other TS, to correspond to the proposed change to relocate ICI System requirements.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Create the possibility of a new or different kind of accident from any previously evaluated.

The ICI System will continue to be used to monitor TS limits on core power distribution. There will be no physical alterations to the plant configuration, changes to setpoint values, or changes to the implementation of setpoints or limits as a result of this proposed change.

The proposed change to TS 2.10.4(1)(b) only clarifies its requirements. The proposed change is more restrictive in that TS 2.10.4(1)(b), as currently written, could be interpreted to allow continued operation for up to seven days with the linear heat rate exceeding its limits. The proposed change clarifies this specification to ensure that TS 2.10.4(1)(a) is applied if the linear heat rate is exceeded while being monitored by the ICI System. TS 2.10.4(1)(a) requires that the linear heat rate be restored within one hour or a plant shutdown initiated.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

(3) Involve a significant reduction in a margin of safety.

The ICI System is used to measure core power distribution parameters which are a direct measure of the margin of safety. The limits on these parameters are not changed. Therefore, the proposed change (i.e., relocation of the ICI System operability requirements to the USAR and/or plant procedures) does not involve a significant reduction in a margin of safety.

The proposed change to TS 2.10.4(1)(b) helps ensure that the margin of safety is maintained by clarifying when the TS is applicable. This clarification ensures that the more restrictive actions of TS 2.10.4(1)(a) are taken if the linear heat rate is exceeded while being monitored by the ICI System. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above discussion, it is OPPD's position that this proposed amendment does not involve significant hazards consideration as defined by 10 CFR 50.92, and that the proposed changes will not result in a condition which significantly alters the impact of the Station on the environment. Thus, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), and pursuant to 10 CFR 51.22(b), no environmental assessment need be prepared.