

2.0 LIMITING CONDITIONS FOR OPERATION  
2.10 Reactor Core (Continued)  
2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

Control Element Assemblies

(4) Full Length CEA Position During Power Operation

All full length (shutdown and regulating) CEA's shall be operable with each CEA of a given group positioned within 12 inches (actual position) of all other CEA's in its group. If one or more of the CEA's is inoperable or misaligned, determine the cause and comply with one of the following:

- a. If one or more full length CEA's are inoperable due to: 1) being immovable as a result of excessive friction or mechanical interference, or 2) known to be untrippable, determine that the shutdown margin requirement of Specification 2.10.2(1) is satisfied within 1 hour and be in at least hot shutdown within 7 hours.
- b. With one full length CEA inoperable due to causes other than addressed in item a. above, and inserted beyond the Long Term Steady State Insertion Limits but within its above specified alignment requirements, power operation may continue for up to 7 EFPD's per occurrence with a total accumulated time of < 14 EFPD per ~~calendar year~~ fuel cycle.
- c. With one full length CEA inoperable due to causes other than addressed in item a. above, but within its above specified alignment requirements and either fully withdrawn or above the Long Term Steady State Insertion Limits if in CEA group 4, power operation may continue.
- d. With one or more full length CEA's misaligned from any other CEA's in its group by more than 12 inches but less than 18 inches (actual position) within one hour either:
  - (i) Restore the misaligned CEA(s) to within 12 inches (actual position) of any other CEA's in its own group (realignment shall be made while maintaining the allowable CEA sequence and CEA insertion limits of the Power Dependent Insertion Limits Figure provided in the COLR; or
  - (ii) Declare the CEA's inoperable. Power operation may continue ~~provid~~ all of the following conditions are met:
    1. The power level shall be reduced to  $\leq 70\%$  of the maximum allowable power level for the existing Reactor Coolant Pump combination within an additional one hour; if negative reactivity insertion is required to reduce power, boron shall be used.

2.0 **LIMITING CONDITIONS FOR OPERATION**  
2.10 Reactor Core (Continued)  
2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

(5) Non-trippable CEA Position During Power Operation

All non-trippable CEA's (NTCEA) shall be withdrawn to at least 114 inches (actual position). If one or more NTCEA's becomes misaligned from other NTCEA's by more than 12 inches (actual position) either:

- a. Restore the NTCEA to within the specified alignment requirements within one hour, or
- b. Be in at least hot shutdown within an additional 6 hours.

(6) Shutdown CEA Insertion Limit During Power Operation

All shutdown CEA's shall be withdrawn to at least 114 inches as a condition for reactor criticality, or with one or more shutdown CEA's inserted to more than 114 inches withdrawn, except for surveillance testing, within one hour, either:

- a. Withdraw the CEA's to at least 114 inches, or
- b. Declare the CEA's inoperable and apply Specification 2.10.2(4).

(7) Regulating CEA Insertion Limits During Hot Standby and Power Operation

The regulating CEA groups shall be positioned within the acceptable operating range for regulating rod position of the Power Dependent Insertion Limits Figure provided in the COLR except during CEA exercises above 114 inches. With all CEA's operable, CEA insertion beyond the Long Term Insertion Limits ~~are~~ is restricted to:

1. 4 hours per 24 hour interval,
  2. 4 EFPD per 30 EFPD interval, and
  3. 14 EFPD per fuel cycle ~~calendar year~~.
- a. When the regulating CEA groups are inserted beyond the Transient Insertion Limits, within two hours, either:
    - (i) Restore the regulating CEA groups to above the Transient Insertion Limits, or
    - (ii) Reduce reactor power to the allowed power of Figure 2-4 which permits continued operation above the Transient Insertion Limit using the existing CEA group position.

2.0 LIMITING CONDITIONS FOR OPERATION

2.10 Reactor Core (Continued)

2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

- b. When the regulating CEA groups are inserted beyond the Long Term Insertion Limit for a time interval in excess of 4 hours per 24 hour interval, operation may proceed deleting this daily restriction, provided either:
  - (i) Regulating CEA groups are not inserted below the Short Term Insertion Limit, or
  - (ii) Regulating CEA groups are not inserted below the Transient Insertion Limit and rates of power increases initiated when the regulating CEA's are inserted below the Short Term Insertion Limit are less than 5%/hour.
- c. When the regulating CEA groups are inserted below the Long Term Insertion Limit for time intervals in excess of 4 EFPD per 30 EFPD interval and 14 EFPD per fuel cycle ~~calendar year~~, either:
  - (i) Restore the regulating groups to within the Long Term Insertion Limit within two hours, or
  - (ii) Be in hot shutdown within 6 hours.

(8) CEA Drop Time

The individual full length (shutdown and regulating) CEA drop time, from a fully withdrawn position, shall be  $\leq 2.5$  seconds from the time the clutch coil is de-energized until the CEA reaches its 90 percent insertion position with:

- a.  $T_{\text{cold}} \geq 515^{\circ}\text{F}$ , and
- b. All reactor coolant pumps operating.

With the drop time of any full length CEA determined to exceed the above limit, restore the CEA drop time to within the above limit prior to proceeding to hot standby or power operation.

(9) Test Exemption

- a. CEA Insertion Limits and Misalignment
  - (i) The insertion limits of Specification 2.10.2 may be suspended during the performance of physics tests provided:

2.0 **LIMITING CONDITIONS FOR OPERATION**

2.10 **Reactor Core (Continued)**

2.10.2 **Reactivity Control Systems and Core Physics Parameters Limits (Continued)**

1. The power is restricted to the test power plateau which shall not exceed (85%) of rated power, and
  2. The power shall be determined at least once per hour during physics tests.
  3. The linear heat rate shall be determined to be within the limits of Specification 2.10.4(1) by monitoring it continuously with the Incore Detector Monitoring System during physics tests above 5% of rated power.
- (ii) The alignment requirements of Specification 2.10.2(4) and insertion limits of Specification 2.10.2(7) may be suspended during the performance of physics tests to determine the isothermal temperature coefficient and power coefficient provided:
1. Only the center CEA (CEA 4-1) is misaligned, and
  2. The linear heat rate shall be determined to be within the limits of Specification 2.10.4(1) by monitoring it continuously with the Incore Detector Monitoring System during physics test above 5% of rated power.
- (iii) With any of the limits of Specification 2.10.4(1) being exceeded while the requirements of Specification 2.10.2(4), (5), (6), and (7) are suspended, either:
1. Reduce power sufficiently to satisfy the requirements of Specification 2.10.4(1), or
  2. Be in hot shutdown within 6 hours.

b. **Shutdown Margin**

- (i) The shutdown margin required by 2.10.2(1) may be reduced during physics testing at power levels less than 10<sup>-1</sup>% of rated power ~~in the following cases: for measurement of CEA worth and shutdown margin provided that:~~
1. Reactivity equivalent to at least the highest estimated CEA worth is available from the operable CEA groups withdrawn (assuming the most reactive CEA of the groups withdrawn is stuck in the fully withdrawn position), and

## 2.0 LIMITING CONDITIONS FOR OPERATION

### 2.10 Reactor Core (Continued)

#### 2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

1. ~~The total available shutdown margin may be reduced to 2%  $\Delta k/k$  during the measurement of the shutdown CEA group reactivities, or~~
  2. ~~The total available shutdown margin may be reduced to the worth of the worst stuck CEA's during the measurement of the stuck CEA reactivity.~~
  2. The position of each trippable CEA required shall be determined at least once per 2 hours and,
  3. Each CEA not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 7 days prior to reducing the Shutdown Margin to less than the limits of Specification 2.10.2(1).
- (ii) If the shutdown margin specified in part (i) above is not available, immediately initiate and continue boration until the requirements of 2.10.2(1) are met.
- (iii) The shutdown margin specified in part (i) above shall be verified every 8 hour shift.
- c. Moderator Temperature Coefficient
- (i) The moderator temperature coefficient (MTC) requirements of 2.10.2(3) may be suspended during physics tests at less than 10<sup>-1</sup>% of rated power.
  - (ii) If power exceeds 10<sup>-1</sup>% of rated power, either:
    1. Reduce power to less than 10<sup>-1</sup>% of rated power within 15 minutes, or
    2. Be in hot shutdown in 2 hours.

#### Basis

#### Shutdown Margin

A sufficient shutdown margin ensures that (1) the reactor can be made subcritical from all operating conditions, (2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and (3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

Shutdown margin requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS  $T_{avg}$ . The most restrictive condition occurs at EOL, with  $T_{avg}$  at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum shutdown margin of 4.0%  $\Delta k/k$  is initially adequate to control the reactivity transient. Accordingly,



2.0 **LIMITING CONDITIONS FOR OPERATION**  
2.10 Reactor Core (Continued)  
2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

Control Element Assemblies

(4) Full Length CEA Position During Power Operation

All full length (shutdown and regulating) CEA's shall be operable with each CEA of a given group positioned within 12 inches (actual position) of all other CEA's in its group. If one or more of the CEA's is inoperable or misaligned, determine the cause and comply with one of the following:

- a. If one or more full length CEA's are inoperable due to: 1) being immovable as a result of excessive friction or mechanical interference, or 2) known to be untrippable, determine that the shutdown margin requirement of Specification 2.10.2(1) is satisfied within 1 hour and be in at least hot shutdown within 7 hours.
- b. With one full length CEA inoperable due to causes other than addressed in item a. above, and inserted beyond the Long Term Steady State Insertion Limits but within its above specified alignment requirements, power operation may continue for up to 7 EFPD's per occurrence with a total accumulated time of < 14 EFPD per fuel cycle.
- c. With one full length CEA inoperable due to causes other than addressed in item a. above, but within its above specified alignment requirements and either fully withdrawn or above the Long Term Steady State Insertion Limits if in CEA group 4, power operation may continue.
- d. With one or more full length CEA's misaligned from any other CEA's in its group by more than 12 inches but less than 18 inches (actual position) within one hour either:
  - (i) Restore the misaligned CEA(s) to within 12 inches (actual position) of any other CEA's in its own group (realignment shall be made while maintaining the allowable CEA sequence and CEA insertion limits of the Power Dependent Insertion Limits Figure provided in the COLR; or
  - (ii) Declare the CEA's inoperable. Power operation may continue provided all of the following conditions are met:
    1. The power level shall be reduced to  $\leq 70\%$  of the maximum allowable power level for the existing Reactor Coolant Pump combination within an additional one hour; if negative reactivity insertion is required to reduce power, boration shall be used.

2.0 LIMITING CONDITIONS FOR OPERATION

2.10 Reactor Core (Continued)

2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

(5) Non-trippable CEA Position During Power Operation

All non-trippable CEA's (NTCEA) shall be withdrawn to at least 114 inches (actual position). If one or more NTCEA's become misaligned from other NTCEA's by more than 12 inches (actual position) either:

- a. Restore the NTCEA to within the specified alignment requirements within one hour, or
- b. Be in at least hot shutdown within an additional 6 hours.

(6) Shutdown CEA Insertion Limit During Power Operation

All shutdown CEA's shall be withdrawn to at least 114 inches as a condition for reactor criticality, or with one or more shutdown CEA's inserted to more than 114 inches withdrawn, except for surveillance testing, within one hour, either:

- a. Withdraw the CEA's to at least 114 inches, or
- b. Declare the CEA's inoperable and apply Specification 2.10.2(4).

(7) Regulating CEA Insertion Limits During Hot Standby and Power Operation

The regulating CEA groups shall be positioned within the acceptable operating range for regulating rod position of the Power Dependent Insertion Limits Figure provided in the COLR except during CEA exercises above 114 inches. With all CEA's operable, CEA insertion beyond the Long Term Insertion Limits is restricted to:

1. 4 hours per 24 hour interval,
  2. 4 EFPD per 30 EFPD interval, and
  3. 14 EFPD per fuel cycle.
- a. When the regulating CEA groups are inserted beyond the Transient Insertion Limits, within two hours, either:
    - (i) Restore the regulating CEA groups to above the Transient Insertion Limits, or
    - (ii) Reduce reactor power to the allowed power of Figure 2-4 which permits continued operation above the Transient Insertion Limit using the existing CEA group position.

## 2.0 LIMITING CONDITIONS FOR OPERATION

### 2.10 Reactor Core (Continued)

#### 2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

- b. When the regulating CEA groups are inserted beyond the Long Term Insertion Limit for a time interval in excess of 4 hours per 24 hour interval, operation may proceed deleting this daily restriction, provided either:
  - (i) Regulating CEA groups are not inserted below the Short Term Insertion Limit, or
  - (ii) Regulating CEA groups are not inserted below the Transient Insertion Limit and rates of power increases initiated when the regulating CEA's are inserted below the Short Term Insertion Limit are less than 5%/hour.
- c. When the regulating CEA groups are inserted below the Long Term Insertion Limit for time intervals in excess of 4 EFPD per 30 EFPD interval and 14 EFPD per fuel cycle, either:
  - (i) Restore the regulating groups to within the Long Term Insertion Limit within two hours, or
  - (ii) Be in hot shutdown within 6 hours.

#### (8) CEA Drop Time

The individual full length (shutdown and regulating) CEA drop time, from a fully withdrawn position, shall be  $\leq 2.5$  seconds from the time the clutch coil is de-energized until the CEA reaches its 90 percent insertion position with:

- a.  $T_{\text{cold}} \geq 515^{\circ}\text{F}$ , and
- b. All reactor coolant pumps operating.

With the drop time of any full length CEA determined to exceed the above limit, restore the CEA drop time to within the above limit prior to proceeding to hot standby or power operation.

#### (9) Test Exemption

- a. CEA Insertion Limits and Misalignment
  - (i) The insertion limits of Specification 2.10.2 may be suspended during the performance of physics tests provided:



## 2.0 LIMITING CONDITIONS FOR OPERATION

### 2.10 Reactor Core (Continued)

#### 2.10.2 Reactivity Control Systems and Core Physics Parameters Limits (Continued)

1. The power is restricted to the test power plateau which shall not exceed (85%) of rated power, and
  2. The power shall be determined at least once per hour during physics tests.
  3. The linear heat rate shall be determined to be within the limits of Specification 2.10.4(1) by monitoring it continuously with the Incore Detector Monitoring System during physics tests above 5% of rated power.
- (ii) The alignment requirements of Specification 2.10.2(4) and insertion limits of Specification 2.10.2(7) may be suspended during the performance of physics tests to determine the isothermal temperature coefficient and power coefficient provided:
1. Only the center CEA (CEA 4-1) is misaligned, and
  2. The linear heat rate shall be determined to be within the limits of Specification 2.10.4(1) by monitoring it continuously with the Incore Detector Monitoring System during physics test above 5% of rated power.
- (iii) With any of the limits of Specification 2.10.4(1) being exceeded while the requirements of Specification 2.10.2(4), (5), (6), and (7) are suspended, either:
1. Reduce power sufficiently to satisfy the requirements of Specification 2.10.4(1), or
  2. Be in hot shutdown within 6 hours.

#### b. Shutdown Margin

- (i) The shutdown margin required by 2.10.2(1) may be reduced during physics testing at power levels less than  $10^{-1}\%$  of rated power for measurement of CEA worth and shutdown margin provided that:
1. Reactivity equivalent to at least the highest estimated CEA worth is available from the operable CEA groups withdrawn (assuming the most reactive CEA of the groups withdrawn is stuck in the fully withdrawn position), and

2.0 **LIMITING CONDITIONS FOR OPERATION**  
2.10 **Reactor Core** (Continued)  
2.10.2 **Reactivity Control Systems and Core Physics Parameters Limits** (Continued)

2. The position of each trippable CEA required shall be determined at least once per 2 hours, and
  3. Each CEA not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 7 days prior to reducing the Shutdown Margin to less than the limits of Specification 2.10.2(1).
- (ii) If the shutdown margin specified in part (i) above is not available, immediately initiate and continue boration until the requirements of 2.10.2(1) are met.
  - (iii) The shutdown margin specified in part (i) above shall be verified every 8 hour shift.
- c. Moderator Temperature Coefficient
- (i) The moderator temperature coefficient (MTC) requirements of 2.10.2(3) may be suspended during physics tests at less than 10<sup>-1</sup>% of rated power.
  - (ii) If power exceeds 10<sup>-1</sup>% of rated power, either:
    1. Reduce power to less than 10<sup>-1</sup>% of rated power within 15 minutes, or
    2. Be in hot shutdown in 2 hours.

**Basis**  
**Shutdown Margin**

A sufficient shutdown margin ensures that (1) the reactor can be made subcritical from all operating conditions, (2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and (3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

Shutdown margin requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS  $T_{avg}$ . The most restrictive condition occurs at EOL, with  $T_{avg}$  at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum shutdown margin of 4.0%  $\Delta k/k$  is initially adequate to control the reactivity transient. Accordingly,

## ATTACHMENT B

## DISCUSSION, JUSTIFICATION AND NO SIGNIFICANT HAZARDS CONSIDERATION

### Description of Amendment Request for CEA Insertion Duration:

This proposed amendment will change the limitations associated with Regulating CEA insertion limits during hot standby and power operation for Technical Specifications 2.10.2(4)b, 2.10.2(7), and 2.10.2(7)c, from "14 EFPD per calendar year" to "14 EFPD per fuel cycle." The proposed change is conservative with respect to limits on control rod insertion times and consistent with OPPD's operation with minimized rod insertion times. The existing specification originated in a timeframe in which Fort Calhoun Station operated on annual fuel cycles. With the implementation of 18 month fuel cycles, it is appropriate to revise Specifications 2.10.2(4)b, 2.10.2(7) and 2.10.2(7)c. to reference "fuel cycle" rather than "calendar year."

### Basis for No Significant Hazards Determination

The proposed amendment does not involve a significant hazards consideration because the operation of Fort Calhoun Station in accordance with this amendment would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated. The proposed amendment changes the CEA long term insertion limits in the third (or longest time interval) category from "14 EFPD per calendar year" to "14 EFPD per fuel cycle." Since a fuel cycle is greater than a calendar year, the proposed changes are more conservative. Evaluation of the impact of CEA insertions on the fuel residing in the core for a given fuel cycle is also more appropriate than evaluating the insertions on a calendar year basis, which may impact two fuel cycles.
- (2) Create the possibility of a new or different kind of accident. It has been determined that a new or different type of accident is not created because no new or different modes of operation result from this change.
- (3) Involve a significant reduction in the margin of safety. The CEA insertion duration limits proposed by this change are more conservative than the current Technical Specifications. Therefore, the margin of safety remains unchanged.

Based on the above considerations, it is OPPD's position that this proposed amendment does not involve a significant hazards consideration as defined by 10 CFR 50.92.

#### Description of Amendment Request for Shutdown Margin:

This proposed amendment modifies Technical Specification 2.10.2(9)b(i) to achieve consistency with the CE Standard Technical Specifications (STS) as contained in NUREG-0212, Revision 2. Specifically, the change defines exceptions to Technical Specification 2.10.2(1) for shutdown margin requirements during physics testing for determining CEA worth and shutdown margin at less than 10% of rated power. Technical Specifications 2.10.2(9)b(i) and 2.10.2(9)b(i)1 have been revised to be consistent with CE Standard TS 3.10.1. Specifications 2.10.2(9)b(i)2 and 2.10.2(9)b(i)3 are being revised/added, respectively, to incorporate CE Standard TS Surveillances 4.10.1.1 and 4.10.1.2. Fort Calhoun does not have part length CEA's therefore the wording of 2.10.2(9)b(i)2 has been revised to reflect this difference from the CE Standard. It is proposed that 2.10.2(9)b(i)2 be revised to require demonstration of insertion within 7 days prior to reducing the shutdown margin instead of the 24 hours stated in CE Standard TS. This change is consistent with draft NUREG-1366.

The proposed revision to Technical Specification 2.10.2(9)b(i) adds wording to achieve consistency with the Standard Technical Specification 3/4.10.1. The objective of the proposed change is to permit full measurement of the sequential CEA Regulating Group worth. The current Technical Specifications do not allow this complete measurement to be performed because the Specification 2.10.2(1) required shutdown margin of 4.0% $\Delta$ k/k (including an allowance for the most limiting stuck CEA) is lost during approximately the last half of Regulating Group 1 insertion (with Groups 4, 3, and 2 already fully inserted). The current Specification 2.10.2(9)b(i)1 allows a reduction to 2.0% $\Delta$ k/k provided shutdown group reactivities are being measured, but does not permit deviation from 4.0% $\Delta$ k/k for total regulating group measurements. The proposed change will allow the shutdown margin to be reduced to the highest estimated CEA worth available from operable CEA groups. Although these proposed changes allow a less conservative shutdown margin (during part of Group 1 insertion for sequential CEA Regulating Group measurement) than the existing Technical Specifications, the overall impact remains acceptable because a sufficient shutdown margin (as defined in both the existing Specification 2.10.2(9)b(i)2 and STS 3/4.10.1) is maintained at all times.

Technical Specification 2.10.2(9)b(i) has also been revised to provide clarification during measurement of CEA worths that an allowance for the most reactive CEA (of the groups withdrawn) being stuck should be assumed when calculating shutdown margin. Technical Specification 2.10.2(9)b(ii), which is unchanged, remains consistent with the STS 3/4.10.1 ACTIONS.



#### Basis for No Significant Hazards Determination:

The proposed amendment does not involve a significant hazards consideration because the operation of Fort Calhoun Station in accordance with this amendment would not:

- 1) Involve a significant increase in the probability or consequences of an accident previously evaluated. The proposed changes result in a consistency between the Fort Calhoun Station Technical Specifications and the NUREG-0212 Revision 2 CE Standard Technical Specifications for the STS 3/4.10.1 exception on required shutdown margin during measurement of CEA worths. Maintaining an available shutdown margin equivalent to at least the highest estimated CEA worth during CEA worth measurement ensures the reactor can be adequately shut down if the need arises. Thus, the proposed change establishes a consistency with the STS and does not significantly increase the probability or consequences of a previously evaluated accident.
- 2) Create the possibility of a new or different kind of accident from any accident previously evaluated. It has been determined that a new or different type of accident is not created because no new or different modes of operation are proposed for the plant. Maintenance of an adequate available shutdown margin, defined as the reactivity equivalent to the highest estimated CEA worth, prevents the possibility of a new or different kind of accident.
- 3) Involve a significant reduction in a margin of safety. The available shutdown margin is allowed to be reduced for CEA measurements which confirm core design and further insure shutdown margin during Mode 1 operations. The brief time period the shutdown margin is reduced is deemed acceptable as confirmed by the current allowed reduction for shutdown CEA worth measurements and inclusion in the CE Standard Technical Specifications. Therefore, a significant reduction in a margin of safety is not involved.

Based on the above considerations, it is OPPD's position that this proposed amendment does not involve a significant hazards consideration as defined by 10 CFR 50.92.