ENCLOSURE 2

VOLUME 6

ST. LUCIE PLANT
UNIT 1 AND UNIT 2

IMPROVED TECHNICAL SPECIFICATIONS CONVERSION

ITS SECTION 3.1
REACTIVITY CONTROL SYSTEMS

Revision 0

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ATTACHMENT 1

3.1.1, SHUTDOWN MARGIN (SDM)

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

ITS

A01

ITS 3.1.1

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200 °F

A02

LIMITING CONDITION FOR OPERATION

LCO 3.1.1 3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR. See ITS 3.1.6

Applicability **APPLICABILITY**: MODES 1, 2*, 3 and 4.

ACTION:

within 15 minutes

L01

ACTION A With the SHUTDOWN MARGIN not within limits immediately initiate and continue boration at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

L02

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits: See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s). See ITS 1.1

b. When in MODES 1 or 2#, in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6. See ITS 3.1.6

c. When in MODE 2## at least once during CEA withdrawal and in accordance with the Surveillance Frequency Control Program until the reactor is critical.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6. L03

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* See Special Test Exception 3.10.1.

\# With $K_{eff} \geq 1.0$.

\## With $K_{eff} < 1.0$.

See ITS 3.1.6

ITS

A01

ITS 3.1.1

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.1.1.1 Frequency

e. ~~When in MODES 3 or 4,~~ in accordance with the Surveillance Frequency Control Program by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,*
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

LA01

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1000 pcm in accordance with the Surveillance Frequency Control Program. This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.e, above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading.

See ITS 3.1.2

* For Modes 3 and 4, during calculation of shutdown margin with all CEA's verified fully inserted, the single CEA with the highest reactivity worth need not be assumed to be stuck in the fully withdrawn position.

See ITS 1.1

ITS

ITS 3.1.1

REACTIVITY CONTROL SYSTEMS

A01

SHUTDOWN MARGIN ~~- $T_{avg} \leq 200$ °F~~

A02

LIMITING CONDITION FOR OPERATION

LCO 3.1.1

3.1.1.2 The SHUTDOWN MARGIN shall be:

Within the limits specified in the COLR, and in addition with the Reactor Coolant System drained below the hot leg centerline, one charging pump shall be rendered inoperable.*

See ITS 3.4.12

Applicability

APPLICABILITY: MODE 5.

ACTION:

within 15 minutes

L01

ACTION A

If the SHUTDOWN MARGIN requirements cannot be met, ~~immediately~~ initiate ~~and continue~~ boration ~~at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent~~ until the required SHUTDOWN MARGIN is restored.

L02

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

4.1.1.2 The SHUTDOWN MARGIN requirements ~~of Specification 3.1.1.2~~ shall be determined:

See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

b. In accordance with the Surveillance Frequency Control Program by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

LA01

c. At least once per 24 hours, when the Reactor Coolant System is drained below the hot leg centerline, by consideration of the factors in 4.1.1.2.b and by verifying at least one charging pump is rendered inoperable.*

See ITS 3.4.12

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* Breaker racked-out.

See ITS 3.4.12

ITS

ITS 3.1.1

A01

3/4.1 REACTIVITY CONTROL SYSTEMS

~~3/4.1.1 BORATION CONTROL~~

SHUTDOWN MARGIN ~~- T_{avg} GREATER THAN 200°F~~

A02

LIMITING CONDITION FOR OPERATION

LCO 3.1.1 3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

See ITS 3.1.6

Applicability **APPLICABILITY:** MODES 1, 2*, 3 and 4.

ACTION:

within 15 minutes

L01

ACTION A With the SHUTDOWN MARGIN outside the COLR limits, ~~immediately~~ initiate ~~and continue~~ boration ~~at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent~~ until the required SHUTDOWN MARGIN is restored.

L02

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

b. When in MODE 1 or MODE 2 with Keff greater than or equal to 1.0, in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

See ITS 3.1.6

c. When in MODE 2 with Keff less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical CEA position is within the limits of Specification 3.1.3.6.

* See Special Test Exception 3.10.1.

See ITS 3.1.6

A01

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e. below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6.

L03

SR 3.1.1.1 Frequency

e. When in MODE 3 or 4, in accordance with the Surveillance Frequency Control Program by consideration of at least the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

LA01

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within $\pm$ 1000 pcm in accordance with the Surveillance Frequency Control Program. This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e., above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPDs after each fuel loading.

See ITS 3.1.2

ITS | ITS 3.1.1

REACTIVITY CONTROL SYSTEMS (A01)

SHUTDOWN MARGIN - ~~T_{avg} LESS THAN OR EQUAL TO 200°F~~ (A02)

LIMITING CONDITION FOR OPERATION

LCO 3.1.1 — 3.1.1.2 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

Applicability — **APPLICABILITY:** MODE 5.

ACTION:

ACTION A — With the SHUTDOWN MARGIN outside the COLR limits, ~~immediately~~ [within 15 minutes] (L01) initiate ~~and continue~~ boration ~~at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent~~ until the required SHUTDOWN MARGIN is restored. (L02)

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 — 4.1.1.2 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

a. Within 1 hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. (See ITS 3.1.4) If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s). (See ITS 1.1)

b. In accordance with the Surveillance Frequency Control Program by consideration of the following factors: (LA01)

   1. Reactor coolant system boron concentration,
   2. CEA position,
   3. Reactor coolant system average temperature,
   4. Fuel burnup based on gross thermal energy generation,
   5. Xenon concentration, and
   6. Samarium concentration.

c. At least once per 24 hours, when the Reactor Coolant System is drained below the hot leg centerline, by consideration of the factors in 4.1.1.2b and by verifying at least two charging pumps are rendered inoperable by racking out their motor circuit breakers. (See ITS 3.4.12)

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2 Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1432, Rev. 5.0, "Standard Technical Specifications - Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.1.1 provides the SHUTDOWN MARGIN (SDM) requirement in MODES 1, 2, 3, and 4 (i.e., T_{avg} > 200°F). CTS 3.1.1.2 provides the SDM requirement in MODE 5 (i.e., T_{avg} ≤ 200°F). ITS 3.1.1 provides the SDM requirement in MODES 3, 4, and 5. This changes the CTS by combining the SDM requirements in MODES 3, 4, and 5. The Applicability for MODES 1 and 2 are described in ITS 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits."

This change is acceptable because the requirements have not changed. Combining the Specifications is an editorial change. Any technical changes resulting from this combination are discussed in other DOCs. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.1.1.1.1.e and CTS 4.1.1.2.b require determination that the SDM is within limits, and specifically requires the consideration of the following factors: reactor coolant system boron concentration, CEA position, reactor coolant system average temperature, fuel burnup based on gross thermal energy generation, xenon concentration and samarium concentration. ITS SR 3.1.1.1 requires a determination that the SDM is within limits, but does not describe the factors that must be considered in the calculation. This information is moved to the Bases. This changes the CTS by removing details on how the SDM calculation is performed from the Specification and placing the information in the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement that the SDM be within limits. The detail of how SDM is calculated does not need to appear in the specification in order for the requirement to apply. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.1.1 ACTION states when the SDM is less than the applicable limit, boration must be initiated immediately. ITS 3.1.1 ACTION states when SDM is not within limits, boration must be initiated within 15 minutes. This changes the CTS by relaxing the Completion Time from "immediately" to 15 minutes.

The purpose of CTS 3.1.1.1 ACTION is to restore the SDM to within its limit promptly. This change is acceptable because the Completion Time is consistent with safe operation under the specific Condition, considering the operability status of the redundant systems of required features, the capacity and capability of remaining features, and the low probability of a DBA occurring during the allowed Completion Time. This ITS Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. In addition, the ITS Bases for the ACTION states that boration must be initiated promptly. This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.1.1.1 ACTION states when the SDM is not within limits, boration must be initiated and continued at ≥ 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent until the required SDM is restored. ITS 3.1.1 ACTION A states that when the SDM is not within limits to initiate boration to restore SDM to within limits. This changes the CTS by eliminating the specific values of flow rate and the boron concentration used to restore compliance with the LCO.

The purpose of CTS 3.1.1.1 ACTION is to restore the SDM to within its limit. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the operability status of the specified redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the allowed Completion Time. Removing the specific values of flow rate and boron concentration from the CTS ACTION provides flexibility in the restoration of the SDM and eliminates conflicts between the SDM value and the specific boration values in the CTS ACTION. As stated, in the ITS Bases for ACTION A, "In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a highly concentrated solution, such as that normally found in the boric acid makeup tank, or the refueling water tank. The operator should borate with the best source available for the plant conditions." Specifying a minimum flow rate and concentration in the ACTION may not accomplish the objective of raising the RCS boron concentration as soon as possible. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.1.1.1.d requires verification that the SDM is within limit, "Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below [CTS 4.1.1.1.1.e], with the CEA groups at the power dependent insertion limits of Specification 3.1.3.6." The ITS does not contain a similar requirement. This changes the CTS by deleting Surveillance Requirement 4.1.1.1.1.d.

The purpose of CTS 4.1.1.1.1.d is to verify core design predictions by determining the SDM with the CEAs at the insertion limits. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify the LCO is within limit. The core design predictions, such as rod worth, boron worth, and critical boron concentration, are verified in a manner and at a Frequency necessary to give confidence that these predicted values are within limit in accordance with ITS SR 3.1.2.1. ITS SR 3.1.2.1 has a conditional Frequency similar to that of CTS 4.1.1.1.d requiring performance prior to entering MODE 1 (> 5% RTP) after fuel loading. To ensure the SDM is within limits during reactor startup the critical boron concentration is verified during the startup physics test program. Thereafter SDM is confirmed by performance of ITS SR 3.1.4.1 (CEA alignment verification), SR 3.1.5.1(shutdown CEA withdrawn verification), and SR 3.1.6.1 (regulating CEA group position verification). Thus, the SDM continues to be verified in a manner and at a Frequency necessary to give confidence that the parameter is within limit. Therefore, the core design parameters upon which SDM relies are verified before exceeding 5% RATED THERMAL POWER after each fuel loading. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

CTS

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3.1.1 SHUTDOWN MARGIN (SDM) (Analog) 1

3.1.1.1
3.1.1.2 LCO 3.1.1 SDM shall be within the limits specified in the COLR.

Applicability APPLICABILITY: MODES 3, 4, and 5.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action DOC L01 DOC L02	A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limits.	15 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.1.1.1.e 4.1.1.2.b	SR 3.1.1.1 Verify SDM to be within the limits specified in the COLR.	[24 hours OR In accordance with the Surveillance Frequency Control Program]	2

CTS

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3.1.1 SHUTDOWN MARGIN (SDM) (Analog) 1

3.1.1.1
3.1.1.2 LCO 3.1.1 SDM shall be within the limits specified in the COLR.

Applicability APPLICABILITY: MODES 3, 4, and 5.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action DOC L01 DOC L02	A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limits.	15 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.1.1.1.e 4.1.1.2.b	SR 3.1.1.1 Verify SDM to be within the limits specified in the COLR.	[24 hours OR In accordance with the Surveillance Frequency Control Program]	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.1, SHUTDOWN MARGIN

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~ 1

B 3.1.1 SHUTDOWN MARGIN (SDM) ~~(Analog)~~

BASES

BACKGROUND	The reactivity control systems must be redundant and capable of holding the reactor core subcritical when shut down under cold conditions, in accordance with GDC 26 (Ref. 1). Maintenance of the SHUTDOWN MARGIN (SDM) ensures that postulated reactivity events will not damage the fuel. SDM requirements provide sufficient reactivity margin to ensure that acceptable fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences (AOOs). As such, the SDM defines the degree of subcriticality that would be obtained immediately following the insertion of all control element assemblies (CEAs), assuming the single CEA of highest reactivity worth is fully withdrawn. The system design requires that two independent reactivity control systems be provided, and that one of these systems be capable of maintaining the core subcritical under cold conditions. These requirements are provided by the use of movable CEAs and soluble boric acid in the Reactor Coolant System (RCS). The CEA System provides the SDM during power operation and is capable of making the core subcritical rapidly enough to prevent exceeding acceptable fuel damage limits, assuming that the CEA of highest reactivity worth remains fully withdrawn. The soluble boron system can compensate for fuel depletion during operation and all xenon burnout reactivity changes, and maintain the reactor subcritical under cold conditions. During power operation, SDM control is ensured by operating with the shutdown CEAs fully withdrawn and the regulating CEAs within the limits of LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits." When the unit is in the shutdown and refueling modes, the SDM requirements are met by means of adjustments to the RCS boron concentration.
APPLICABLE SAFETY ANALYSES	The minimum required SDM is assumed as an initial condition in safety analysis. The safety analysis (Ref. 2) establishes an SDM that ensures specified acceptable fuel design limits are not exceeded for normal operation and AOOs, with the assumption of the highest worth CEA stuck out following a reactor trip. For MODE 5, the primary safety analysis that relies on the SDM limits is the boron dilution analysis.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The acceptance criteria for the SDM requirements are that specified acceptable fuel design limits are maintained. This is done by ensuring that:

a. The reactor can be made subcritical from all operating conditions, transients, and Design Basis Events,

b. The reactivity transients associated with postulated accident conditions are controllable within acceptable limits (departure from nucleate boiling ratio (DNBR), fuel centerline temperature limit AOOs, and ≤ 280 cal/gm energy deposition for the CEA ejection accident), and 3 2

c. The reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting accident for the SDM requirements are based on a main steam line break (MSLB), as described in the accident analysis (Ref. 2). The increased steam flow resulting from a pipe break in the main steam system causes an increased energy removal from the affected steam generator (SG), and consequently the RCS. This results in a reduction of the reactor coolant temperature. The resultant coolant shrinkage causes a reduction in pressure. In the presence of a negative moderator temperature coefficient, this cooldown causes an increase in core reactivity. As RCS temperature decreases, the severity of an MSLB decreases until the MODE 5 value is reached. The most limiting MSLB, with respect to potential fuel damage before a reactor trip occurs, is a guillotine break of a main steam line inside containment initiated at the end of core life. The positive reactivity addition from the moderator temperature decrease will terminate when the affected SG boils dry, thus terminating RCS heat removal and cooldown. Following the MSLB, a post trip return to power may occur; however, no fuel damage occurs as a result of the post trip return to power, and THERMAL POWER does not violate the Safety Limit (SL) requirement of SL 2.1.1.

In addition to the limiting MSLB transient, the SDM requirement for MODES 3 and 4 must also protect against:

BASES

APPLICABLE SAFETY ANALYSES (continued)

a. Inadvertent boron dilution,

b. An uncontrolled CEA withdrawal from a subcritical condition,

c. Startup of an inactive reactor coolant pump (RCP), and 2

c

d. CEA ejection.

Each of these events is discussed below.

In the boron dilution analysis, the required SDM defines the reactivity difference between an initial subcritical boron concentration and the corresponding critical boron concentration. These values, in conjunction with the configuration of the RCS and the assumed dilution flow rate, directly affect the results of the analysis. This event is most limiting at the beginning of core life when critical boron concentrations are highest.

The withdrawal of CEAs from subcritical conditions adds reactivity to the reactor core, causing both the core power level and heat flux to increase with corresponding increases in reactor coolant temperatures and pressure. The withdrawal of CEAs also produces a time dependent redistribution of core power.

Depending on the system initial conditions and reactivity insertion rate, the uncontrolled CEA withdrawal transient is terminated by either a high power trip or a high pressurizer pressure trip. In all cases, power level, RCS pressure, linear heat rate, and the DNBR do not exceed allowable limits.

The startup of an inactive RCP will not result in a "cold water" criticality, even if the maximum difference in temperature exists between the SG and the core. The maximum positive reactivity addition that can occur due to an inadvertent RCP start is less than half the minimum required SDM. An idle RCP cannot, therefore, produce a return to power from the hot standby condition.

SDM satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). 2

The ejection of a CEA rapidly adds reactivity to the reactor core, causing both the core power level and heat flux to increase with corresponding increases in reactor coolant temperatures and pressure. The ejection of a CEA also produces a time dependent redistribution of core power.

BASES

LCO

The MSLB (Ref. 2) and the boron dilution (Ref. 3) accidents are the most limiting analyses that establish the SDM value of the LCO. For MSLB accidents, if the LCO is violated, there is a potential to exceed the DNBR limit and to exceed 10 CFR ~~100, "Reactor Site Criteria~~," limits (Ref. 4). For the boron dilution accident, if the LCO is violated, then the minimum required time assumed for operator action to terminate dilution may no longer be applicable.

50.67, "Accident source term 2

SDM is a core physics design condition that can be ensured through CEA positioning (regulating and shutdown CEA) and through the soluble boron concentration.

APPLICABILITY

In MODES 3, 4, and 5, the SDM requirements are applicable to provide sufficient negative reactivity to meet the assumptions of the safety analyses discussed above. In MODES 1 and 2, SDM is ensured by complying with LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits," and LCO 3.1.6. In MODE 6, the shutdown reactivity requirements are given in LCO 3.9.1, "Boron Concentration."

ACTIONS

A.1

If the SDM requirements are not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. It is assumed that boration will be continued until the SDM requirements are met.

In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a highly concentrated solution, such as that normally found in the boric acid makeup ~~storage~~ tank or the refueling ~~borated~~ water ~~storage~~ tank. The operator should borate with the best source available for the plant conditions. 2

in 4

In determining the boration flow rate, the time in core life must be considered. For instance, the most difficult time in core life to increase the RCS boron concentration is at the beginning of cycle, when the boron concentration may approach or exceed 2000 ppm. A ~~Assuming that a value of 1% Δk/k must be recovered and a~~ boration flow rate of ~~[ ] gpm, it is possible to increase the boron concentration of the RCS by 100 ppm in approximately 35 minutes. If a boron worth of 10 pcm/ppm is assumed, this combination of parameters will increase the SDM by 1% Δk/k. These boration parameters of [ ]~~ 40 gpm and a boron concentration of 1900 ~~[ ]~~ ppm represent typical values needed to recover SDM to within limits ~~and are provided for the purpose of offering a specific example~~. 5 3

3

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

SDM is verified by performing a reactivity balance calculation, considering the listed reactivity effects:

a. RCS boron concentration,

b. CEA positions,

c. RCS average temperature,

d. Fuel burnup based on gross thermal energy generation,

e. Xenon concentration,

f. Samarium concentration, and

g. Isothermal temperature coefficient (ITC).

Using the ITC accounts for Doppler reactivity in this calculation because the reactor is subcritical and the fuel temperature will be changing at the same rate as the RCS. 2

[The Frequency of 24 hours is based on the generally slow change in required boron concentration, and also allows sufficient time for the operator to collect the required data, which includes performing a boron concentration analysis, and complete the calculation. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 6
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BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26.
2. FSAR, Section ~~[ ]~~ 15.4.6.
3. FSAR, Section ~~[ ]~~ 15.2.4.
4. 10 CFR ~~100~~ 50.67.

U (3) (2)

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~ (1)

B 3.1.1 SHUTDOWN MARGIN (SDM) ~~(Analog)~~

BASES

BACKGROUND

The reactivity control systems must be redundant and capable of holding the reactor core subcritical when shut down under cold conditions, in accordance with GDC 26 (Ref. 1). Maintenance of the SHUTDOWN MARGIN (SDM) ensures that postulated reactivity events will not damage the fuel. SDM requirements provide sufficient reactivity margin to ensure that acceptable fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences (AOOs). As such, the SDM defines the degree of subcriticality that would be obtained immediately following the insertion of all control element assemblies (CEAs), assuming the single CEA of highest reactivity worth is fully withdrawn.

The system design requires that two independent reactivity control systems be provided, and that one of these systems be capable of maintaining the core subcritical under cold conditions. These requirements are provided by the use of movable CEAs and soluble boric acid in the Reactor Coolant System (RCS). The CEA System provides the SDM during power operation and is capable of making the core subcritical rapidly enough to prevent exceeding acceptable fuel damage limits, assuming that the CEA of highest reactivity worth remains fully withdrawn.

The soluble boron system can compensate for fuel depletion during operation and all xenon burnout reactivity changes, and maintain the reactor subcritical under cold conditions.

During power operation, SDM control is ensured by operating with the shutdown CEAs fully withdrawn and the regulating CEAs within the limits of LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits." When the unit is in the shutdown and refueling modes, the SDM requirements are met by means of adjustments to the RCS boron concentration.

APPLICABLE SAFETY ANALYSES

The minimum required SDM is assumed as an initial condition in safety analysis. The safety analysis (Ref. 2) establishes an SDM that ensures specified acceptable fuel design limits are not exceeded for normal operation and AOOs, with the assumption of the highest worth CEA stuck out following a reactor trip. For MODE 5, the primary safety analysis that relies on the SDM limits is the boron dilution analysis.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The acceptance criteria for the SDM requirements are that specified acceptable fuel design limits are maintained. This is done by ensuring that:

a. The reactor can be made subcritical from all operating conditions, transients, and Design Basis Events,

b. The reactivity transients associated with postulated accident conditions are controllable within acceptable limits (departure from nucleate boiling ratio (DNBR), fuel centerline temperature limit AOOs, and ≤ 2~~8~~0 cal/gm energy deposition for the CEA ejection accident), and 3 2

c. The reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting accident for the SDM requirements are based on a main steam line break (MSLB), as described in the accident analysis (Ref. 2). The increased steam flow resulting from a pipe break in the main steam system causes an increased energy removal from the affected steam generator (SG), and consequently the RCS. This results in a reduction of the reactor coolant temperature. The resultant coolant shrinkage causes a reduction in pressure. In the presence of a negative moderator temperature coefficient, this cooldown causes an increase in core reactivity. As RCS temperature decreases, the severity of an MSLB decreases until the MODE 5 value is reached. The most limiting MSLB, with respect to potential fuel damage before a reactor trip occurs, is a guillotine break of a main steam line inside containment initiated at the end of core life. The positive reactivity addition from the moderator temperature decrease will terminate when the affected SG boils dry, thus terminating RCS heat removal and cooldown. Following the MSLB, a post trip return to power may occur; however, no fuel damage occurs as a result of the post trip return to power, and THERMAL POWER does not violate the Safety Limit (SL) requirement of SL 2.1.1.

In addition to the limiting MSLB transient, the SDM requirement for MODES 3 and 4 must also protect against:

BASES

APPLICABLE SAFETY ANALYSES (continued)

a. Inadvertent boron dilution,

b. An uncontrolled CEA withdrawal from a subcritical condition,

~~c. Startup of an inactive reactor coolant pump (RCP),~~ and

c ~~d~~. CEA ejection. 2

Each of these events is discussed below.

In the boron dilution analysis, the required SDM defines the reactivity difference between an initial subcritical boron concentration and the corresponding critical boron concentration. These values, in conjunction with the configuration of the RCS and the assumed dilution flow rate, directly affect the results of the analysis. This event is most limiting at the beginning of core life when critical boron concentrations are highest.

The withdrawal of CEAs from subcritical conditions adds reactivity to the reactor core, causing both the core power level and heat flux to increase with corresponding increases in reactor coolant temperatures and pressure. The withdrawal of CEAs also produces a time dependent redistribution of core power.

Depending on the system initial conditions and reactivity insertion rate, the uncontrolled CEA withdrawal transient is terminated by either a high power trip or a high pressurizer pressure trip. In all cases, power level, RCS pressure, linear heat rate, and the DNBR do not exceed allowable limits.

~~The startup of an inactive RCP will not result in a "cold water" criticality, even if the maximum difference in temperature exists between the SG and the core. The maximum positive reactivity addition that can occur due to an inadvertent RCP start is less than half the minimum required SDM. An idle RCP cannot, therefore, produce a return to power from the hot standby condition.~~

The ejection of a CEA rapidly adds reactivity to the reactor core, causing both the core power level and heat flux to increase with corresponding increases in reactor coolant temperatures and pressure. The ejection of a CEA also produces a time dependent redistribution of core power.

SDM satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). 2

BASES

LCO

The MSLB (Ref. 2) and the boron dilution (Ref. 3) accidents are the most limiting analyses that establish the SDM value of the LCO. For MSLB accidents, if the LCO is violated, there is a potential to exceed the DNBR limit and to exceed 10 CFR 100, "Reactor Site Criteria," limits (Ref. 4). For the boron dilution accident, if the LCO is violated, then the minimum required time assumed for operator action to terminate dilution may no longer be applicable.

50.67, "Accident source term 2

SDM is a core physics design condition that can be ensured through CEA positioning (regulating and shutdown CEA) and through the soluble boron concentration.

APPLICABILITY

In MODES 3, 4, and 5, the SDM requirements are applicable to provide sufficient negative reactivity to meet the assumptions of the safety analyses discussed above. In MODES 1 and 2, SDM is ensured by complying with LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits," and LCO 3.1.6. In MODE 6, the shutdown reactivity requirements are given in LCO 3.9.1, "Boron Concentration."

ACTIONS

A.1

If the SDM requirements are not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. It is assumed that boration will be continued until the SDM requirements are met.

In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a highly concentrated solution, such as that normally found in the boric acid storage tank or the borated water storage tank. The operator should borate with the best source available for the plant conditions.

makeup
refueling
2

in 4

In determining the boration flow rate, the time core life must be considered. For instance, the most difficult time in core life to increase the RCS boron concentration is at the beginning of cycle, when the boron concentration may approach or exceed 2000 ppm. Assuming that a value of 1% Δk/k must be recovered and a boration flow rate of [ ] gpm, it is possible to increase the boron concentration of the RCS by 100 ppm in approximately 35 minutes. If a boron worth of 10 pcm/ppm is assumed, this combination of parameters will increase the SDM by 1% Δk/k. These boration parameters of [ ] gpm and [ ] ppm represent typical values and are provided for the purpose of offering a specific example.

A
5
3
40
needed to recover SDM to within limits
a boron concentration of 1900
3

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

SDM is verified by performing a reactivity balance calculation, considering the listed reactivity effects:

a. RCS boron concentration,

b. CEA positions,

c. RCS average temperature,

d. Fuel burnup based on gross thermal energy generation,

e. Xenon concentration,

f. Samarium concentration, and

g. Isothermal temperature coefficient (ITC).

Using the ITC accounts for Doppler reactivity in this calculation because the reactor is subcritical and the fuel temperature will be changing at the same rate as the RCS. 2

[The Frequency of 24 hours is based on the generally slow change in required boron concentration, and also allows sufficient time for the operator to collect the required data, which includes performing a boron concentration analysis, and complete the calculation. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 6
--]

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26.
2. FSAR, Section [ ]. 15.4.6
3. FSAR, Section [ ]. 15.2.4
4. 10 CFR 100. 50.67

U 2 3

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.1 BASES, SHUTDOWN MARGIN (SDM)

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. Editorial changes made for enhanced clarity/consistency or grammatical error corrected.

5. As stated, the ISTS Bases discussion regarding the required boration flow rate and time necessary to recover 1% $\Delta k/k$ of SDM is provided for the purpose of offering a specific example. St. Lucie Plant operating procedures provide guidance to determine the necessary flow rate and boron concentration to recover SDM based on plant conditions. Therefore, the example provided in the ISTS 3.1.1 Bases is not included in the plant-specific ITS 3.1.1 Bases.

6. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.1, SHUTDOWN MARGIN (SDM)

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 2

3.1.2, Reactivity Balance

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

ITS

A01

ITS 3.1.2

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

Reactivity Balance

A02

SHUTDOWN MARGIN - T_{avg} > 200 °F

Add proposed LCO 3.1.2

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

See ITS 3.1.1

Applicability

APPLICABILITY: MODES 1, 2*, 3 and 4.

See ITS 3.1.6

L01

ACTION:

Add proposed ACTIONS A and B

L02

With the SHUTDOWN MARGIN not within limits immediately initiate and continue boration at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

See ITS 3.1.1

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

b. When in MODES 1 or 2#, in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

See ITS 3.1.6

c. When in MODE 2## at least once during CEA withdrawal and in accordance with the Surveillance Frequency Control Program until the reactor is critical.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6.

See ITS 3.1.1

* See Special Test Exception 3.10.1.

\# With K_{eff} ≥ 1.0.

\## With K_{eff} < 1.0.

See ITS 3.1.6

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

e. When in MODES 3 or 4, in accordance with the Surveillance Frequency Control Program by consideration of the following factors:

See ITS 3.1.1

1. Reactor coolant system boron concentration,
2. CEA position,*
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

Add proposed Note 2

Prior to entering MODE 1 after fuel loading AND L03

Note Only required after 60 EFPD

1% Δk/k A02

LCO 3.1.2
SR 3.1.2.1

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± ~~1000 pcm~~ in accordance with the Surveillance Frequency Control Program. ~~This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.e, above.~~ LA01 The predicted reactivity values ~~shall~~ may be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading. L04

SR 3.1.2.1
Note 1

* For Modes 3 and 4, during calculation of shutdown margin with all CEA's verified fully inserted, the single CEA with the highest reactivity worth need not be assumed to be stuck in the fully withdrawn position.

See ITS 1.1

3/4.1 REACTIVITY CONTROL SYSTEMS

A01

~~3/4.1.1 BORATION CONTROL~~

Reactivity Balance

A02

~~SHUTDOWN MARGIN - T_{avg} GREATER THAN 200°F~~

Add proposed LCO 3.1.2

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

See ITS 3.1.1

Applicability

APPLICABILITY: MODES 1, 2*, ~~3 and 4~~.

See ITS 3.1.6

L01

ACTION:

Add proposed ACTIONS A and B

L02

With the SHUTDOWN MARGIN outside the COLR limits, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

See ITS 3.1.1

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

b. When in MODE 1 or MODE 2 with Keff greater than or equal to 1.0, in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

See ITS 3.1.6

c. When in MODE 2 with Keff less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical CEA position is within the limits of Specification 3.1.3.6.

* See Special Test Exception 3.10.1.

See ITS 3.1.6

ITS

A01

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e. below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6. See ITS 3.1.1

e. When in MODE 3 or 4, in accordance with the Surveillance Frequency Control Program by consideration of at least the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

See ITS 3.1.1

Add proposed Note 2

Prior to entering MODE 1 after fuel loading AND — L03

Note Only required after 60 EFPD

1% Δk/k — A02

LCO 3.1.2 SR 3.1.2.1 — 4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± ~~1000 pcm~~ in accordance with the Surveillance Frequency Control Program. ~~This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e., above~~. The predicted reactivity values ~~shall~~ be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPDs after each fuel loading.

LA01

SR 3.1.2.1 Note 1

may — L04

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2 Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1432, Rev. 5.0, "Standard Technical Specifications - Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 4.1.1.1.2 requires the overall core reactivity balance to be compared to predicted values to demonstrate agreement within ± 1000 pcm. However, this Surveillance is currently part of the SHUTDOWN MARGIN Specification. Additionally, CTS 3.1.1.1 is titled SHUTDOWN MARGIN – T_{avg} > 200°F. A new LCO, ITS LCO 3.1.2, requires the measured core reactivity balance to be within ± 1% Δk/k of predicted values. Furthermore, ITS 3.1.2 is titled Reactivity Balance. This changes the CTS by having a separate Specification for the core reactivity requirement and changing the title. This change also changes the units of 1000 pcm to 1% Δk/k which are equivalent units of reactivity.

This change is acceptable because the requirements have not changed. Converting the requirement from a Surveillance in the SHUTDOWN MARGIN specification to an LCO is consistent with the ITS format and content guidance. Any technical changes resulting from this change are discussed in other DOCs. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.1.1.1.2 requires comparison of the actual and predicted core reactivity balance and specifically requires consideration of at least those factors stated in Specification 4.1.1.1.1.e. CTS 4.1.1.1.1.e requires determination of SDM and requires the consideration of the following factors: reactor coolant system boron concentration, control element assembly (CEA) position, reactor coolant system average temperature, fuel burnup based on gross thermal energy generation, xenon concentration, and samarium concentration when in MODES 3 or 4. ITS SR 3.1.2.1 requires overall core reactivity balance to be within the predicted values, but does not describe the factors that must be considered in the calculation. This information is relocated to the Bases. This changes the CTS by removing details on how the core reactivity balance comparison calculation is performed from the CTS and placing the information in the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.1.2 still retains the requirement that the core reactivity balance comparison be within ± 1% $\Delta k/k$ in MODES 1 and 2. Refer to Discussion of Change L02 associated with deletion of MODES 3 and 4 from Applicability of CTS 4.1.1.1.2.

The details of how this comparison is calculated do not need to appear in the Specification in order for the requirement to apply. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the CTS.

<u>LESS RESTRICTIVE CHANGES</u>

L01 *(Category 2 – Relaxation of Applicability)* CTS 4.1.1.1.2 is applicable in MODES 1, 2, 3, and 4. ITS 3.1.2 is applicable in MODES 1 and 2. This changes the CTS by reducing the applicable MODES in which the core reactivity requirement must be met.

The purpose of CTS Surveillance 4.1.1.1.2 is to verify the core design by comparing the actual and predicted core reactivity. This change is acceptable because the requirements continue to ensure that the process variables are maintained in the MODES and other specified conditions assumed in the safety analysis and licensing basis. The core reactivity balance can only be determined when the reactor is critical (MODES 1 and 2). Reducing the applicable MODES from MODES 1, 2, 3, and 4 to MODES 1 and 2 does not result in a reduction of the verification of this important measure of core design accuracy. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.1.1.1 does not contain ACTIONS to follow if the core reactivity balance Surveillance is not met. If the core reactivity balance Surveillance is not met, CTS 3.0.3 would be entered. CTS 3.0.3 requires action to be initiated within 1 hour and the unit to be in hot standby (MODE 3) within the next 6 hours, hot shutdown (MODE 4) within the following 6 hours, and cold shutdown (MODE 5) within the subsequent 24 hours. ITS 3.1.2 contains ACTIONS to follow if the core reactivity balance LCO is not met. If the LCO is not met, 7 days are provided to re-evaluate the core design and safety analysis, to determine that the reactor core is acceptable for continued operation, and to establish appropriate operating restrictions and SRs. If these actions are not completed within the 7 days, the plant must be placed in MODE 3 within 6 hours. This changes the CTS by providing 7 days to evaluate and provide compensatory measures for not meeting the core reactivity balance requirement and then requiring entry into MODE 3 instead of requiring a unit shutdown and entry into MODE 5.

The purpose of CTS 4.1.1.1.2 is to verify the accuracy of the core design by comparing the predicted and actual core reactivity throughout core life. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABILITY status of the redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period. Should the core reactivity balance requirement not be met, time is required to determine the cause of the disagreement and what adjustments may be needed to the operating conditions of the core. The startup physics testing program is used to verify most of the critical core design parameters, such as CEA worth, boron worth, and moderator temperature coefficient. In addition, there is considerable conservatism in the application of these values in the accident analyses. Therefore, allowing a time to evaluate the difference and make any adjustments to the operational controls is acceptable. The 7 day Completion time is reasonable considering the complexity of the evaluations and the time to meet administrative requirements, such as 10 CFR 50.59 safety evaluation preparation and approval. If it cannot be determined within 7 days that the core is acceptable for continued operation, the unit must be shutdown. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.1.1.1.2 requires comparison of the actual and predicted core reactivity balance in accordance with the Surveillance Frequency Control Program. CTS 4.1.1.1.2 also requires the predicted reactivity values to be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading. ITS SR 3.1.2.1 requires verifying the overall core reactivity balance is within ± 1 % Δ k/k of the predicted values prior to entering MODE 1 after each refueling and in accordance with the Surveillance Frequency Control Program after 60 EFPD. Note 2 to ITS SR 3.1.2.1 states that the Surveillance is not required to be performed prior to entry into MODE 2. This changes the CTS by not requiring the periodic, at-power core reactivity comparison until core burnup reaches 60 EFPD. Additionally, it allows the initial verification following fuel loading to be performed after entering MODE 2 and prior to MODE 1.

The purpose of CTS 4.1.1.1.2 is to verify the agreement between the actual and predicted core reactivity. The CTS requires and the ITS may require the predicted core reactivity values to be normalized to the actual values prior to exceeding 60 EFPD of core burnup. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. The change allowing the required subsequent periodic Frequency in accordance with the Surveillance Frequency Control Program to be performed after entering MODE 2 and following the initial 60 EFPD after fuel loading, is acceptable, based on the slow rate of core reactivity changes resulting from fuel depletion and the presence of other indicators (AZIMUTHAL POWER TILT, AXIAL SHAPE INDEX, etc.) for prompt indication of an anomaly. This change has been designated as less restrictive because the Surveillance will be performed in a different MODE of operation under the ITS than under the CTS.

L04 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.1.1.1.2 requires, in part, that the predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading. ITS SR 3.1.2.1 Note 1 states the adjustment "may" be performed prior to exceeding a fuel burnup of 60 EFPD after each fuel loading. This changes the CTS by stating that the normalization may be performed prior to 60 EFPD after each fuel loading.

The purpose of adjusting the predicted reactivity values to the core conditions is to allow benchmarking of the design calculations. Making this adjustment closer to a fuel burnup of 60 EFPD of operation allows sufficient time for the core conditions to reach steady state. This change is acceptable because the expectation is to perform the adjusting of the predicted reactivity values to the core conditions. ITS SR 3.1.2.1 still allows the adjustment to take place prior to the 60 EFPD after each fuel loading. This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

CTS

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3.1.2 Reactivity Balance (Analog)

1

4.1.1.1.2 LCO 3.1.2 The core reactivity balance shall be within ± 1% Δk/k of predicted values.

DOC A02

DOC L01 APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L02	A. Core reactivity balance not within limit.	A.1 Re-evaluate core design and safety analysis and determine that the reactor core is acceptable for continued operation. AND A.2 Establish appropriate operating restrictions and SRs.	7 days 7 days
DOC L02	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.1.1.1.2 DOC L04 DOC L03	SR 3.1.2.1	------------------------------NOTES---------------------------- 1. The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading. 2. This Surveillance is not required to be performed prior to entry into MODE 2. --- Verify overall core reactivity balance is within ± 1.0% Δk/k of predicted values.	Prior to entering MODE 1 after fuel loading <u>AND</u> --------NOTE-------- Only required after 60 EFPD ------------------------ [31 EFPD <u>OR</u> In accordance with the Surveillance Frequency Control Program] 3

CTS

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3.1.2 Reactivity Balance (Analog)

1

4.1.1.1.2
DOC A02
LCO 3.1.2 The core reactivity balance shall be within ± 1% Δk/k of predicted values.

DOC L01 APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L02	A. Core reactivity balance not within limit.	A.1 Re-evaluate core design and safety analysis and determine that the reactor core is acceptable for continued operation. AND A.2 Establish appropriate operating restrictions and SRs.	7 days 7 days
DOC L02	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.1.1.1.2 DOC L04 DOC L03	SR 3.1.2.1	------------------------------NOTES---------------------------- 1. The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading. 2. This Surveillance is not required to be performed prior to entry into MODE 2. --- Verify overall core reactivity balance is within ± 1.0% Δk/k of predicted values.	Prior to entering MODE 1 after fuel loading AND --------NOTE-------- Only required after 60 EFPD ------------------------ [31 EFPD OR In accordance with the Surveillance Frequency Control Program] 3

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.2, REACTIVITY BALANCE

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The ISTS contains bracketed information and/or values that are generic to Combustion Engineering vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis

Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~

B 3.1.2 Reactivity Balance ~~(Analog)~~ 1

BASES

BACKGROUND

According to GDC 26, GDC 28, and GDC 29 (Ref. 1), reactivity shall be controllable, such that, subcriticality is maintained under cold conditions, and acceptable fuel design limits are not exceeded during normal operation and anticipated operational occurrences. Therefore, reactivity balance is used as a measure of the predicted versus measured core reactivity during power operation. The periodic confirmation of core reactivity is necessary to ensure that Design Basis Accident (DBA) and transient safety analyses remain valid. A large reactivity difference could be the result of unanticipated changes in fuel, control element assembly (CEA) worth, or operation at conditions not consistent with those assumed in the predictions of core reactivity, and could potentially result in a loss of SDM or violation of acceptable fuel design limits. Comparing predicted versus measured core reactivity validates the nuclear methods used in the safety analysis and supports the SDM demonstrations (LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") in ensuring the reactor can be brought safely to cold, subcritical conditions.

When the reactor core is critical or in normal power operation, a reactivity balance exists and the net reactivity is zero. A comparison of predicted and measured reactivity is convenient under such a balance, since parameters are being maintained relatively stable under steady state power conditions. The positive reactivity inherent in the core design is balanced by the negative reactivity of the control components, thermal feedback, neutron leakage, and materials in the core that absorb neutrons, such as burnable absorbers producing zero net reactivity. Excess reactivity can be inferred from the critical boron curve, which provides an indication of the soluble boron concentration in the Reactor Coolant System (RCS) versus cycle burnup. Periodic measurement of the RCS boron concentration for comparison with the predicted value with other variables fixed (such as CEA height, temperature, pressure, and power) provides a convenient method of ensuring that core reactivity is within design expectations, and that the calculational models used to generate the safety analysis are adequate.

In order to achieve the required fuel cycle energy output, the uranium enrichment in the new fuel loading and in the fuel remaining from the previous cycle, provides excess positive reactivity beyond that required to sustain steady state operation throughout the cycle. When the reactor is critical at RTP and moderator temperature, the excess positive reactivity is compensated by burnable absorbers (if any), CEAs, whatever neutron poisons (mainly xenon and samarium) are present in the fuel, and the RCS boron concentration.

BASES

BACKGROUND (continued)

When the core is producing THERMAL POWER, the fuel is being depleted and excess reactivity is decreasing. As the fuel depletes, the RCS boron concentration is reduced to decrease negative reactivity and maintain constant THERMAL POWER. The critical boron curve is based on steady state operation at RTP. Therefore, deviations from the predicted critical boron curve may indicate deficiencies in the design analysis, deficiencies in the calculational models, or abnormal core conditions, and must be evaluated.

APPLICABLE SAFETY ANALYSES

Accurate prediction of core reactivity is either an explicit or implicit assumption in the accident analysis evaluations. Every accident evaluation (Ref. 2) is, therefore, dependent upon accurate evaluation of core reactivity. In particular, SDM and reactivity transients, such as CEA withdrawal accidents or CEA ejection accidents, are very sensitive to accurate prediction of core reactivity. These accident analysis evaluations rely on computer codes that have been qualified against available test data, operating plant data, and analytical benchmarks. Monitoring reactivity balance additionally ensures that the nuclear methods provide an accurate representation of the core reactivity.

Design calculations and safety analyses are performed for each fuel cycle for the purpose of predetermining reactivity behavior and the RCS boron concentration requirements for reactivity control during fuel depletion.

The comparison between measured and predicted initial core reactivity provides a normalization for calculational models used to predict core reactivity. If the measured and predicted RCS boron concentrations for identical core conditions at beginning of cycle (BOC) do not agree, then the assumptions used in the reload cycle design analysis or the calculational models used to predict soluble boron requirements may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at BOC, then the prediction may be normalized to the measured boron concentration. Thereafter, any significant deviations in the measured boron concentration from the predicted critical boron curve that develop during fuel depletion may be an indication that the calculational model is not adequate for core burnups beyond BOC, or that an unexpected change in core conditions has occurred.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The normalization of predicted RCS boron concentration to the measured value is typically performed after reaching RTP following startup from a refueling outage, with the CEAs in their normal positions for power operation. The normalization is performed at BOC conditions, so that core reactivity relative to predicted values can be continually monitored and evaluated as core conditions change during the cycle.

The reactivity balance satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The reactivity balance limit is established to ensure plant operation is maintained within the assumptions of the safety analyses. Large differences between actual and predicted core reactivity may indicate that the assumptions of the DBA and transient analyses are no longer valid, or that the uncertainties in the nuclear design methodology are larger than expected. A limit on the reactivity balance of ± 1% Δk/k has been established, based on engineering judgment. A 1% deviation in reactivity from that predicted is larger than expected for normal operation and should therefore be evaluated.

When measured core reactivity is within 1% Δk/k of the predicted value at steady state thermal conditions, the core is considered to be operating within acceptable design limits. Since deviations from the limit are normally detected by comparing predicted and measured steady state RCS critical boron concentrations, the difference between measured and predicted values would be approximately 100 ppm (depending on the boron worth) before the limit is reached. These values are well within the uncertainty limits for analysis of boron concentration samples, so that spurious violations of the limit due to uncertainty in measuring the RCS boron concentration are unlikely.

APPLICABILITY

The limits on core reactivity must be maintained during MODES 1 and 2 because a reactivity balance must exist when the reactor is critical or producing THERMAL POWER. As the fuel depletes, core conditions are changing, and confirmation of the reactivity balance ensures the core is operating as designed. This Specification does not apply in MODES 3, 4, and 5 because the reactor is shut down and the reactivity balance is not changing.

In MODE 6, fuel loading results in a continually changing core reactivity. Boron concentration requirements (LCO 3.9.1, "Boron Concentration") ensure that fuel movements are performed within the bounds of the safety analysis. An SDM demonstration is required during the first startup following operations that could have altered core reactivity (e.g., fuel movement, or CEA replacement, or shuffling).

BASES

ACTIONS

A.1 and A.2

Should an anomaly develop between measured and predicted core reactivity, an evaluation of the core design and safety analysis must be performed. Core conditions are evaluated to determine their consistency with input to design calculations. Measured core and process parameters are evaluated to determine that they are within the bounds of the safety analysis, and safety analysis calculational models are reviewed to verify that they are adequate for representation of the core conditions. The required Completion Time of 7 days is based on the low probability of a DBA occurring during this period, and allows sufficient time to assess the physical condition of the reactor and complete the evaluation of the core design and safety analysis.

Following evaluations of the core design and safety analysis, the cause of the reactivity anomaly may be resolved. If the cause of the reactivity anomaly is a mismatch in core conditions at the time of RCS boron concentration sampling, then a recalculation of the RCS boron concentration requirements may be performed to demonstrate that core reactivity is behaving as expected. If an unexpected physical change in the condition of the core has occurred, it must be evaluated and corrected, if possible. If the cause of the reactivity anomaly is in the calculation technique, then the calculational models must be revised to provide more accurate predictions. If any of these results are demonstrated, and it is concluded that the reactor core is acceptable for continued operation, then the boron letdown curve may be renormalized, and power operation may continue. If operational restrictions or additional SRs are necessary to ensure the reactor core is acceptable for continued operation, then they must be defined.

The required Completion Time of 7 days is adequate for preparing whatever operating restrictions or Surveillances that may be required to allow continued reactor operation.

B.1

If the core reactivity cannot be restored to within the 1% $\Delta k/k$ limit, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. If the SDM for MODE 3 is not met, then boration required by SR 3.1.1.1 would occur. The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

Core reactivity is verified by periodic comparisons of measured and predicted RCS boron concentrations. The comparison is made considering that other core conditions are fixed or stable including CEA position, moderator RCS boron concentration, RCS average temperature, fuel temperature, fuel depletion, xenon concentration, and samarium concentration. The Surveillance is performed prior to entering MODE 1 as an initial check on core conditions and design calculations at BOC. The SR is modified by three Notes. Note 1 in the Surveillance column indicates that the normalization of predicted core reactivity to the measured value must may take place , if required, within the first 60 effective full power days (EFPD) after each fuel loading. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. [The required subsequent Frequency of 31 EFPD following the initial 60 EFPD after entering MODE 1, is acceptable, based on the slow rate of core changes due to fuel depletion and the presence of other indicators (e.g., QPTR, etc.) for prompt indication of an anomaly. 2 4 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
--]

A second Note, "only required after 60 EFPD," is added to the Frequency column to allow this. Note 2 in the Surveillance column indicates that the performance of SR 3.1.2.1 is not required prior to entering MODE 2. This Note is required to allow a MODE 2 entry to verify core reactivity, because LCO Applicability is for MODES 1 and 2.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26, GDC 28, and GDC 29.

2. U FSAR, Section [[4.3]. 3

2

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~

1

B 3.1.2 Reactivity Balance ~~(Analog)~~

BASES

BACKGROUND

According to GDC 26, GDC 28, and GDC 29 (Ref. 1), reactivity shall be controllable, such that, subcriticality is maintained under cold conditions, and acceptable fuel design limits are not exceeded during normal operation and anticipated operational occurrences. Therefore, reactivity balance is used as a measure of the predicted versus measured core reactivity during power operation. The periodic confirmation of core reactivity is necessary to ensure that Design Basis Accident (DBA) and transient safety analyses remain valid. A large reactivity difference could be the result of unanticipated changes in fuel, control element assembly (CEA) worth, or operation at conditions not consistent with those assumed in the predictions of core reactivity, and could potentially result in a loss of SDM or violation of acceptable fuel design limits. Comparing predicted versus measured core reactivity validates the nuclear methods used in the safety analysis and supports the SDM demonstrations (LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") in ensuring the reactor can be brought safely to cold, subcritical conditions.

When the reactor core is critical or in normal power operation, a reactivity balance exists and the net reactivity is zero. A comparison of predicted and measured reactivity is convenient under such a balance, since parameters are being maintained relatively stable under steady state power conditions. The positive reactivity inherent in the core design is balanced by the negative reactivity of the control components, thermal feedback, neutron leakage, and materials in the core that absorb neutrons, such as burnable absorbers producing zero net reactivity. Excess reactivity can be inferred from the critical boron curve, which provides an indication of the soluble boron concentration in the Reactor Coolant System (RCS) versus cycle burnup. Periodic measurement of the RCS boron concentration for comparison with the predicted value with other variables fixed (such as CEA height, temperature, pressure, and power) provides a convenient method of ensuring that core reactivity is within design expectations, and that the calculational models used to generate the safety analysis are adequate.

In order to achieve the required fuel cycle energy output, the uranium enrichment in the new fuel loading and in the fuel remaining from the previous cycle, provides excess positive reactivity beyond that required to sustain steady state operation throughout the cycle. When the reactor is critical at RTP and moderator temperature, the excess positive reactivity is compensated by burnable absorbers (if any), CEAs, whatever neutron poisons (mainly xenon and samarium) are present in the fuel, and the RCS boron concentration.

BASES

BACKGROUND (continued)

When the core is producing THERMAL POWER, the fuel is being depleted and excess reactivity is decreasing. As the fuel depletes, the RCS boron concentration is reduced to decrease negative reactivity and maintain constant THERMAL POWER. The critical boron curve is based on steady state operation at RTP. Therefore, deviations from the predicted critical boron curve may indicate deficiencies in the design analysis, deficiencies in the calculational models, or abnormal core conditions, and must be evaluated.

APPLICABLE SAFETY ANALYSES

Accurate prediction of core reactivity is either an explicit or implicit assumption in the accident analysis evaluations. Every accident evaluation (Ref. 2) is, therefore, dependent upon accurate evaluation of core reactivity. In particular, SDM and reactivity transients, such as CEA withdrawal accidents or CEA ejection accidents, are very sensitive to accurate prediction of core reactivity. These accident analysis evaluations rely on computer codes that have been qualified against available test data, operating plant data, and analytical benchmarks. Monitoring reactivity balance additionally ensures that the nuclear methods provide an accurate representation of the core reactivity.

Design calculations and safety analyses are performed for each fuel cycle for the purpose of predetermining reactivity behavior and the RCS boron concentration requirements for reactivity control during fuel depletion.

The comparison between measured and predicted initial core reactivity provides a normalization for calculational models used to predict core reactivity. If the measured and predicted RCS boron concentrations for identical core conditions at beginning of cycle (BOC) do not agree, then the assumptions used in the reload cycle design analysis or the calculational models used to predict soluble boron requirements may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at BOC, then the prediction may be normalized to the measured boron concentration. Thereafter, any significant deviations in the measured boron concentration from the predicted critical boron curve that develop during fuel depletion may be an indication that the calculational model is not adequate for core burnups beyond BOC, or that an unexpected change in core conditions has occurred.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The normalization of predicted RCS boron concentration to the measured value is typically performed after reaching RTP following startup from a refueling outage, with the CEAs in their normal positions for power operation. The normalization is performed at BOC conditions, so that core reactivity relative to predicted values can be continually monitored and evaluated as core conditions change during the cycle.

The reactivity balance satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The reactivity balance limit is established to ensure plant operation is maintained within the assumptions of the safety analyses. Large differences between actual and predicted core reactivity may indicate that the assumptions of the DBA and transient analyses are no longer valid, or that the uncertainties in the nuclear design methodology are larger than expected. A limit on the reactivity balance of ± 1% $\Delta k/k$ has been established, based on engineering judgment. A 1% deviation in reactivity from that predicted is larger than expected for normal operation and should therefore be evaluated.

When measured core reactivity is within 1% $\Delta k/k$ of the predicted value at steady state thermal conditions, the core is considered to be operating within acceptable design limits. Since deviations from the limit are normally detected by comparing predicted and measured steady state RCS critical boron concentrations, the difference between measured and predicted values would be approximately 100 ppm (depending on the boron worth) before the limit is reached. These values are well within the uncertainty limits for analysis of boron concentration samples, so that spurious violations of the limit due to uncertainty in measuring the RCS boron concentration are unlikely.

APPLICABILITY

The limits on core reactivity must be maintained during MODES 1 and 2 because a reactivity balance must exist when the reactor is critical or producing THERMAL POWER. As the fuel depletes, core conditions are changing, and confirmation of the reactivity balance ensures the core is operating as designed. This Specification does not apply in MODES 3, 4, and 5 because the reactor is shut down and the reactivity balance is not changing.

In MODE 6, fuel loading results in a continually changing core reactivity. Boron concentration requirements (LCO 3.9.1, "Boron Concentration") ensure that fuel movements are performed within the bounds of the safety analysis. An SDM demonstration is required during the first startup following operations that could have altered core reactivity (e.g., fuel movement, or CEA replacement, or shuffling).

BASES

ACTIONS

A.1 and A.2

Should an anomaly develop between measured and predicted core reactivity, an evaluation of the core design and safety analysis must be performed. Core conditions are evaluated to determine their consistency with input to design calculations. Measured core and process parameters are evaluated to determine that they are within the bounds of the safety analysis, and safety analysis calculational models are reviewed to verify that they are adequate for representation of the core conditions. The required Completion Time of 7 days is based on the low probability of a DBA occurring during this period, and allows sufficient time to assess the physical condition of the reactor and complete the evaluation of the core design and safety analysis.

Following evaluations of the core design and safety analysis, the cause of the reactivity anomaly may be resolved. If the cause of the reactivity anomaly is a mismatch in core conditions at the time of RCS boron concentration sampling, then a recalculation of the RCS boron concentration requirements may be performed to demonstrate that core reactivity is behaving as expected. If an unexpected physical change in the condition of the core has occurred, it must be evaluated and corrected, if possible. If the cause of the reactivity anomaly is in the calculation technique, then the calculational models must be revised to provide more accurate predictions. If any of these results are demonstrated, and it is concluded that the reactor core is acceptable for continued operation, then the boron letdown curve may be renormalized, and power operation may continue. If operational restrictions or additional SRs are necessary to ensure the reactor core is acceptable for continued operation, then they must be defined.

The required Completion Time of 7 days is adequate for preparing whatever operating restrictions or Surveillances that may be required to allow continued reactor operation.

B.1

If the core reactivity cannot be restored to within the 1% $\Delta k/k$ limit, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. If the SDM for MODE 3 is not met, then boration required by SR 3.1.1.1 would occur. The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

Core reactivity is verified by periodic comparisons of measured and predicted RCS boron concentrations. The comparison is made considering that other core conditions are fixed or stable including CEA position, moderator RCS boron concentration, RCS average temperature, fuel temperature, fuel depletion, xenon concentration, and samarium concentration. The Surveillance is performed prior to entering MODE 1 as an initial check on core conditions and design calculations at BOC. The SR is modified by three Notes. Note 1 in the Surveillance column indicates that the normalization of predicted core reactivity to the measured value must may, if required, take place within the first 60 effective full power days (EFPD) after each fuel loading. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. [The required subsequent Frequency of 31 EFPD following the initial 60 EFPD after entering MODE 1, is acceptable, based on the slow rate of core changes due to fuel depletion and the presence of other indicators (e.g., QPTR, etc.) for prompt indication of an anomaly.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

A second Note, "only required after 60 EFPD," is added to the Frequency column to allow this. Note 2 in the Surveillance column indicates that the performance of SR 3.1.2.1 is not required prior to entering MODE 2. This Note is required to allow a MODE 2 entry to verify core reactivity, because LCO Applicability is for MODES 1 and 2.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26, GDC 28, and GDC 29.
2. U FSAR, Section [[4.3].

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.2 BASES, REACTIVITY BALANCE

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The ISTS contains bracketed information and/or values that are generic to Combustion Engineering vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. Changes are made to be consistent with the requirements of the Specification.

5. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.2, REACTIVITY BALANCE

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 3

3.1.3, Moderator Temperature Coefficient (MTC)

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

A01

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

LCO 3.1.3 3.1.1.4 The moderator temperature coefficient (MTC) shall be maintained within the limits specified in the COLR. The maximum positive limit shall be:

a. ~~Less positive than~~ +7 pcm/°F when~~ever~~ THERMAL POWER is ≤ 70% of RATED THERMAL POWER, and

b. ~~Less positive than~~ +2 pcm/°F when~~ever~~ THERMAL POWER is > 70% of RATED THERMAL POWER.

A02

M01

Applicability **APPLICABILITY:** MODES 1 AND 2~~*#~~.

A03

ACTION:

ACTION A With the moderator temperature coefficient outside any one of the above limits, be in HOT STANDBY within 6 hours.

A02

SURVEILLANCE REQUIREMENTS

the COLR

SR 3.1.3.1 4.1.1.4.1 Verify MTC is within the upper limit specified in ~~LCO 3.1.1.4~~.

a. Prior to entering MODE 1 after each fuel loading, and

b. Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup.**

M01

~~* With K_{eff} ≥ 1.0~~.

SR 3.1.3.1 2nd Freq. Note ** Only required to be performed when MTC determined prior to entering MODE 1 is verified using adjusted predicted MTC.

~~# See Special Test Exception 3.10.2.~~

A03

REACTIVITY CONTROL SYSTEMS

A01

SURVEILLANCE REQUIREMENTS (continued)

SR 3.2.1.3 4.1.1.4.2*** Verify MTC is within the lower limit specified in the COLR.****

Each fuel cycle within 7 EFPD of reaching 2/3 of expected core burnup.

SR 3.1.3.2 Note 2 *** If MTC is more negative than the lower limit specified in the COLR when extrapolated to the end of cycle, 4.1.1.4.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit.

to be performed

SR 3.1.3.2 Note 1 **** Only Required if ~~the~~ MTC determined ~~in SR 4.1.1.4.1~~ is not within ~~±~~ 1.6 pcm/°F of ~~the corresponding design value~~.

predicted MTC

during performance of SR 3.1.3.1

A04

ITS

ITS 3.1.3

A01

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

A01

positive

LIMITING CONDITION FOR OPERATION

LCO 3.1.3 3.1.1.4 The moderator temperature coefficient (MTC) shall be maintained within the limits specified in the COLR. The maximum ~~upper~~ limit shall be +5 pcm/°F at ≤ 70% of RATED THERMAL POWER, with a linear ~~ramp~~ from +5 pcm/°F at 70% of RATED THERMAL POWER to 0 pcm/°F at 100% RATED THERMAL POWER.

decrease

M01

Applicability **APPLICABILITY**: MODES 1 AND 2*#.

A03

ACTION:

ACTION A With the moderator temperature coefficient outside any one of the above limits, be in at least HOT STANDBY within 6 hours.

A02

the COLR

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1 4.1.1.4.1 Verify MTC is within the upper limit specified in ~~LCO 3.1.1.4~~.

a. Prior to entering MODE 1 after each fuel loading, and

b. Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup. **

SR 3.2.1.3 4.1.1.4.2*** Verify MTC is within the lower limit specified in the COLR.****

Each fuel cycle within 7 EFPD of reaching 2/3 of expected core burnup.

A03

~~# See Special Test Exception 3.10.2 and 3.10.5~~.

M01

~~* With K_{eff} greater than or equal to 1.0.~~

SR 3.1.3.1 2nd Freq. Note ** Only required to be performed when MTC determined prior to entering MODE 1 is verified using adjusted predicted MTC.

SR 3.1.3.2 Note 2 *** If MTC is more negative than the lower limit specified in the COLR when extrapolated to the end of cycle, 4.1.1.4.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit.

to be performed

SR 3.1.3.2 Note 1 **** Only Required if ~~the~~ MTC determined ~~in SR 4.1.1.4.1~~ is not within ~~±~~ 1.6 pcm/°F of ~~the corresponding design value~~.

A04

predicted MTC

during performance of SR 3.1.3.1

DISCUSSION OF CHANGES
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2 Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1432, Rev. 5.0, "Standard Technical Specifications - Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 Unit 1 CTS 3.1.1.4 states, in part, that the maximum positive limit shall be less positive than +7 pcm/°F whenever THERMAL POWER is ≤ 70% of RATED THERMAL POWER, and less positive than +2 pcm/°F whenever THERMAL POWER is > 70% of RATED THERMAL POWER. Unit 1 ITS 3.1.3 states, in part, that the maximum positive limit shall be +7 pcm/°F when THERMAL POWER is ≤ 70% RTP, and +2 pcm/°F when THERMAL POWER is > 70% RTP. This changes the Unit 1 CTS by eliminating the wording "less positive than," prior to listing the maximum positive MTC limit. This change is acceptable because the Unit 1 LCO requires a maximum value not a variable maximum value. The first sentence of the LCO requires the MTC to be maintained within the limits specified in the COLR and the second sentence is intended to ensure the upper MTC value specified in the COLR does not exceed a maximum positive MTC as stated in the LCO. In addition, Unit 1 and Unit 2 CTS 4.1.1.4.1, which requires verification that MTC is within the upper MTC limit, is changed to reference the COLR instead of the LCO, which references the maximum positive (i.e., upper) MTC limit. The limiting upper MTC specified in the COLR may be more restrictive than the maximum positive limit specified in the LCO. Therefore, ITS SR 3.1.3.1 requires verifying the MTC is within the upper limit specified in the COLR, which would encompass verifying the MTC is within the positive upper limit specified in the LCO. These changes are designated as administrative because they represent a presentation preference and do not represent a technical change to the CTS.

A03 The Applicability of CTS 3.1.1.4 is modified by footnote # stating "See Special Test Exception 3.10.2 (and 3.10.5 for Unit 2 only)." ITS 3.1.3 Applicability does not contain the footnote or a reference to the Special Test Exception. This changes the CTS by not including footnote # in the ITS.

The purpose of the footnote reference is to alert the user that a Special Test Exception exists that may modify the Applicability of the Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A04 CTS 4.1.1.4.2 requires verification that the lower MTC is within the limits of the COLR. ****Note states that this Surveillance is only required if the MTC determined in SR 4.1.1.4.1 is not within ± 1.6 pcm/°F of the corresponding design value. ITS SR 3.1.3.2 contains a similar note (Note 1), which states, "Only required to be performed if MTC determined during performance of SR 3.2.3.1 is not within 1.6 pcm/°F of the predicted MTC value." This changes the CTS by revising the Note to clarify the intent that the 1.6 pcm/°F criterion is based on the difference between the MTC determined during the performance of CTS 4.1.1.4.1 (ITS SR 3.1.3.1) and the predicted MTC at the point in core life when the Surveillance is performed.

In September 2016, the CTS **** Note was added in Amendments 235 and 185 for PSL Units 1 and 2, respectively, to waive performance of the MTC end of cycle measurement at or near 2/3 of expected core burn up if the MTC determined during performance of CTS 4.1.1.4.1 is within 1.6 pcm/°F of the predicted value (NRC ADAMS Accession No. ML16183A138). This change in presentation is designated as administrative because it only provides clarification to the original intent as approved in Amendments 235 (Unit 1) and 185 (Unit 2) and does not represent a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.1.1.4 is applicable in MODES 1 and 2 with an * Note that states, "With K_{eff} ≥ 1.0 (Unit 1 CTS)," and "With K_{eff} greater than or equal to 1.0 (Unit 2 CTS." ITS 3.1.3 is applicable in MODES 1 and 2. This changes the CTS by requiring MTC to be maintained within limits in MODE 2 when k_{eff} is < 1.0.

MTC is an input assumption in the PSL accident analyses, particularly core overheating and core overcooling events. MTC is also an input assumption in startup and subcritical events, such as the uncontrolled CEA withdrawal from a subcritical or low power startup condition. Therefore, MTC must be maintained within limits during MODE 2, whether the reactor is critical or subcritical. This change is consistent with the Applicability of the ISTS and is designated as more restrictive because the Applicability of the CTS LCO requirements is expanded to include subcritical conditions while in MODE 2.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

Note

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

CTS

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3.1.3 Moderator Temperature Coefficient (MTC) (Analog) 1

3.1.1.4 LCO 3.1.3 The MTC shall be maintained within the limits specified in the COLR. The maximum positive limit shall be: that specified in Figure 3.1.3-1.

DOC A02

a. +7 pcm/°F with THERMAL POWER ≤ 70% RTP, and

b. +2 pcm/°F with THERMAL POWER > 70% RTP. 2

Applicability
DOC M01
DOC A03

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. MTC not within limits.	A.1 Be in MODE 3.	6 hours

Action

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.1.1.4.1 4.1.1.4.1.a	SR 3.1.3.1	Verify MTC is within the upper limit specified in the COLR.	Prior to entering MODE 1 after each fuel loading ~~[~~ AND 4 --------NOTE-------- Only required to be performed when MTC determined prior to entering MODE 1 is verified using adjusted predicted MTC ------------------------
**Note 4.1.1.4.1.b			Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.3.2 ***Note 4.1.1.4.2 ****Note DOC A04	-----------------------------NOTES--------------------------- If the MTC is more negative than the limit specified in the COLR when extrapolated to the end of cycle, SR 3.1.3.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. -- Verify MTC is within the lower limit specified in the COLR. 1. Only required to be performed if MTC determined during performance of SR 3.1.3.1 is not within 1.6 pcm/°F of predicted MTC. 2.	5 Each fuel cycle within 7 EFPD of reaching 40 EFPD core burnup AND 6 Each fuel cycle within 7 EFPD of reaching 2/3 of expected core burnup 5

2

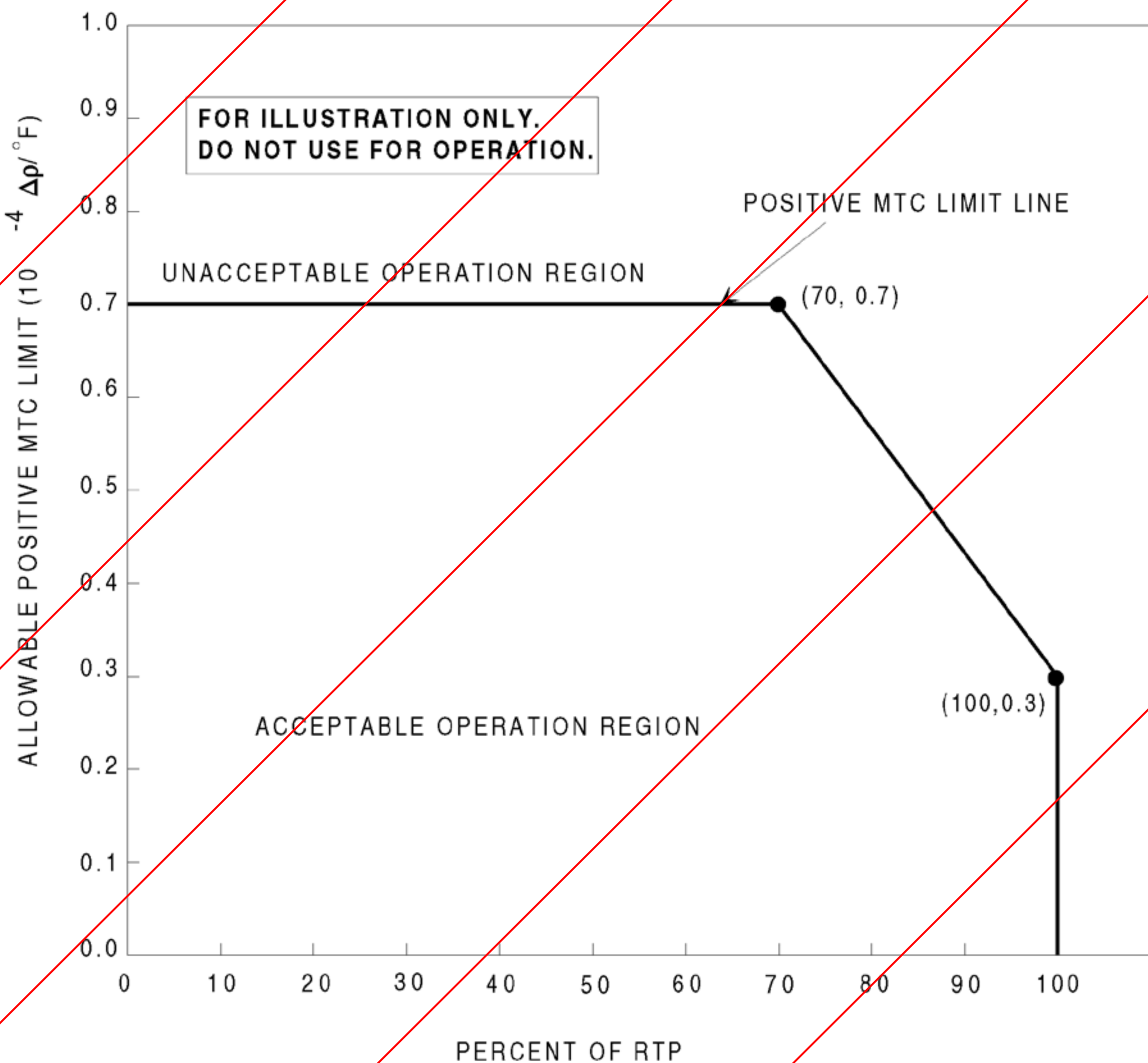

Figure 3.1.3-1 (page 1 of 1)
Allowable Positive MTC Limit

CTS

3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~

3.1.3 Moderator Temperature Coefficient (MTC) ~~(Analog)~~ (1)

3.1.1.4 LCO 3.1.3 The MTC shall be maintained within the limits specified in the COLR. The maximum positive limit shall be: ~~that specified in Figure 3.1.3-1.~~ (2)

DOC A02

a. +5 pcm/°F with THERMAL POWER < 70% RTP, and

b. +5 pcm/°F with THERMAL POWER at 70% RTP with a linear decrease to 0 pcm/°F at 100% RTP.

Applicability
DOC M01
DOC A03

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. MTC not within limits.	A.1 Be in MODE 3.	6 hours

Action

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.1.1.4.1 4.1.1.4.1.a	SR 3.1.3.1	Verify MTC is within the upper limit specified in the COLR.	Prior to entering MODE 1 after each fuel loading [AND 4
**Note			--------NOTE-------- Only required to be performed when MTC determined prior to entering MODE 1 is verified using adjusted predicted MTC ------------------------
4.1.1.4.1.b			Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.3.2	-----------------------------NOTES----------------------------- If the MTC is more negative than the limit specified in the COLR when extrapolated to the end of cycle, SR 3.1.3.2 may be repeated. Shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. --	5
	Verify MTC is within the lower limit specified in the COLR.	Each fuel cycle within 7 EFPD of reaching 40 EFPD core burnup AND Each fuel cycle within 7 EFPD of reaching 2/3 of expected core burnup

***Note

4.1.1.4.2

****Note
DOC A04

1. Only required to be performed if MTC determined during performance of SR 3.1.3.1 is not within 1.6 pcm/°F of predicted MTC.
2.

6

5

2

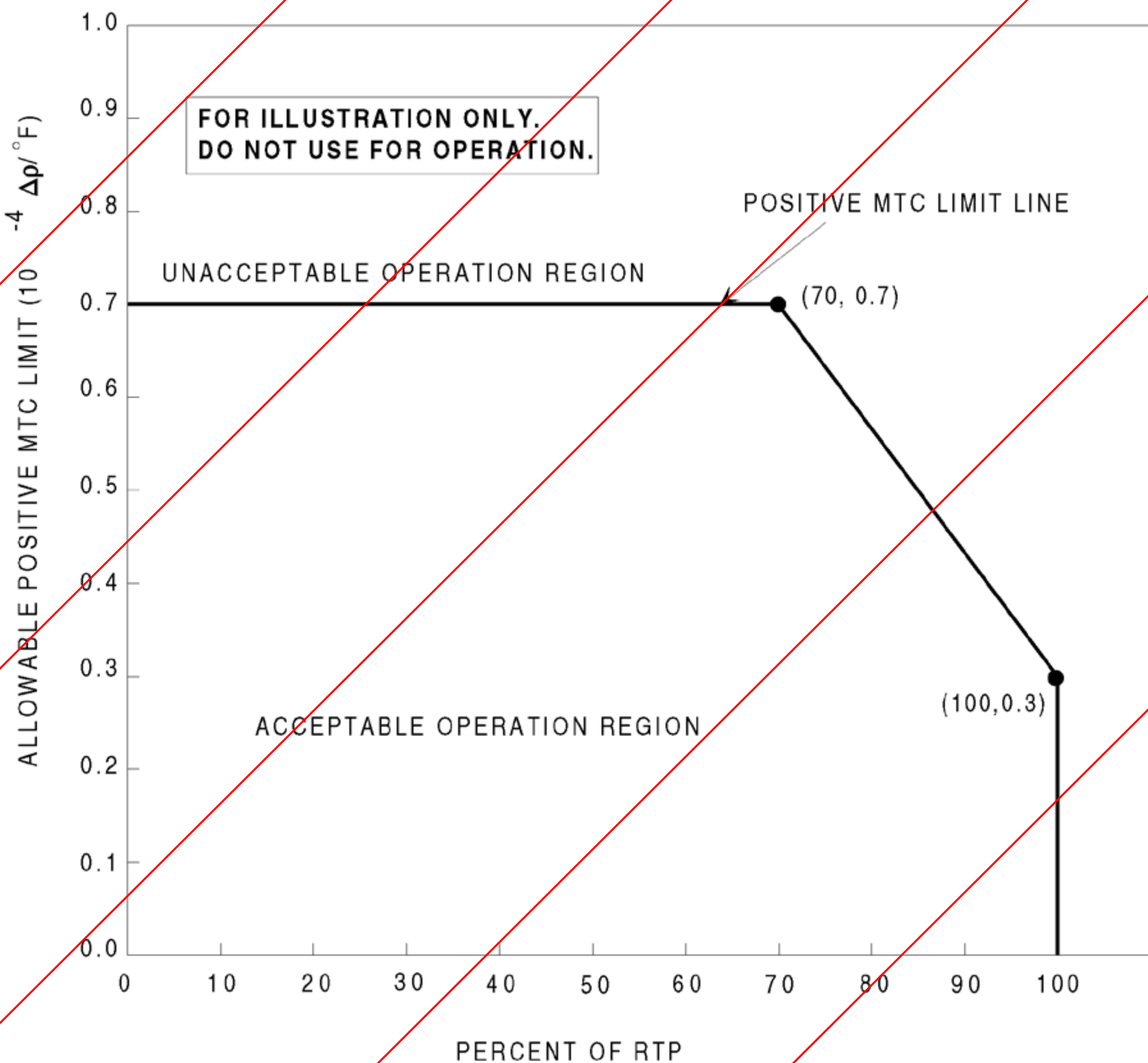

Figure 3.1.3-1 (page 1 of 1)
Allowable Positive MTC Limit

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. ISTS 3.1.3 contains Figure 3.1.3-1 for Allowable Positive MTC Vs Percent of RTP. This figure is not maintained in ITS 3.1.3. ITS 3.1.3 lists the maximum upper limit value based on THERMAL POWER level in the LCO. Therefore, ISTS Figure 3.1.3-1 is not required and has been deleted.

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

4. The ISTS contains bracketed information and/or values that are generic to Combustion Engineering vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

5. ISTS SR 3.1.3.2 contains one Note. ITS SR 3.1.3.2 retains the Note but also adds a Note (Note 1) that states, “Only required to be performed if MTC determined during performance of SR 3.1.3.1 is not within 1.6 pcm/°F of predicted MTC.” This Note is consistent with CTS and was approved in License Amendments 235 and 185, dated September 19, 2016, for PSL Units 1 and 2, respectively, as supported by Combustion Engineering Owners Group Topical Report CE NPSD-911-A and Amendment 1-A. The Note waives performance of the MTC end of cycle measurement if the measured MTC during performance of SR 3.1.3.1 is within 1.6 pcm/°F of the predicted value (NRC ADAMS Accession No. ML16183A138). Concomitant changes are made to reflect two Notes in the ITS.

6. The first Frequency of ISTS SR 3.1.3.2 states, “Each fuel cycle within 7 EFPD of reaching 40 EFPD core burnup.” In September 2014, PSL modified the MTC surveillance requirements associated with the implementation of Westinghouse Topical Report WCAP-16011-P-A, “Startup Test Activity Reduction (STAR) Program.” In the license amendment request supporting the change, PSL stated that proposed Surveillance 4.1.1.4.2 does not include a requirement for MTC measurements within 7 EFPD of reaching 40 EFPD core burnup to be extrapolated for comparison to the lower MTC limit because performing the surveillance at 2/3 of core burnup will be performed and available for extrapolation to verify the lower MTC limit. The extrapolation of MTC measured within 7 EFPD of reaching 40 EFPD core burnup will not add any additional technical value for comparison to the MTC lower limit and therefore the elimination of this frequency is considered acceptable. CTS 4.1.1.4.2, without the Frequency of 7 EFPD of reaching 40 EFPD core burnup, was approved in License Amendments 219 and 168, dated September 16, 2014, for PSL Units 1 and 2, respectively (NRC ADAMS Accession No. ML14218A180). Therefore, ITS SR 3.1.3.2 does not include this Frequency consistent with CTS.

Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~

B 3.1.3 Moderator Temperature Coefficient (MTC) ~~(Analog)~~

BASES

BACKGROUND

According to GDC 11 (Ref. 1), the reactor core and its interaction with the Reactor Coolant System (RCS) must be designed for inherently stable power operation, even in the possible event of an accident. In particular, the net reactivity feedback in the system must compensate for any unintended or rapid reactivity increases.

The MTC relates a change in core reactivity to a change in reactor coolant temperature. A positive MTC means that reactivity increases with increasing moderator temperature; conversely, a negative MTC means that reactivity decreases with increasing moderator temperature. The reactor is designed to operate with a negative MTC over the largest possible range of fuel cycle operation. Therefore, a coolant temperature increase will cause a reactivity decrease, so that the coolant temperature tends to return toward its initial value. Reactivity increases that cause a coolant temperature increase will thus be self limiting, and stable power operation will result.

MTC values are predicted at selected burnups during the safety evaluation analysis and are confirmed to be acceptable by measurements. Both initial and reload cores are designed so that the beginning of cycle (BOC) MTC is less positive than that allowed by the LCO. The actual value of the MTC is dependent on core characteristics, such as fuel loading and reactor coolant soluble boron concentration. The core design may require additional fixed distributed poisons (lumped burnable poison assemblies) to yield an MTC at the BOC within the range analyzed in the plant accident analysis. The end of cycle (EOC) MTC is also limited by the requirements of the accident analysis. Fuel cycles that are designed to achieve high burnups or that have changes to other characteristics are evaluated to ensure that the MTC does not exceed the EOC limit.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for the specified MTC are:

a. The MTC values must remain within the bounds of those used in the accident analysis (Ref. 2) and

b. The MTC must be such that inherently stable power operations result during normal operation and during accidents, such as overheating and overcooling events.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Reference 2 contains analyses of accidents that result in both overheating and overcooling of the reactor core. MTC is one of the controlling parameters for core reactivity in these accidents. Both the most positive value and most negative value of the MTC are important to safety, and both values must be bounded. Values used in the analyses consider worst case conditions, such as very large soluble boron concentrations, to ensure the accident results are bounding (Ref. 3). 2

Accidents that cause core overheating, either by decreased heat removal or increased power production, must be evaluated for results when the MTC is positive. Reactivity accidents that cause increased power production include the control element assembly (CEA) withdrawal transient from either zero or full THERMAL POWER. The limiting overheating event relative to plant response is based on the maximum difference between core power and steam generator heat removal during a transient. The most limiting event with respect to a positive MTC is a [an uncontrolled] CEA withdrawal accident from zero power, also referred to as a startup accident (Ref. 4 [2]). 2

Accidents that cause core overcooling must be evaluated for results when the MTC is most negative. The event that produces the most rapid cooldown of the RCS, and is therefore the most limiting event with respect to the negative MTC, is a steam line break (SLB) event. Following the reactor trip for the postulated EOC SLB event, the large moderator temperature reduction combined with the large negative MTC may produce reactivity increases that are as much as the shutdown reactivity. When this occurs, a substantial fraction of core power is produced with all CEAs inserted, except the most reactive one, which is assumed withdrawn. Even if the reactivity increase produces slightly subcritical conditions, a large fraction of core power may be produced through the effects of subcritical neutron multiplication.

MTC values are bounded in reload safety evaluations assuming steady state conditions at BOC and EOC. A middle of cycle (MOC) measurement is conducted at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the EOC value, in order to confirm reload design predictions.

The MTC satisfies Criterion 2 of the NRC Policy Statement [10 CFR 50.36(c)(2)(ii)]. 2

BASES

LCO

LCO 3.1.3 requires the MTC to be within the positive and negative limits specified in the COLR to ensure the core operates within the assumptions of the accident analysis. During the reload core safety evaluation, the MTC is analyzed to determine that its values remain within the bounds of the original accident analysis during operation. The positive MTC limit in the COLR ensures that core overheating accidents will not violate the accident analysis assumptions. The negative MTC limit for EOC specified in the COLR ensures that core overcooling accidents will not violate the accident analysis assumptions.

The MTC limit in ~~Figure 3.1.3-1~~ the LCO is the maximum positive MTC value approved in the plant's licensing basis and ensures that the reactor operates with a negative MTC over the largest possible range of fuel cycle operation. The cycle-specific MTC limit specified in the COLR must be equal to or less positive than the MTC limit specified in ~~Figure 3.1.3-1~~ the LCO. (3)

MTC is a core physics parameter determined by the fuel and fuel cycle design and cannot be easily controlled once the core design is fixed. Limited control of MTC can be achieved by adjusting CEA position and boron concentration. During operation the LCO can be ensured through measurement and adjustments to CEA position and boron concentration. The surveillance checks at BOC and MOC on an MTC provide confirmation that the MTC is behaving as anticipated, so that the acceptance criteria are met.

APPLICABILITY

In MODE 1, the limits on the MTC must be maintained to ensure that any accident initiated from THERMAL POWER operation will not violate the design assumptions of the accident analysis. In MODE 2, the limits must also be maintained to ensure startup and subcritical accidents, such as the uncontrolled CEA or group withdrawal, will not violate the assumptions of the accident analysis. In MODES 3, 4, 5, and 6, this LCO is not applicable, since no Design Basis Accidents (DBAs) using the MTC as an analysis assumption are initiated from these MODES. However, the variation of the MTC, with temperature in MODES 3, 4, and 5, for DBAs initiated in MODES 1 and 2, is accounted for in the subject accident analysis. The variation of the MTC, with temperature assumed in the safety analysis, is accepted as valid once the BOC and MOC measurements are used for normalization.

ACTIONS

A.1

MTC is a function of the fuel and fuel cycle designs, and cannot be controlled directly once the designs have been implemented in the core. If MTC exceeds its limits, the reactor must be placed in MODE 3. This eliminates the potential for violation of the accident analysis bounds. The

BASES

ACTIONS (continued)

associated Completion Time of 6 hours is reasonable, considering the probability of an accident occurring during the time period that would require an MTC value within the LCO limits, and the time for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1 and SR 3.1.3.2

The SRs for measurement of the MTC at the beginning and middle of each fuel cycle provide for confirmation of the limiting MTC values. The MTC changes smoothly from most positive (least negative) to most negative value during fuel cycle operation, as the RCS boron concentration is reduced to compensate for fuel depletion.

------------------------------ REVIEWER'S NOTE ---------------------------------
The following Bases and the second Frequency of SR 3.1.3.1 are only applicable to plants that adopt WCAP-16011 (Reference 5). 4

[For fuel cycles that meet the applicability requirements in Reference 5 3, and specifically the acceptance criteria that must be met in order to substitute the measured value of MTC at hot zero power (HZP) with an alternate MTC value, SR 3.1.3.1 may be met prior to entering MODE 1 after each fuel loading by confirmation that the predicted MTC, when adjusted for the measured RCS boron concentration, is within the most positive (least negative) MTC limit specified in the COLR. If this adjusted predicted MTC value is used to meet the SR prior to entering MODE 1, a confirmation by measurement that MTC is within the upper MTC limit must be performed in MODE 1 within 7 Effective Full Power Days (EFPD) after reaching 40 EFPD of core burnup. The applicability requirements in Reference 5 3 ensure core designs are not significantly different from those used to benchmark predictions and require that the measured RCS boron concentration meets specific test criteria. This provides assurance that the MTC obtained from the adjusted predicted MTC is accurate. 5 3 2 2

For fuel cycles that do not meet the applicability requirements in Reference 5 3, the verification of MTC required prior to entering MODE 1 after each fuel loading is performed by calculation of the MTC based on measurement of the isothermal temperature coefficient. In this case, measurement of MTC within 7 EFPD after reaching 40 EFPD of core burnup is not required.] 2 5 3

BASES

SURVEILLANCE REQUIREMENTS (continued)

The requirement for measurement prior to operation > 5% RTP satisfies the confirmatory check on the most positive (least negative) MTC value.

The requirement for measurement, within 7 EFPD after reaching 40 EFPD at and 2/3 core burnup, satisfies the confirmatory check of the most negative MTC value. The measurement is performed at any THERMAL POWER, so that the projected EOC MTC may be evaluated before the reactor actually reaches the EOC condition. MTC values may be extrapolated and compensated to permit direct comparison to the MTC limits specified in the COLR. 3

SR 3.1.3.2 is modified by a Note, which Insert 1 indicates that if the extrapolated MTC is more negative than the EOC limit specified in the COLR, the Surveillance may be repeated, and that shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. An engineering evaluation is performed if the extrapolated value of MTC exceeds the Specification limits. 2 3

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.

2. FSAR, Section [ ] Chapter 15. U

3. FSAR, Section [ ].

4. FSAR, Section [ ].

3 5. [WCAP-16011-P-A, Rev. 0, "Startup Test Activity Reduction Program," dated February 2005.] 2 5 3

4. Combustion Engineering Owners Group Topical Report CE NPSD-911-A and Amendment 1-A, “Analysis of Moderator Temperature Coefficients in Support of a Change in the Technical Specifications End-Of-Cycle Negative MTC Limit,” dated June 2000. 2 3

INSERT 1 2 3

two Notes. Note 1 waives performance of the MTC EOC verification if the MTC determined during performance of SR 3.1.3.1 is within 1.6 pcm/°F of the predicted value. This allowance is based on the methodology described in Topical Report CE NPSD-911-A and Amendment 1-A (Ref. 4). Each cycle, the core is designed using this CE methodology such that the best estimate MTC includes a design margin to the BOC and EOC limits. The design margin is determined to be 1.6 pcm/°F at all times in core life. Therefore, if the BOC MTC values are within 1.6 pcm/°F of the best estimate prediction, then it can be assumed that the EOC MTC values will also be within 1.6 pcm/°F of the prediction and its verification is not required. Note 2

B 3.1 REACTIVITY CONTROL SYSTEMS (Analog)

B 3.1.3 Moderator Temperature Coefficient (MTC) (Analog)

BASES

BACKGROUND

According to GDC 11 (Ref. 1), the reactor core and its interaction with the Reactor Coolant System (RCS) must be designed for inherently stable power operation, even in the possible event of an accident. In particular, the net reactivity feedback in the system must compensate for any unintended or rapid reactivity increases.

The MTC relates a change in core reactivity to a change in reactor coolant temperature. A positive MTC means that reactivity increases with increasing moderator temperature; conversely, a negative MTC means that reactivity decreases with increasing moderator temperature. The reactor is designed to operate with a negative MTC over the largest possible range of fuel cycle operation. Therefore, a coolant temperature increase will cause a reactivity decrease, so that the coolant temperature tends to return toward its initial value. Reactivity increases that cause a coolant temperature increase will thus be self limiting, and stable power operation will result.

MTC values are predicted at selected burnups during the safety evaluation analysis and are confirmed to be acceptable by measurements. Both initial and reload cores are designed so that the beginning of cycle (BOC) MTC is less positive than that allowed by the LCO. The actual value of the MTC is dependent on core characteristics, such as fuel loading and reactor coolant soluble boron concentration. The core design may require additional fixed distributed poisons (lumped burnable poison assemblies) to yield an MTC at the BOC within the range analyzed in the plant accident analysis. The end of cycle (EOC) MTC is also limited by the requirements of the accident analysis. Fuel cycles that are designed to achieve high burnups or that have changes to other characteristics are evaluated to ensure that the MTC does not exceed the EOC limit.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for the specified MTC are:

a. The MTC values must remain within the bounds of those used in the accident analysis (Ref. 2) and

b. The MTC must be such that inherently stable power operations result during normal operation and during accidents, such as overheating and overcooling events.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Reference 2 contains analyses of accidents that result in both overheating and overcooling of the reactor core. MTC is one of the controlling parameters for core reactivity in these accidents. Both the most positive value and most negative value of the MTC are important to safety, and both values must be bounded. Values used in the analyses consider worst case conditions, such as very large soluble boron concentrations, to ensure the accident results are bounding (Ref. 3). 2

Accidents that cause core overheating, either by decreased heat removal or increased power production, must be evaluated for results when the MTC is positive. Reactivity accidents that cause increased power production include the control element assembly (CEA) withdrawal transient from either zero or full THERMAL POWER. The limiting overheating event relative to plant response is based on the maximum difference between core power and steam generator heat removal during a transient. The most limiting event with respect to a positive MTC is a CEA withdrawal accident from zero power, also referred to as a startup accident (Ref. 4). 2

2 an uncontrolled

2

Accidents that cause core overcooling must be evaluated for results when the MTC is most negative. The event that produces the most rapid cooldown of the RCS, and is therefore the most limiting event with respect to the negative MTC, is a steam line break (SLB) event. Following the reactor trip for the postulated EOC SLB event, the large moderator temperature reduction combined with the large negative MTC may produce reactivity increases that are as much as the shutdown reactivity. When this occurs, a substantial fraction of core power is produced with all CEAs inserted, except the most reactive one, which is assumed withdrawn. Even if the reactivity increase produces slightly subcritical conditions, a large fraction of core power may be produced through the effects of subcritical neutron multiplication.

MTC values are bounded in reload safety evaluations assuming steady state conditions at BOC and EOC. A middle of cycle (MOC) measurement is conducted at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the EOC value, in order to confirm reload design predictions.

10 CFR 50.36(c)(2)(ii) 2

The MTC satisfies Criterion 2 of the NRC Policy Statement.

BASES

LCO

LCO 3.1.3 requires the MTC to be within the positive and negative limits specified in the COLR to ensure the core operates within the assumptions of the accident analysis. During the reload core safety evaluation, the MTC is analyzed to determine that its values remain within the bounds of the original accident analysis during operation. The positive MTC limit in the COLR ensures that core overheating accidents will not violate the accident analysis assumptions. The negative MTC limit for EOC specified in the COLR ensures that core overcooling accidents will not violate the accident analysis assumptions.

The MTC limit in Figure 3.1.3-1 the LCO is the maximum positive MTC value approved in the plant's licensing basis and ensures that the reactor operates with a negative MTC over the largest possible range of fuel cycle operation. The cycle-specific MTC limit specified in the COLR must be equal to or less positive than the MTC limit specified in Figure 3.1.3-1 the LCO. 3

MTC is a core physics parameter determined by the fuel and fuel cycle design and cannot be easily controlled once the core design is fixed. Limited control of MTC can be achieved by adjusting CEA position and boron concentration. During operation the LCO can be ensured through measurement and adjustments to CEA position and boron concentration. The surveillance checks at BOC and MOC on an MTC provide confirmation that the MTC is behaving as anticipated, so that the acceptance criteria are met.

APPLICABILITY

In MODE 1, the limits on the MTC must be maintained to ensure that any accident initiated from THERMAL POWER operation will not violate the design assumptions of the accident analysis. In MODE 2, the limits must also be maintained to ensure startup and subcritical accidents, such as the uncontrolled CEA or group withdrawal, will not violate the assumptions of the accident analysis. In MODES 3, 4, 5, and 6, this LCO is not applicable, since no Design Basis Accidents (DBAs) using the MTC as an analysis assumption are initiated from these MODES. However, the variation of the MTC, with temperature in MODES 3, 4, and 5, for DBAs initiated in MODES 1 and 2, is accounted for in the subject accident analysis. The variation of the MTC, with temperature assumed in the safety analysis, is accepted as valid once the BOC and MOC measurements are used for normalization.

ACTIONS

A.1

MTC is a function of the fuel and fuel cycle designs, and cannot be controlled directly once the designs have been implemented in the core. If MTC exceeds its limits, the reactor must be placed in MODE 3. This eliminates the potential for violation of the accident analysis bounds. The

BASES

ACTIONS (continued)

associated Completion Time of 6 hours is reasonable, considering the probability of an accident occurring during the time period that would require an MTC value within the LCO limits, and the time for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1 and SR 3.1.3.2

The SRs for measurement of the MTC at the beginning and middle of each fuel cycle provide for confirmation of the limiting MTC values. The MTC changes smoothly from most positive (least negative) to most negative value during fuel cycle operation, as the RCS boron concentration is reduced to compensate for fuel depletion.

------------------------------ REVIEWER'S NOTE ------------------------------
The following Bases and the second Frequency of SR 3.1.3.1 are only applicable to plants that adopt WCAP-16011 (Reference 5). 4

[For fuel cycles that meet the applicability requirements in Reference 5, 5 3
and specifically the acceptance criteria that must be met in order to substitute the measured value of MTC at hot zero power (HZP) with an alternate MTC value, SR 3.1.3.1 may be met prior to entering MODE 1 3
after each fuel loading by confirmation that the predicted MTC, when adjusted for the measured RCS boron concentration, is within the most 2
positive (least negative) MTC limit specified in the COLR. If this adjusted predicted MTC value is used to meet the SR prior to entering MODE 1, a confirmation by measurement that MTC is within the upper MTC limit must be performed in MODE 1 within 7 Effective Full Power Days (EFPD) after reaching 40 EFPD of core burnup. The applicability requirements in 2
3 Reference 5 ensure core designs are not significantly different from those used to benchmark predictions and require that the measured RCS boron concentration meets specific test criteria. This provides assurance that the MTC obtained from the adjusted predicted MTC is accurate.

For fuel cycles that do not meet the applicability requirements in 2
3 Reference 5, the verification of MTC required prior to entering MODE 1 after each fuel loading is performed by calculation of the MTC based on measurement of the isothermal temperature coefficient. In this case, measurement of MTC within 7 EFPD after reaching 40 EFPD of core 5 3
burnup is not required.]

BASES

SURVEILLANCE REQUIREMENTS (continued)

The requirement for measurement prior to operation > 5% RTP satisfies the confirmatory check on the most positive (least negative) MTC value.

The requirement for measurement, within 7 EFPD after reaching 40 EFPD at and 2/3 core burnup, satisfies the confirmatory check of the most negative MTC value. The measurement is performed at any THERMAL POWER, so that the projected EOC MTC may be evaluated before the reactor actually reaches the EOC condition. MTC values may be extrapolated and compensated to permit direct comparison to the MTC limits specified in the COLR. 3

Insert 1 2 3

SR 3.1.3.2 is modified by a Note, which indicates that if the extrapolated MTC is more negative than the EOC limit specified in the COLR, the Surveillance may be repeated, and that shutdown must occur prior to exceeding the minimum allowable boron concentration at which MTC is projected to exceed the lower limit. An engineering evaluation is performed if the extrapolated value of MTC exceeds the Specification limits.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.

2. FSAR, Section [ ]. Chapter 15 U

3. FSAR, Section [ ].

4. FSAR, Section [ ].

3 5. [WCAP-16011-P-A, Rev. 0, "Startup Test Activity Reduction Program," dated February 2005.] 2 5 3

4. Combustion Engineering Owners Group Topical Report CE NPSD-911-A and Amendment 1-A, "Analysis of Moderator Temperature Coefficients in Support of a Change in the Technical Specifications End-Of-Cycle Negative MTC Limit," dated June 2000. 2 3

INSERT 1 (2) (3)

two Notes. Note 1 waives performance of the MTC EOC verification if the MTC determined during performance of SR 3.1.3.1 is within 1.6 pcm/°F of the predicted value. This allowance is based on the methodology described in Topical Report CE NPSD-911-A and Amendment 1-A (Ref. 4). Each cycle, the core is designed using this CE methodology such that the best estimate MTC includes a design margin to the BOC and EOC limits. The design margin is determined to be 1.6 pcm/°F at all times in core life. Therefore, if the BOC MTC values are within 1.6 pcm/°F of the best estimate prediction, then it can be assumed that the EOC MTC values will also be within 1.6 pcm/°F of the prediction and its verification is not required. Note 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.3 BASES, MODERATOR TEMPERATURE COEFFICIENT (MTC)

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. Changes are made to be consistent with changes made to the Specification.

4. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

5. The ISTS contains bracketed information and/or values that are generic to Combustion Engineering vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 4

3.1.4 Control Element Assembly (CEA) Alignment

Current Technical Specifications (CTS) Markup
and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

Control Element Assembly ( ) Alignment

FULL LENGTH CEA POSITION

LIMITING CONDITION FOR OPERATION

LCO 3.1.4 — M01, A02

3.1.3.1 , and The CEA Block Circuit and the CEA deviation circuit shall be OPERABLE. all full length (shutdown and regulating) CEAs shall be OPERABLE with each AND all CEA s of a given group positioned shall be aligned to within 7.5 inches (indicated position) of all other CEAs in its their respective group.

Applicability — A03

APPLICABILITY: MODES 1* and 2*.

ACTION:

ACTION F — A02, LA01, L01

a. With one or more full length CEAs inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY MODE 3 within 6 hours.

Required Action F.1

b. With the CEA Block Circuit inoperable, within 6 hours either:

A04

1. With one CEA position indicator per group inoperable, take action per Specification 3.1.3.3, or

Required Action D.2.2. NOTE — L02

NOTE Required Action D.2.2 shall not be performed when in conflict with either Required Action C.1, C.2, or E.1.

Required Action D.2.2

2. With the group overlap and/or sequencing interlocks inoperable, maintain Fully withdraw all CEAs in groups 3, 4, 5 and 6 fully withdrawn and withdraw the all CEAs in group 7 to less than 5% insertion and place and maintain the CEA drive system mode switch in either the "Manual" or "Off" position, or

Required Action F.1

3. Be in at least HOT STANDBY MODE 3.

A05

c. With one full length CEA inoperable due to causes other than addressed by Action a above, but within its above specified alignment requirements and either fully withdrawn or within the long term steady state insertion limits if in CEA group 7, operation in MODES 1 and 2 may continue.

ACTION A Condition A — A02

d. With one or more full length CEAs misaligned from any other CEAs in its group by more than 7.5 inches but less than 15 inches, operation in MODES 1 and 2 may continue, provided that within 2 hours one hour the misaligned CEA(s) is either:

Required Action A.1 — A06

1. Restore d to OPERABLE status within its above specified CEA alignment requirements, or within 2 hours

A03

* See Special Test Exceptions 3.10.2 and 3.10.5.

REACTIVITY CONTROL SYSTEMS

Control Element Assembly ( ) Alignment

FULL LENGTH CEA POSITION (continued)

LIMITING CONDITION FOR OPERATION (continued)

2. Declared inoperable and satisfy SHUTDOWN MARGIN requirements of Specification 3.1.1.1. After declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 for up to 7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year provided all of the following conditions are met: L02 A07

Required Action A.1

a) Within 2 hours 1 hour, the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on COLR Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation. A06

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours. L01

Required Action F.1

Otherwise, be in MODE 3 at least HOT STANDBY within the next 6 hours.

ACTION B Condition B

Required Action B.1

e. With one full length CEA misaligned from any other CEA in its group by 15 or more inches, operation in MODES 1 and 2 may continue provided that the misaligned CEA is positioned within 7.5 inches of other CEAs in its group in accordance with the time constraints shown in COLR Figure 3.1-1a. A02 LA02

ACTION C Condition C

Required Action C.1

Required Action C.2

f. With one full length CEA misaligned from any other CEA in its group by 15 or more inches beyond the time constraints shown in COLR Figure 3.1-1a, reduce power to ≤ 70% of RATED THERMAL POWER RTP within 1 hour. prior to completing ACTION f.1 or f.2. A02 M02

1. Restored the CEA to OPERABLE status within its specified alignment within 2 hours requirements, or M02

2. Declare the CEA inoperable and satisfy the SHUTDOWN MARGIN requirements of Specification 3.1.1.1. After declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 provided: L01

Required Action C.2

a) Within 2 hours 1 hour, the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on COLR Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation. A06

REACTIVITY CONTROL SYSTEMS

Control Element Assembly ( ) Alignment

FULL LENGTH CEA POSITION (continued)

LIMITING CONDITION FOR OPERATION (continued)

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours. L01

Required Action F.1 — Otherwise, be at least HOT STANDBY in MODE 3 within the next 6 hours.

Condition F / Required Action F.1 — g. With more than one full length Two or more CEA s inoperable or misaligned from any other CEA in its group by ≥ 15 inches (indicated position) or more, be in HOT STANDBY MODE 3 within 6 hours. A02

h. With one full length CEA inoperable due to causes other than addressed by ACTION a above, and inserted beyond the long term steady state insertion limits but within its above specified alignment requirements, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6. A05

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1 — 4.1.3.1.1 Verify The indicated position of each full-length CEA shall be determined to be within 7.5 inches (indicated position) of all other CEAs in its group in accordance with the Surveillance Frequency Control Program except during time intervals when the Deviation Circuit and/or CEA Block Circuit are inoperable, then verify the individual CEA positions at least once per 1 hour AND Every 4 hours thereafter. A02 M03

Required Action D.1, E.1 Completion Time

SR 3.1.4.4 — 4.1.3.1.2 Verify CEA freedom of movement (trippability) by moving Each full length individual CEA not fully inserted shall be determined to be OPERABLE by inserting it at least 7.5 inches in either direction, that is in accordance with the Surveillance Frequency Control Program. A02

SR 3.1.4.2 — 4.1.3.1.3 Verify The CEA Block Circuit shall be demonstrated is OPERABLE in accordance with the Surveillance Frequency Control Program by a functional test which verifies that the circuit prevents any CEA from being misaligned from all other CEAs in its group by more than 7.5 inches (indicated position). LA03

SR 3.1.4.2 — 4.1.3.1.4 Verify The CEA Block Circuit shall be demonstrated is OPERABLE by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of COLR Figure 3.1-2: LA03

*a. Prior to each entry into MODE 2 from MODE 3, except that such verification need not be performed more often than once per 92 days, and A08

b. In accordance with the Surveillance Frequency Control Program.

SR 3.1.4.3 — Verify the CEA deviation circuit is OPERABLE in accordance with the Surveillance Frequency Control Program. M01

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* The licensee shall be excepted from compliance during the startup test program for an entry into MODE 2 from MODE 3 made in association with a measurement of power defect. A08

~~DELETED~~

REACTIVITY CONTROL SYSTEMS

CEA DROP TIME

LIMITING CONDITION FOR OPERATION

SR 3.1.4.5 3.1.3.4 The individual full length (shutdown and control) Verify each CEA drop time is, from a fully withdrawn position, shall be ≤ 3.1 seconds from when electrical power is interrupted to the CEA drive mechanism until the CEA reaches its 90 percent insertion position with: LA04

a. T_{avg} ≥ 515°F, and

b. All reactor coolant pumps operating.

APPLICABILITY: MODE 3. A09

ACTION:

a. 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 MODE 1 or 2. A09

b. With the CEA drop times within limits but determined at less than full reactor coolant flow, operation may proceed provided THERMAL POWER is restricted to less than or equal to the maximum THERMAL POWER level allowable for the reactor coolant pump combination operating at the time of CEA drop time determination. A10

SURVEILLANCE REQUIREMENTS

SR 3.1.4.5 4.1.3.4 The CEA drop time of full length CEAs shall be demonstrated through measurement prior to reactor criticality:

a. For all CEAs following after each removal of the reactor vessel head,

b. For specifically affected individual CEAs following any maintenance on or modification to the CEA drive system which could affect the drop time of those specific CEAs, and L03

c. In accordance with the Surveillance Frequency Control Program. L04

A01

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

See ITS 3.1.1

SHUTDOWN MARGIN - T_{avg} > 200 °F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

APPLICABILITY: MODES 1, 2*, 3 and 4.

See ITS 3.1.6

ACTION:

With the SHUTDOWN MARGIN not within limits immediately initiate and continue boration at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

L01

a. ~~Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable.~~ If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

b. When in MODES 1 or 2#, in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

c. When in MODE 2## at least once during CEA withdrawal and in accordance with the Surveillance Frequency Control Program until the reactor is critical.

See ITS 3.1.6

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6.

See ITS 3.1.1

* See Special Test Exception 3.10.1.

\# With K_{eff} ≥ 1.0.

\## With K_{eff} < 1.0.

See ITS 3.1.6

REACTIVITY CONTROL SYSTEMS

A01

SHUTDOWN MARGIN - $T_{avg} \leq 200$ °F

See ITS 3.1.1

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be:

Within the limits specified in the COLR, and in addition with the Reactor Coolant System drained below the hot leg centerline, one charging pump shall be rendered inoperable.*

See ITS 3.4.12

APPLICABILITY: MODE 5.

ACTION:

See ITS 3.1.1

If the SHUTDOWN MARGIN requirements cannot be met, immediately initiate and continue boration at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN requirements of Specification 3.1.1.2 shall be determined:

a. ~~Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable.~~ If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

L01

See ITS 1.1

b. In accordance with the Surveillance Frequency Control Program by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

See ITS 3.1.1

c. At least once per 24 hours, when the Reactor Coolant System is drained below the hot leg centerline, by consideration of the factors in 4.1.1.2.b and by verifying at least one charging pump is rendered inoperable.*

See ITS 3.4.12

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* Breaker racked-out.

See ITS 3.4.12

REACTIVITY CONTROL SYSTEMS

Control Element Assembly

~~3/4.1.3 MOVABLE CONTROL ASSEMBLIES~~

( ) Alignment

CEA ~~POSITION~~

LIMITING CONDITION FOR OPERATION

LCO 3.1.4 ~~3.1.3.1~~ , and The CEA Block Circuit and the CEA deviation circuit shall be OPERABLE. all ~~full-length (shutdown and regulating)~~ CEAs ~~which are inserted in the core,~~ shall be OPERABLE ~~with each~~ CEA ~~of a given group positioned~~ shall be aligned to within 7.0 inches (indicated position) of ~~all other~~ AND all ~~CEAs in~~ s ~~its~~ their respective group. M01 A02

Applicability **APPLICABILITY**: MODES 1~~*~~ and 2~~*~~. A03

ACTION:

ACTION F ~~a.~~ ~~With~~ one or more ~~full-length~~ CEAs inoperable ~~due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable,~~ ~~determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour~~ and be in at least ~~HOT STANDBY~~ MODE 3 within 6 hours. A02 LA01

Required Action F.1 L01

~~b.~~ ~~With the~~ CEA Block Circuit inoperable, within 6 hours ~~either:~~

~~1.~~ ~~With one CEA position indicator per group inoperable take action per Specification 3.1.3.2, or~~ A04

Required Action D.2.2. NOTE: NOTE Required Action D.2.2 shall not be performed when in conflict with either Required Action C.1, C.2, or E.1. L02

Required Action D.2.2 ~~2.~~ ~~With the group overlap and/or sequencing interlocks inoperable maintain~~ Fully withdraw all CEA groups 1, 2, 3 and 4 ~~fully withdrawn~~ and withdraw all ~~the~~ CEAs in group 5 to less than 15% insertion and place and maintain the CEA drive ~~system~~ in either the "Manual" or "Off" position~~, or~~

Required Action F.1 ~~3.~~ Be in ~~at least HOT STANDBY~~ MODE 3.

Condition F ~~c.~~ ~~With more than one full-length~~ Two or more CEA s ~~inoperable or~~ misaligned ~~from any other CEA in its group~~ by more than 15 inches ~~(indicated position),~~ be in ~~at least HOT STANDBY~~ MODE 3 within 6 hours. A02

Required Action F.1

ACTION B Condition B ~~d.~~ ~~With~~ one ~~full-length~~ CEA misaligned from ~~any other CEA in~~ its group by more than 15 inches~~, operation in MODES 1 and 2 may continue, provided that the misaligned~~ CEA is positioned within 15 inches of the other CEAs in its group in accordance with ~~the time constraints shown~~ in COLR ~~Figure 3.1-1a.~~ A02

Required Action B.1 LA02

~~* See Special Test Exceptions 3.10.2, 3.10.4 and 3.10.5.~~ A03

REACTIVITY CONTROL SYSTEMS

ACTION: (Continued)

LA02 L01

ACTION C Condition C

Required Action C.1

> A02

e. With one full-length CEA misaligned from any other CEA in its group by more than 15 inches beyond the time constraints shown in COLR Figure 3-1-1a, reduce power to ≤ 70% of RATED THERMAL POWER prior to completing ACTION e.1 or e.2. RTP within 1 hour. M02

Required Action C.2

1. Restore the CEA to OPERABLE status within its specified alignment requirements, or within 2 hours M02

2. Declare the CEA inoperable and satisfy SHUTDOWN MARGIN requirement of Specification 3.1.1.1. After declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 provided:* A06

Required Action C.2

a) Within 2 hours 1 hour the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.0 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on COLR Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours. L01

Required Action F.1

Otherwise, be in at least HOT STANDBY in MODE 3 within the next 6 hours.

ACTION A Condition A

f. With one or more full-length CEA(s) misaligned from any other CEAs in its group by more than 7.0 inches but less than or equal to 15 inches, operation in MODES 1 and 2 may continue, provided that within 2 hours 1 hour the misaligned CEA(s) is either: A02

Required Action A.1

1. Restored to OPERABLE status within its above specified CEA alignment requirements, or within 2 hours A06

2. Declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. After declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 provided: A06

Required Action A.1

a) Within 2 hours 1 hour the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.0 inches of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on COLR Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours. L01

Required Action F.1

Otherwise, be in at least HOT STANDBY in MODE 3 within the next 6 hours.

g. With one full-length CEA inoperable due to causes other than addressed by ACTION a., above, and inserted beyond the Long Term Steady State Insertion Limits but within its above specified alignment requirements, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6. A05

* If the pre-misalignment ASI was more negative than –0.15, reduce power to ≤ 70% of RATED THERMAL POWER or 70% of the THERMAL POWER level prior to the misalignment, whichever is less, prior to completing ACTION e.2.a) and e.2.b). L05

REACTIVITY CONTROL SYSTEMS

ACTION: (Continued)

h. With one full-length CEA inoperable due to causes other than addressed by ACTION a., above, but within its above specified alignment requirements and either fully withdrawn or within the Long Term Steady State Insertion Limits if in full-length CEA group 5, operation in MODES 1 and 2 may continue. A05

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1 4.1.3.1.1 Verify The indicated Position of each full-length CEA shall be determined to be within 7.0 inches (indicated position) of all other CEAs in its group in accordance with the Surveillance Frequency Control Program except during time intervals when the Deviation Circuit and/or CEA Block Circuit are inoperable, then verify the individual CEA positions at least once per 4 hours. thereafter A02

Required Action D.1, E.1 Completion Time: 1 hour AND Every M03

SR 3.1.4.4 4.1.3.1.2 Verify CEA freedom of movement (trippability) by moving Each individual full-length CEA that is not fully inserted in the core shall be determined to be OPERABLE by movement of at least 7.0 inches in either any one direction in accordance with the Surveillance Frequency Control Program. A02

SR 3.1.4.2 4.1.3.1.3 Verify The CEA Block Circuit is shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by a functional test which verifies that the circuit prevents any CEA from being misaligned from all other CEAs in its group by more than 7.0 inches (indicated position). LA03

SR 3.1.4.2 4.1.3.1.4 Verify The CEA Block Circuit is shall be demonstrated OPERABLE by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of COLR Figure 3.1-2: LA03

*a. Prior to each entry into MODE 2 from MODE 3, except that such verification need not be performed more often than once per 92 days, and A08

b. In accordance with the Surveillance Frequency Control Program.

SR 3.1.4.3 Verify the CEA deviation circuit is OPERABLE in accordance with the Surveillance Frequency Control Program.. M01

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* The licensee shall be excepted from compliance during the initial startup test program for an entry into MODE 2 from MODE 3 made in association with a measurement of power defect. A08

REACTIVITY CONTROL SYSTEMS

CEA DROP TIME

LIMITING CONDITION FOR OPERATION

SR 3.1.4.5 3.1.3.4 The individual full-length (shutdown and regulating) [Verify each] CEA drop time, [is] from a fully withdrawn position, shall be less than or equal to [≤] 3.25 seconds from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches its 90% insertion position with: LA04

a. T_{avg} greater than or equal to 515°F, and

b. All reactor coolant pumps operating.

APPLICABILITY: MODES 1 and 2.

ACTION:

ITS 3.1.4 Condition F — a. With the drop time of any full-length CEA determined to exceed the above limit: [One or more CEAs inoperable]

ITS 3.1.4 Required Action F.1 — 1. If in MODE 1 or 2, be in at least HOT STANDBY within 6 hours, or

2. If in MODE 3, 4, or 5, restore the CEA drop time to within the above limit prior to proceeding to MODE 1 or 2. A09

b. With the CEA drop times within limits but determined at less than full reactor coolant flow, operation may proceed provided THERMAL POWER is restricted to less than or equal to the maximum THERMAL POWER level allowable for the reactor coolant pump combination operating at the time of CEA drop time determination. A10

SURVEILLANCE REQUIREMENTS

SR 3.1.4.5 4.1.3.4 The CEA drop time of full-length CEAs shall be demonstrated through measurement prior to reactor criticality:

a. For all CEAs following [after] each removal and installation of the reactor vessel head,

b. For specifically affected individual CEAs following any maintenance on or modification to the CEA drive system which could affect the drop time of those specific CEAs, and L03

c. In accordance with the Surveillance Frequency Control Program. L04

A01

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

See ITS 3.1.1

SHUTDOWN MARGIN - T_{avg} GREATER THAN 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

APPLICABILITY: MODES 1, 2*, 3 and 4.

See ITS 3.1.6

ACTION:

With the SHUTDOWN MARGIN outside the COLR limits, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

L01

a. ~~Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable.~~ If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

b. When in MODE 1 or MODE 2 with Keff greater than or equal to 1.0, in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

c. When in MODE 2 with Keff less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical CEA position is within the limits of Specification 3.1.3.6.

See ITS 3.1.6

* See Special Test Exception 3.10.1.

See ITS 3.1.6

A01

ITS 3.1.4

SHUTDOWN MARGIN - T_{avg} LESS THAN OR EQUAL TO 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

APPLICABILITY: MODE 5.

See ITS 3.1.1

ACTION:

With the SHUTDOWN MARGIN outside the COLR limits, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

a. ~~Within 1 hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable.~~ If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

L01

See ITS 1.1

b. In accordance with the Surveillance Frequency Control Program by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

See ITS 3.1.1

c. At least once per 24 hours, when the Reactor Coolant System is drained below the hot leg centerline, by consideration of the factors in 4.1.1.2b and by verifying at least two charging pumps are rendered inoperable by racking out their motor circuit breakers.

See ITS 3.4.12

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS). These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 Unit 1 CTS 3.1.3.1 LCO, Actions a, d, e, f, g, 4.1.3.1.1, and 4.1.3.1.2 include the descriptor “full length” in reference to CEA(s). Unit 2 CTS 3.1.3.1 LCO, Actions a, c, d, e, f, 4.1.3.1.1, and 4.1.3.1.2 include the descriptor “full length” in reference to CEA(s).

The purpose of the CTS 3.1.3.1 descriptor is to distinguish between full length and partial length CEA(s). Unit 1 and Unit 2 no longer use partial length CEA(s). Therefore, since partial length CEA(s) are no longer a design feature for Unit 1 and Unit 2, the “full length” descriptors used for CEA(s) are deleted. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A03 Unit 1 CTS 3.1.3.1 Applicability is MODES 1 and 2 with a footnote (footnote *) for MODE 1 and MODE 2 stating "See Special Test Exception 3.10.2 and 3.10.5.” Unit 2 CTS 3.1.3.1 Applicability is MODES 1 and 2 with a footnote (footnote *) for MODE 1 and MODE 2 stating "See Special Test Exception 3.10.2, 3.10.4, and 3.10.5.” ITS 3.1.4 does not contain the footnote or a reference to the Special Test Exceptions. This changes the CTS by not including footnote * in the ITS.

The purpose of the footnote references is to alert the user that conditions exist that may modify the Applicability of the Specification. ITS LCO 3.0.7 provides guidance on the use of special test exceptions. It is an ITS convention to not include reference only type footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A04 Unit 1 CTS 3.1.3.1 ACTION b.1 states, in part, that “With one CEA position indicator per group inoperable, take action per Specification 3.1.3.3.” Unit 2 CTS 3.1.3.1 ACTION b.1 states, in part, that “With one CEA position indicator per group inoperable, take action per Specification 3.1.3.2.” ITS 3.1.4 does not provide a reference to ITS 3.1.6. This changes the CTS by deleting the reference to another Specification.

The purpose of the CTS 3.1.3.1 statement, “with one CEA position indicator per group inoperable, take action per Specification…” is to provide a reference to another Specification that may apply under these conditions. This changes the CTS by not including the cross-reference in the ITS. It is an ITS convention to not include footnotes or cross-references to comply with other Specification LCO and actions. CTS 3.0.1 (ITS LCO 3.0.1) requires LCOs to be met during the MODES or other specified conditions in the Applicability, except as provided in

LCO 3.0.2. CTS 3.0.2 (ITS LCO 3.0.2) requires, in part, upon discovery of a failure to meet an LCO, the Actions to be met. Therefore, it is unnecessary to reference or duplicate the requirements of another Specification. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A05 Unit 1 CTS 3.1.3.1 ACTION h. and Unit 2 CTS ACTION g. each state that with one full length CEA inoperable due to causes other than addressed by ACTION a above, and inserted beyond the long term steady state insertion limits but within its above specified alignment requirements, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6. ITS 3.1.4 does not provide a reference to ITS 3.1.6 (CTS 3.1.3.6). This changes the CTS by deleting the reference to Specification 3.1.3.6.

Unit 1 CTS 3.1.3.1 ACTION c. and Unit 2 CTS ACTION h. each state that with one full length CEA inoperable due to causes other than addressed by Action a above, but within its above specified alignment requirements and either fully withdrawn or within the long term steady state insertion limits if in CEA group 7 (for Unit 1) and if in CEA group 5 (for Unit 2), operation in MODES 1 and 2 may continue. Though specific reference to other Specifications is not made, reference to Specifications 3.1.3.5 and 3.1.3.6 is implied and requirements from these Specifications and the COLR are duplicated within this statement. ITS 3.1.4 does not include duplicative requirements from other Specifications. This changes the CTS by deleting a statement that contains duplicative requirements from other Specifications.

The purpose of the CTS statements is to associate requirements from other Specifications that may apply under these conditions with a CEA that is "trippable." This changes the CTS by not including these statements in the ITS. It is an ITS convention to not include these type of references or duplicative requirements from other Specifications. CTS 3.0.1 (ITS LCO 3.0.1) requires LCOs to be met during the MODES or other specified conditions in the Applicability, except as provided in LCO 3.0.2. CTS 3.0.2 (ITS LCO 3.0.2) requires, in part, upon discovery of a failure to meet an LCO, the Actions to be met. Therefore, it is unnecessary to reference or duplicate the requirements of another Specification. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A06 Unit 1 CTS 3.1.3.1 Action d, and Unit 2 Action f, each allow, when one or more CEAs are misaligned by more than the LCO limit, but < 15 inches for Unit 1 and ≤ 15 inches for Unit 2, operation to continue in MODES 1 and 2 provided within 1 hour action is taken per d.1 or d.2 (Unit 1) and f.1 or f.2 (Unit 2).

Unit 1 CTS 3.1.3.1 Actions d.2 and f.2, and Unit 2 Actions e.2 and f.2, each state that after declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 provided within 1 hour the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within the LCO tolerance of the inoperable CEA while maintaining the allowable CEA sequence and insertion limits shown on COLR Figure 3.1-2; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation.

The purpose of the CTS statement is to provide time to restore the CEA to within alignment limits. CTS 3.1.3.1 Unit 1 Action d, and Unit 2 Action f specifically allow one hour to either align the CEA (i.e., move the misaligned CEA to align with the CEA group) or declare the CEA inoperable and provide an additional hour to move the other CEAs within the group to align with the misaligned CEA while maintaining allowable CEA sequence and insertion limits specified in the referenced COLR figure and THERMAL POWER restriction specified in Specification 3.1.3.6. In effect, the CTS Actions provide a total of 2 hours to align a CEA to within limits in this condition. This changes CTS by combining the 1 hour to restore the CEA alignment and additional 1 hour to restore CEA alignment.

CTS 3.1.3.1 Unit 1 Action f, and Unit 2 Action e require, in part, THERMAL POWER to be reduced ≤ 70 RTP prior to performing Action f.2 (Unit 1) and Action e.2 (Unit 2). The time to reduce THERMAL POWER has been defined as one hour (See DOC M02). After the power reduction, Action f.2 (Unit 1) and Action e.2 (Unit 2) require declaring the CEA inoperable and provide an additional hour to move the other CEAs within the group to align with the misaligned CEA while maintaining allowable CEA sequence and insertion limits specified in the referenced COLR figure and THERMAL POWER restriction specified in Specification 3.1.3.6. In effect, the CTS Actions provide time to reduce THERMAL POWER (i.e., 1 hour per ITS 3.1.4, Required Action C.1) and an additional hour (i.e., total of 2 hours from Condition entry) to align a CEA to within limits in this condition. This changes CTS by combining the 1 hour to reduce THERMAL POWER and additional 1 hour to restore CEA alignment.

ITS Section 1.2 provides guidance on logical connectors and ITS Section 1.3 provides guidance on Completion Times. When two actions are connected by the logical connector “or” either action can be performed within the required Completion Time. Thus, a total of 2 hours is provided in ITS to align the CEA regardless of the method of restoring the alignment (i.e., moving the CEA to align or moving the CEA group to align).

Also, CTS 3.1.3.6 LCO includes reference to limits specified in the COLR that include the COLR figure specifying the CEA sequence and insertion limits and THERMAL POWER level. This changes the CTS by not including the reference to the COLR figure and Specification 3.1.3.6 in the ITS. It is an ITS convention to not include these type of references and duplicative requirements from other Specifications. CTS 3.0.1 (ITS LCO 3.0.1) requires LCOs to be met during the MODES or other specified conditions in the Applicability, except as provided in LCO 3.0.2. CTS 3.0.2 (ITS LCO 3.0.2) requires, in part, upon discovery of a failure to meet an LCO, the ACTIONS to be met. Therefore, it is unnecessary to reference or duplicate the requirements of another Specification.

This change is designated as administrative as it combines the 1 hour and additional 1 hour to restore CEA alignment into a single 2 hour Completion Time and removes reference to other Specification requirements with no technical change to the CTS.

A07 **Unit 1 only:** CTS 3.1.3.1 ACTION d.2 states that with one or more CEAs misaligned from any other CEAs in its group by more than 7.5 inches but less than 15 inches, after declaring the CEA inoperable, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6 "for up to 7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year." Additionally, CTS 3.1.3.1 ACTION d.2.a) requires that within 1 hour, the remainder of the CEAs in the group with the inoperable CEA shall be aligned to within 7.5 inches of the inoperable CEA (i.e., within 1 hour, meet the LCO requirements of CTS 3.1.3.1). ITS 3.1.4 ACTIONS do not include the operational limit "for up to 7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year." This changes the CTS by deleting the operational limit "for up to 7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year." ITS 3.1.4 retains appropriate CTS 3.1.3.1 actions associated with a CEA outside alignment limits, as modified per the Discussion of Changes provided herein.

The purpose of the CTS requirement is to limit the time to operate, once CEA alignment limits are restored, with regulating CEAs not within the applicable insertion and withdraw sequence limits. The CTS 3.1.3.1 ACTION d.2 operational limit "for up to 7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year," is inconsistent with the requirements of CTS 3.0.2 (ITS LCO 3.0.2). CTS 3.0.2 states, in part, "If the LCO is met or is no longer applicable prior to expiration of the specified time interval(s), completion of the ACTIONS is not required, unless otherwise stated." Once the CEA alignment limits have been restored, LCO 3.1.3.1 (ITS LCO 3.1.4) is met and, therefore, the remaining action limiting operation to, "7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year," is no longer required since there is no note requiring completion of this action following restoration of the LCO. This change is designated as administrative and has no technical impact because the operational limit "for up to 7 days per occurrence with a total accumulated time of ≤ 14 days per calendar year," is an action that is never applicable since the CTS (and ITS) ACTIONS require the CEA Alignment LCO to be met prior to the applicable action requirement becoming limiting.

A08 CTS 4.1.3.1.4.a states that the CEA Block Circuit be demonstrated OPERABLE prior to each entry into MODE 2 from MODE 3, except that such verification need not be performed more often than once per 92 days. The associated footnote (*) states that the licensee shall be excepted from compliance during the initial startup test program for an entry into MODE 2 from MODE 3 made in association with a measurement of power defect.

The purpose of the CTS statement is to provide an exception to performance of the CEA Block Circuit Surveillance at less than a 92 day Frequency. CTS 4.0.4 (ITS SR 3.0.4) requires LCO's Surveillances have been met within their specified frequency prior to entry into a MODE or other specified condition in the Applicability of an LCO, except as provided by CTS 4.0.3 (ITS SR 3.0.3). Therefore, the requirement to perform the Surveillance prior to each entry into MODE 2 from MODE 3, except that such verification need not be performed more often than once per 92 days, is duplicative and unnecessary. CTS 4.1.3.1.4.a (ITS SR 3.1.4.2) will continue to be performed prior to entry into

MODE 2 from MODE 3 and within the Frequency specified in the Surveillance Frequency Control Program.

The purpose of the CTS footnote (*) is to provide a special test exception (STE). CTS 3.10.2, Group Height, Insertion and Power Distribution Limits (STE) provide provision for suspension of certain Specifications, including CTS 3.1.3.1, for startup testing. In addition, ITS LCO 3.0.7 provides guidance on the use of special test exceptions. It is an ITS convention to not include duplicative requirements from other Specifications. ITS 3.1.8 retains the CTS 3.10.2 requirements, therefore, the CTS footnote (*) is unnecessary and deleted.

This changes the CTS by deleting the statement to perform the Surveillance prior to entry into MODE 2 from MODE 3, except performance of the CEA Block Circuit Surveillance at less than a 92 day Frequency is not required, and deleting the footnote (*) that provides a special test exception. This change is designated as administrative as it removes duplicative requirements to Section 3.0 usage requirements and other Specifications with no technical change to the CTS.

A09 Unit 1 CTS 3.1.3.4 Action a. states “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 MODE 1 or 2.” Unit 2 CTS 3.1.3.4 Action a.2 states “If in MODE 3, 4, or 5, restore the CEA drop time to within the above limit prior to proceeding to MODE 1 or 2.” In both cases, the “above limit’ refers to the CEA drop time specified in CTS 3.1.3.4. CTS 3.0.4 (ITS LCO 3.0.4) states that when an LCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made under certain conditions. The purpose of CTS 3.1.3.4 is to ensure the CEA drop times are determined within limits prior to entering MODES 1 and 2. Since a plant shutdown (i.e., be in MODE 3 within 6 hours) is required when one or more CEAs is not within the CEA drop time, CTS 3.1.3.4 Actions (ITS 3.1.4 ACTIONS) do not meet any of the LCO 3.0.4 conditions, and therefore, the LCO must be met prior to entry into the MODE of applicability. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A10 CTS 3.1.3.4 ACTION b provides an allowance for drop times to be determined at less than full reactor coolant flow provided THERMAL POWER is restricted to less than or equal to the maximum THERMAL POWER level allowable for the reactor coolant pump combination operating at the time of the CEA Drop time. ITS 3.1.4 does not contain a similar allowance. This changes the CTS by not allowing continued operation at reduced power when the CEA drop times are determined with only 3 reactor coolant pumps operating. This change is designated as administrative change and is acceptable because they do not result in technical changes to the CTS.

The purpose of CTS 3.1.3.4 is to ensure the CEAs insert within the CEA drop criteria. This change is acceptable because ITS SR 3.1.4.5 requires verification of the CEA drop times be performed with all of the Reactor coolant pumps operating. In accordance with CTS 3.4.1.1 and ITS 3.4.1, Unit 1 and Unit 2 only operate in MODES 1 and 2 with both reactor coolant loops and both reactor coolant pumps in each loop in operation. Therefore, ITS 3.1.4 will not allow the CEA drop times to be determined with only 3 reactor coolant pumps operating.

This change is designated as administrative change and is acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 4.1.3.1.1 states that with the CEA Deviation Circuit and/or the CEA Block Circuit inoperable, verification of the individual CEA positions is required once per 4 hours. However, there is no explicit requirement for the CEA Deviation Circuit to be OPERABLE and no periodic Surveillance is specified to verify the CEA Deviation Circuit is OPERABLE. ITS LCO 3.1.4 requires, in part, that the CEA deviation circuit be OPERABLE and ITS SR 3.1.4.3 requires verification that the deviation circuit is OPERABLE with a Frequency in accordance with the Surveillance Frequency Control Program (SFCP). This changes the CTS by explicitly requiring the deviation circuit be OPERABLE and adding a Surveillance Requirement to verify the deviation circuit is OPERABLE with a Frequency in accordance with the SFCP.

The purpose of the CEA Deviation Circuit is to ensure improper CEA alignments are identified before unacceptable flux distributions occur. CTS 4.1.3.1.1 implies that the CEA deviation circuit is required to be OPERABLE. This change is acceptable because OPERABILITY requirements, implicit in the CTS, and a periodic Surveillance are added to the ITS. FPL adopted an SFCP in Amendments 223 and 173 for PSL Units 1 and 2, respectively (ADAMS Accession No. ML15127A066). Therefore, the Frequency of ITS SR 3.4.1.3 will be in accordance with the SFCP with an initial periodic frequency of 92 days consistent with the Frequency specified in ISTS SR 3.1.4.3. This Frequency considers other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA motion inhibit.

This change has been designated as more restrictive because it explicitly adds an LCO operability requirement and Surveillance Requirement to the CTS.

M02 CTS 3.1.3.1 Unit 1 Action f, and Unit 2 Action e require, in part, THERMAL POWER to be reduced ≤ 70 RTP prior to performing Actions f.1 or f.2 (Unit 1) and Action e.1 or e.2 (Unit 2). After the power reduction, Action f.1 (Unit 1) and Action e.1 (Unit 2) require restoring the CEA to within the required alignment limits. The time to reduce THERMAL POWER and the time to restore CEA alignment limit in Action f.1 (Unit 1) and Action e.1 (Unit 2) are not defined in CTS. ITS 3.1.4, Required Action C.1 requires 1 hour to reduce THERMAL POWER to ≤ 70 RTP and Required Action C.2 requires a total of 2 hours (combining the 1 hour to reduce power and 1 hour to restore CEA alignment) to restore the CEA to within the required alignment limits. This changes CTS by adding a specific Completion Time to reduce THERMAL POWER and restore CEA alignment to within limits.

The purpose of CTS 3.1.3.1 actions, in part, is to ensure, when a major CEA alignment deviation occurs, that the CEA alignment be restored in a reasonable period of time to ensure core power distributions are maintained and thermal limits are not exceeded. Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned. If the alignment cannot be restored within one hour, a power reduction is required to minimize the effects of the xenon redistribution, while allowing additional time to restore the CEA alignment consistent with the time provided in CTS 3.1.3.1 Unit 1 Action f.2 and Unit 2 Action e.2.

ITS 3.1.4, ACTION C requires THERMAL POWER to be reduced ≤ 70% RTP within 1 hour and the CEA to be restored to within the alignment limits within 2 hours. The Completion Time of Required Action C.1 provides the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System. The Completion Time of C.2 is sufficient to take appropriate corrective action to realign the CEA following the power reduction while recognizing the importance of minimizing the effects of xenon redistribution.

This change has been designated as more restrictive because it adds to the CTS actions an explicit time to complete the THERMAL POWER reduction and time to restore the CEA to within the required limit following the power reduction.

M03 CTS 4.1.3.1.1 states that with the CEA Deviation Circuit and/or the CEA Block Circuit inoperable, verification of the individual CEA positions is required once per 4 hours. ITS 3.1.4 ACTION D and ACTION E require, with the CEA block circuit or the CEA deviation circuit inoperable, ITS SR 3.1.4.1 (verification of the individual CEA positions) must be performed within 1 hour and once per 4 hours thereafter. This changes the CTS by requiring the initial verification of the individual CEA positions be performed within 1 hour.

The purpose of CTS 4.1.3.1.1 CEA Block Circuit is to permit CEA motion within the requirements of LCO 3.1.6, "Regulating Control Element Assembly Insertion Limits," and prevents regulating CEAs from being misaligned from other CEAs in the group. The purpose of CTS 4.1.3.1.1 CEA Deviation Circuit is to ensure improper CEA alignments are identified before unacceptable flux distributions occur. Performing ITS SR 3.1.4.1 within 1 hour and every 4 hours thereafter, is considered acceptable since it takes into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and the protection provided by the CEA block and deviation circuit is not required. This change has been designated as more restrictive because it reduces the amount of time to perform the initial verification of CEA positions.

<u>RELOCATED SPECIFICATIONS</u>

None

<u>REMOVED DETAIL CHANGES</u>

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.1.3.1 Action a. requires that with one or more full-length CEAs inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the

SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in at least HOT STANDBY within 6 hours. This changes the CTS by relocating details for CEA operability. The details for CEA inoperability due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable is relocated to the ITS Bases. The removal of these details that are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for CEA operability. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.1.3.1 Unit 1 Action e and Unit 2 Action d state that a misaligned CEA be positioned within the LCO alignment limit of other CEAs in its group in accordance with the time constraints shown in COLR Figure 3.1-1a. ITS 3.1.4 Required Action B.1 requires that the CEA alignment be restored “in accordance with the COLR” when one CEA is misaligned more than the maximum allowable alignment deviation. This changes the CTS by relocating details of the specific location in the COLR where the Completion Time value is provided. The details of the COLR figure number where a time restraints are provided based on the measured F_r^T value prior to the misalignment are relocated to the ITS Bases.

The purpose of CTS 3.1.3.1 Unit 1 Actions e and f and Unit 2 Actions d and e is to ensure CEA alignment is restored in a reasonable period of time to ensure core power distributions are maintained and thermal limits are not exceeded. Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned.

The removal of these details that are related to a specific document reference, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement to restore a misaligned CEA to within the required alignment limit with a Completion Time in accordance with the COLR. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications

LA03 CTS 4.1.3.1.3 requires the CEA Block Circuit to be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by a functional test which verifies that the circuit prevents any CEA from being misaligned from all other CEAs in its group by more than the required limit (indicated position).

CTS 4.1.3.1.4 requires the CEA Block Circuit to be demonstrated OPERABLE by a functional test which verifies that the circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 and that the circuit prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of COLR Figure 3.1-2.

ITS SR 3.1.4.2 does not retain this detail. This changes the CTS by relocating the details that a functional test that verifies the CEA Block Circuit prevents any CEA from being misaligned from all other CEAs in its group by more than the LCO limit (indicated position), and verifies the CEA Block Circuit circuit maintains the CEA group overlap and sequencing requirements of Specification 3.1.3.6 (ITS 3.1.6) and the CEA Block Circuit prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of COLR Figure 3.1-2 to the Bases.

The removal of these details, that are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the Surveillance requirement that the CEA Block Ciruit be OPERABLE. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA04 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.1.3.4 requires the individual (shutdown and regulating) CEA drop time from the fully withdrawn position shall be less than or equal to 3.1 seconds (Unit 1) and less than or equal to 3.25 seconds (Unit 2) from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches the 90% insertion position with T_{avg} greater than or equal to 515°F and all reactor coolant pumps operating. This changes the CTS by relocating details for the CEA drop time surveillance. The CEA drop time of less than or equal to 3.1 seconds is provided in Unit 1 ITS SR 3.1.4.5, and the CEA drop time of less than or equal to 3.25 seconds is provided in Unit 2 ITS SR 3.1.4.5, rather than the ITS 3.1.4 Bases description for SR 3.1.4.5. Because Units 1 and 2 only operate with four reactor coolant pumps, this detail is deleted and not included in the CEA drop time details provided in the ITS 3.1.4 Bases description for SR 3.1.4.5.

The removal of these details that are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for performing CEA drop time testing from the fully withdrawn position. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* Unit 1 CTS 3.1.3.1 ACTION a. states that with a CEA inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, satisfy the SHUTDOWN MARGIN (SDM) requirements of Specification 3.1.1.1 within 1 hour. Unit 1 CTS 3.1.3.1 ACTION d.2., d.2.b., f.2., f.2.b., state that with a misaligned CEA not restored to alignment requirements within 1 hour, declare the CEA inoperable and satisfy SDM requirements of Specification 3.1.1.1. Additionally, the SDM requirement of Specification 3.1.1.1 and 3.1.1.2 is determined at least once per 12 hours thereafter while the CEA(s) are inoperable in accordance with CTS 4.1.1.1.1.a and CTS 4.1.1.2.a, respectively.

Unit 2 CTS 3.1.3.1 ACTION a. states that with a CEA inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, satisfy the SDM requirements of Specification 3.1.1.1 within 1 hour. Unit 2 CTS 3.1.3.1 ACTION e.2., e.2.b., f.2., f.2.b., state that with a misaligned CEA not restored to alignment requirements within 1 hour, declare the CEA inoperable and satisfy SDM requirements of Specification 3.1.1.1. Additionally, the SDM requirement of Specification 3.1.1.1 and 3.1.1.2 is determined at least once per 12 hours thereafter while the CEA(s) are inoperable in accordance with CTS 4.1.1.1.1.a and CTS 4.1.1.2.a, respectively.

CTS 3.1.1.1, SDM requirements are applicable in MODES 1, 2, 3, and 4. ITS 3.1.4 does not require a SDM verification when one or more CEAs are inoperable. This changes the CTS Actions by not requiring SDM verification within 1 hour and once per 12 hours thereafter with one or more inoperable CEAs.

The purpose of CTS 4.1.1.1.1.a and CTS 4.1.1.2.a is to provide the appropriate compensatory measures to determine SDM when CEAs are inoperable during operations in MODES 1, 2, 3, 4, and 5. The purpose of the ITS 3.1.4 ACTIONS are to provide the appropriate compensatory actions for inoperable CEAs in MODES 1 and 2. ITS 3.1.5 and 3.1.6 provide requirements for shutdown and regulating CEA insertion limits in MODES 1 and 2. These insertion limits ensure SDM is maintained while the unit is at power. The purpose of ITS SR 3.1.1.1 is to periodically verify SDM regardless of the status of the CEAs in MODES 3, 4, and 5. ITS SR 3.1.1.1 requires SDM verification in accordance with the Surveillance Frequency Control Program. When the plant is operating in MODES 1 and 2, with one or more CEAs inoperable, the unit cannot continue operation and must be placed in MODE 3 within 6 hours. After reaching MODE 3, ITS 3.1.4 no longer applies therefore it is inappropriate to specify additional actions after the unit is outside the Applicability of the Specification. Nevertheless, SDM is periodically verified in accordance with ITS SR 3.1.1.1 in MODES 3, 4, and 5 in accordance with the frequency specified in the Surveillance Frequency Control Program.

This SDM verification must also compensate for the reactivity worth of the CEA as specified in the definition of SDM. This change is acceptable since SDM will still be required to be monitored at a frequency in accordance with the Surveillance Frequency Control Program, and based on the definition of SDM, the reactivity worth of CEA not capable of being fully inserted must be accounted for in the determination of SDM. Since the proposed actions continue to require a plant shutdown to at least MODE 3 and a verification of SDM must account for the reactivity worth of an inoperable CEA, sufficient remedial measures continue to be provided to allow safe operation pursuant the requirements of 10 CFR 50.36(c)(2). SDM continues to be monitored in a manner and at a Frequency necessary to give confidence that the assumptions in the safety analyses are protected. The frequency currently established for the SDM margin verification in accordance with the Surveillance Frequency Control Program is 24 hours. This change is designated as less restrictive because an Action to perform a Surveillance which is required in the CTS will not be explicitly required in the ITS.

L02 *(Category 4 – Relaxation of Required Action)* Unit 1 CTS 3.1.3.1 Action b and b.2 states, in part, with the CEA Block Circuit inoperable, within 6 hours, with the group overlap and/or sequencing interlocks inoperable, maintain CEAs groups 3, 4, 5 and 6 fully withdrawn and withdraw the CEAs in group 7 to less than 5% insertion and place and maintain the CEA drive system mode switch in either the "Manual" or "Off" position. Unit 2 CTS 3.1.3.1 Action b and b.2 states, in part, with the CEA Block Circuit inoperable, within 6 hours, with the group overlap and/or sequencing interlocks inoperable, maintain CEA groups 1, 2, 3 and 4 fully withdrawn and the CEAs in group 5 to less than 15% insertion and place and maintain the CEA drive system in either the "Manual" or "Off" position. ITS 3.1.4 Required Action D.2.2 retains the CTS requirement, however, the ITS adds a Note that states that Required Action D.2.2 shall not be performed when in conflict with either Required Action C.1, C.2, or E.1. The Note is less restrictive by not requiring performance of Required Action D.2.2 when in conflict with reduction in THERMAL POWER to ≤ 70% RTP per Required Action C.1, restoring CEA alignment to within limits per Required Action C.2, or when performing the deviation circuit Surveillance (SR 3.1.4.1) per Required Action E.1. This changes the CTS by relaxing the requirements for an Action.

The purpose of Unit 1 CTS 3.1.3.1 Actions is to ensure acceptable power distributions are maintained and core thermal limits are not exceeded. This change is acceptable because the actions in the Note are consistent with safe operation under the specific Condition, considering the actions of lowering THERMAL POWER, restoring CEA alignment to within limits, or verifying the deviation circuit is OPERABLE by performance of the Surveillance, are sufficient remedial actions to ensure thermal limits are not exceeded and, therefore, should not be prevented by Required Action D.2.2. This change is designated as less restrictive because the requirements for an Action are relaxed.

L03 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.4.b requires the CEA drop time of CEAs shall be demonstrated through measurement prior to reactor criticality for specifically affected individual CEAs following any maintenance on or modification to the CEA control system which could affect the drop time of those specific CEAs. ITS 3.1.4 does not contain this testing requirement. This changes the CTS by not explicitly requiring post-maintenance testing on CEAs.

The purpose of CTS 4.1.3.4.b is to verify OPERABILITY of the CEAs following maintenance that could alter their operation. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify that the equipment used to meet the LCO can perform its required functions. Thus, appropriate equipment continues to be tested in a manner and at a Frequency necessary to give confidence that the equipment can perform its assumed safety function. Any time the OPERABILITY of a system or component has been affected by repair, maintenance, modification, or replacement of a component, post-maintenance testing is required to demonstrate the OPERABILITY of the system or component. This is described in the Bases for ITS SR 3.0.1 and required under ITS SR 3.0.1. The OPERABILITY requirements for the CEA control system are described in the Bases for ITS 3.1.4. In addition, the requirements of 10 CFR 50, Appendix B, Section XI (Test Control) provide adequate controls for test programs to ensure that testing incorporates applicable acceptance criteria. Compliance with 10 CFR 50, Appendix B, is required under the unit operating license. As a result, post-maintenance testing will continue to be performed and an explicit requirement in the Technical Specifications is not necessary. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

L04 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.4 requires drop testing of CEAs to be demonstrated through measurement prior to reactor criticality following each removal of the reactor vessel head and in accordance with the Surveillance Frequency Control Program, which is at least once per 18 months. ITS 3.1.4.5 requires the test to be performed prior to criticality after each removal of the reactor head. This changes the CTS by deleting the requirement to perform this test at least once per 18 months.

The purpose of CTS 4.1.3.4 is to ensure the CEA insert within the CEA drop criteria. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify that the equipment used to meet the LCO can perform its safety function. Thus, appropriate equipment continues to be tested in a manner and at a Frequency necessary to give confidence the equipment can perform its assumed safety function. The requirements in the CTS to perform the test following each removal of the reactor vessel head and at least once per 18 months normally coincide with one another. The head is removed once per 18 months unless there is a need to remove the head prior to the end of the cycle. This change is designated as less restrictive because a Surveillance that was required in the CTS will not be performed in the ITS.

L05 **Unit 2 only:** *(Category 4 – Relaxation of Required Action)* When a CEA is declared inoperable when misaligned by more than 15 inches and beyond the time constraints specified in the COLR figure, CTS 3.1.3.1 e.2 footnote (*) requires that if the pre-misalignment AXIAL SHAPE INDEX (ASI) was more negative than –0.15, power must be reduced to < 70% of RATED THERMAL POWER or 70% of the THERMAL POWER level prior to the misalignment, whichever is less, prior to completing ACTION e.2.a) and e.2.b). ITS 3.1.4 does not include this additional power reduction requirement based on ASI. This changes the CTS by eliminating the requirement to reduce power to 70% of the THERMAL POWER level prior to the misalignment.

The purpose of the CTS 3.1.3.1 e.2 footnote (*) is to ensure adequate margin to thermal limits are maintained during recovery from a major CEA alignment deviation with a negative ASI value. CTS 3.2.5 (ITS 3.2.4) provides the appropriate remedial actions for conditions when ASI is outside limits specified in the COLR to ensure thermal limits are not exceeded. This change is acceptable because the CTS 3.2.5 action requirements, retained in ITS 3.2.4, provide the appropriate remedial actions for conditions when ASI is outside limits specified in the COLR to ensure thermal limits are not exceeded. The time to restore ASI to within limits specified in ITS 3.2.4 ACTION A is considered sufficiently short that the xenon distribution in the core cannot change significantly and the action to reduce THERMAL POWER in ITS 3.2.4 ACTION B provides reasonable assurance that the core is operating farther from thermal limits and places the core in a conservative condition. This change is designated as less restrictive because the requirements for an Action are relaxed.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS (Analog) 1

3.1.4 Control Element Assembly (CEA) Alignment (Analog)

3.1.3.1 LCO 3.1.4 All CEAs shall be OPERABLE.

AND

3.1.3.1
DOC M01

All CEAs shall be aligned to within [7] 7.5 inches (indicated position) of their respective group, and [the CEA motion inhibit block circuit and the CEA deviation circuit shall be OPERABLE]. 2

Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS 3 Insert 1

C CONDITION	C REQUIRED ACTION	COMPLETION TIME 3
3.1.3.1 Action f DOC M02 DOC L01 Insert 2 A. C One or more CEAs misaligned from its group by > [7 inches] and ≤ [15 inches]. OR One CEA misaligned from its group by > [15 inches].	A. C .1 Reduce THERMAL POWER to ≤ 70% RTP. AND A. C .2 Restore CEA Alignment to within alignment limit.	1 hour 2 hours 2 4 4
3.1.3.1 Action b 4.1.3.1.1 DOC M03 B. D CEA motion inhibit block circuit inoperable.	B. D .1 Perform SR 3.1.4.1. AND 3.1.3.1 Action b B. D .2.1 Restore CEA motion inhibit block circuit to OPERABLE status. OR	1 hour AND Every 4 hours thereafter 3 4 6 hours 3 4

CTS

3

INSERT 1

3.1.3.1 Action d	A. One or more CEAs misaligned from its group by > 7.5 inches and < 15 inches.	A.1	Restore CEAs to within alignment limit.	2 hours
3.1.3.1 Action e	B. One CEA misaligned from its group by ≥ 15 inches.	B.1	Restore CEA alignment to < 15 inches.	In accordance with the COLR

3

INSERT 2

3.1.3.1 Action f

Required Action and associated Completion Time of Condition B not met.

1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	D B.2.2 --------------NOTE-------------- Required Action D B.2.2 shall not be performed when in conflict with either Required Action A.1, A.2, or C.1 C.1, C.2, or E.1. ---	
	, and p Place and maintain the CEA drive switch in either the "off" or "manual" position, [and fully withdraw F all CEAs in groups 3 , 4, 5 and 4 6 and withdraw all CEAs in group 5 7 to < 5% insertion].	6 hours
E C. CEA deviation circuit inoperable.	E C.1 Perform SR 3.1.4.1.	1 hour AND Every 4 hours thereafter
F D. Required Action and associated Completion Time of Conditions A, B, or C , D, or E not met. OR One or more CEAs inoperable. OR Two or more CEAs misaligned by > ≥ [15 inches].	F D.1 Be in MODE 3.	6 hours

DOC L02

3.1.3.1 Action b.2

4.1.3.1.1

3.1.3.1 Actions b.3, d, and f

3.1.3.1 Action a

3.1.3.1 Action g

3 4 2 3 2 4

4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.1.1	SR 3.1.4.1	Verify the indicated position of each CEA to be within [7 inches] 7.5 of all other CEAs in its group.	Within 1 hour following any CEA movement of > [7 inches] 7.5 AND [12 hours OR In accordance with the Surveillance Frequency Control Program]	②
4.1.3.1.3 4.1.3.1.4	SR 3.1.4.2	Verify the CEA motion inhibit block circuit is OPERABLE.	[92 days OR In accordance with the Surveillance Frequency Control Program]	④ ②

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.1.3.1.1	SR 3.1.4.3	Verify the CEA deviation circuit is OPERABLE.	[92 days OR In accordance with the Surveillance Frequency Control Program]	2
4.1.3.1.2	SR 3.1.4.4	Verify CEA freedom of movement (trippability) by moving each individual CEA that is not fully inserted into the reactor core [5 inches] in either direction. 7.5	[92 days OR In accordance with the Surveillance Frequency Control Program]	2
	SR 3.1.4.5	Perform a CHANNEL FUNCTIONAL TEST of the reed switch position transmitter channel.	[18 months OR In accordance with the Surveillance Frequency Control Program]	5
4.1.3.4 DOC L03 DOC L04	SR 3.1.4.6 5	Verify each CEA drop time is ≤ [3.1] seconds.	Prior to reactor criticality, after each removal of the reactor head and installation	4 2 5

3.1 REACTIVITY CONTROL SYSTEMS (Analog) 1

3.1.4 Control Element Assembly (CEA) Alignment (Analog)

3.1.3.1 LCO 3.1.4 All CEAs shall be OPERABLE.

AND

3.1.3.1 DOC M01 All CEAs shall be aligned to within [7] inches (indicated position) of their respective group, and [the CEA motion inhibit block circuit and the CEA deviation circuit shall be OPERABLE]. 2

Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS (Insert 1) 3

C CONDITION	C REQUIRED ACTION	COMPLETION TIME 3
3.1.3.1 Action e, f DOC M02 DOC L01 DOC L05 (Insert 2) A. One or more CEAs misaligned from its group by > [7 inches] and ≤ [15 inches]. OR One CEA misaligned from its group by > [15 inches].	A.1 Reduce THERMAL POWER to ≤ 70% RTP. AND A.2 (C) Restore CEA Alignment to within alignment limit. (D)	1 hour 2 4 hours 4
3.1.3.1 Action b B. (D) CEA motion inhibit block circuit inoperable. 4.1.3.1.1 DOC M03	(D) B.1 Perform SR 3.1.4.1. AND 3.1.3.1 Action b.1 (D) B.2.1 Restore CEA motion inhibit block circuit to OPERABLE status. OR	1 hour AND Every 4 hours thereafter 3 4 6 hours 3 4

CTS

INSERT 1 (3)

3.1.3.1 Action f	A. One or more CEAs misaligned from its group by > 7 inches and ≤ 15 inches.	A.1	Restore CEAs to within alignment limit.	2 hours
3.1.3.1 Action d	B. One CEA misaligned from its group by > 15 inches.	B.1	Restore CEA alignment to ≤ 15 inches.	In accordance with the COLR

INSERT 2 (3)

3.1.3.1 Action e

Required Action and associated Completion Time of Condition B not met.

1

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
DOC L02		D B.2.2	-------------NOTE------------- Required Action D B.2.2 shall not be performed when in conflict with either Required Action A.1, A.2, or C.1. C.1, C.2, or E.1 ------------------------------------		3
3.1.3.1 Action b.2		, and	p Place and maintain the CEA drive switch in either the "off" or "manual" position, F [and fully withdraw all CEAs in groups 1, 2, 3 and 4 and withdraw all CEAs in group 5 to < 15 5% insertion].	6 hours	4 2
4.1.3.1.1	E C. CEA deviation circuit inoperable.	E C.1	Perform SR 3.1.4.1.	1 hour AND Every 4 hours thereafter	3
3.1.3.1 Actions b.3, e, and f 3.1.3.1 Action a 3.1.3.1 Action c	F D. Required Action and associated Completion Time of Conditions A, B, or C , D, or E not met. OR One or more CEAs inoperable. OR Two or more CEAs misaligned by > [15 inches].	F D.1	Be in MODE 3.	6 hours	

4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.1.1	SR 3.1.4.1	Verify the indicated position of each CEA to be within [7 inches] of all other CEAs in its group.	Within 1 hour following any CEA movement of > [7 inches] AND [12 hours OR In accordance with the Surveillance Frequency Control Program]	2
4.1.3.1.3 4.1.3.1.4	SR 3.1.4.2	Verify the CEA motion inhibit block circuit is OPERABLE.	[92 days OR In accordance with the Surveillance Frequency Control Program]	4 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.1.3.1.1	SR 3.1.4.3	Verify the CEA deviation circuit is OPERABLE.	[92 days OR In accordance with the Surveillance Frequency Control Program]	2
4.1.3.1.2	SR 3.1.4.4	Verify CEA freedom of movement (trippability) by moving each individual CEA that is not fully inserted into the reactor core [5 inches] in either direction. 7	[92 days OR In accordance with the Surveillance Frequency Control Program]	2
	SR 3.1.4.5	Perform a CHANNEL FUNCTIONAL TEST of the reed switch position transmitter channel.	[18 months OR In accordance with the Surveillance Frequency Control Program]	5
4.1.3.4 DOC L03 DOC L04	SR 3.1.4.6 5	Verify each CEA drop time is ≤ [3.1] 3.25 seconds.	Prior to reactor criticality, after and installation each removal of the reactor head	4 2 5

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.4, CONTROL ELEMENT ASSEMBLY (CEA) ALIGNMENT

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering (CE) vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. ACTIONS A and B are added in the PSL Unit 1 and Unit 2 ITS. ITS ACTION A provides an action to restore the CEA alignment to within the limit in the condition of a minor CEA alignment deviation. For a major CEA alignment deviation, ITS ACTION B first allows time to restore the CEA alignment to within limits prior to the power reduction with a Completion Time of “in accordance with the COLR.” These changes are consistent with the CTS Actions. The CTS Action requirement for a minor CEA alignment deviation does not require a THERMAL POWER reduction. For a major CEA alignment deviation, the CTS Actions allow time to restore CEA alignment prior to requiring a THERMAL POWER reduction, provided the time constraints in the specified COLR figure are not exceeded. This allowance was approved in License Amendments 150 and 92 for Unit 1 and Unit 2, respectively (ADAMS Accession No. ML17229A288 (U1) and ML013600531 (U2)) and is considered acceptable because the Completion Time in accordance with the COLR is dependent upon the F_r^T prior to the major CEA alignment deviation. A worst case analysis has previously shown that a DNB fuel design limit violation may occur during this condition but is eliminated by limiting the time operation is permitted at full power before a power reduction is required. Changes to the time constraint specified in the COLR are controlled by an NRC-approved methodology. This change to the ISTS is also similar to the ITS 3.1.4 ACTIONS of another analog type CE plant; Calvert Cliff Nuclear Power Plant, Units 1 and 2 (ADAMS Accession No. ML052720276). ISTS 3.1.4, Condition A (ITS 3.1.4., Condition C) is revised to state, “Required Action and associated Completion Time of Condition B not met. ISTS Required Action A.2 (ITS Required Action C.2) is revised to be consistent with the wording in Required Action A.1 of new ITS ACTION A and is considered editorial. The Completion Time for ISTS Required Actions A.1 and A.2 (ITS Required Actions C.1 and C.2) remain unchanged and are consistent with the Calvert Cliffs ITS 3.1.4 ACTION C Completion Times. Subsequent Conditions, Required Actions, and references to Required Actions are renumbered to reflect this change.

4. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

5. ISTS SR 3.1.4.5 is deleted and subsequent Surveillance is renumbered. PSL developed ITS 3.1.7, Control Element Assembly (CEA) Position Indication, and requires performance of ITS SR 3.1.7.1 to determine operability of the reed switch position indicating channels and the pulse counting position indicating channels in accordance with the Surveillance Frequency Control Program.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS (Analog) 1

B 3.1.4 Control Element Assembly (CEA) Alignment (Analog)

BASES

BACKGROUND

The OPERABILITY (i.e., trippability) of the shutdown and regulating Control Element Assemblies (CEAs) is an initial assumption in all safety analyses that assume CEA insertion upon reactor trip. Maximum CEA misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10 and GDC 26 (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants" (Ref. 2).

Mechanical or electrical failures may cause a CEA to become inoperable or to become misaligned from its group. CEA inoperability or misalignment may cause increased power peaking, due to the asymmetric reactivity distribution and a reduction in the total available CEA worth for reactor shutdown. Therefore, CEA alignment and OPERABILITY are related to core operation in design power peaking limits and the core design requirement of a minimum SDM.

Limits on CEA alignment and OPERABILITY have been established, and all CEA positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

CEAs are moved by their control element drive mechanisms (CEDMs). Each CEDM moves its CEA one step (approximately ¾ inch) at a time, but at varying rates (steps per minute) depending on the signal output from the Control Element Drive Mechanism Control System (CEDMCS). 2

The CEAs are arranged into groups that are radially symmetric. Therefore, movement of the CEAs does not introduce radial asymmetries in the core power distribution. The shutdown and regulating CEAs provide the required reactivity worth for immediate reactor shutdown upon a reactor trip. The regulating CEAs also provide reactivity (power level) control during normal operation and transients. Their movement may be automatically controlled by the Reactor Regulating System. 2

The axial position of shutdown and regulating CEAs is indicated by two separate and independent systems, which are the Plant Computer CEA Position Indication System and the Reed Switch Position Indication System. 3

Pulse Counting

1

BASES

BACKGROUND (continued)

Pulse Counting

The ~~Plant Computer CEA~~ Position Indication System counts the commands sent to the CEA gripper coils from the CEDM Control System that moves the CEAs. There is a one step counter for each ~~group of~~ CEA~~s~~. Individual CEAs in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. ~~Plant Computer CEA~~ Position Indication System is considered highly precise (± 1 step or ± ¾ inch). ~~If a CEA does not move one step for each command signal, the step counter will still count the command and incorrectly reflect the position of the CEA.~~

3

An individual CEA may be moved in the Manual Individual Mode. The Pulse Counting

3 4

A step is counted after the Step Complete signal is received.

4

The Reed Switch Position Indication System provides a highly accurate indication of actual CEA position, but at a lower precision than the step counters. This system is based on ~~inductive analog~~ signals from a series of reed switch~~es~~ spaced ~~along a tube with a center to center distance of~~ 1.5 inch~~es~~, which is two steps. ~~To increase the reliability of the system, there are redundant reed switches at each position.~~

magnetically actuated

position transmitters

at

intervals

4

3

APPLICABLE SAFETY ANALYSES

CEA misalignment accidents are analyzed in the safety analysis (Ref. 3). The accident analysis defines CEA misoperation as an~~y~~ event~~, with the exception of sequential group withdraws,~~ which could result from a single malfunction in the reactivity control systems. ~~For example, CEA misalignment may be caused by a malfunction of the CEDM, CEDMCS, or by operator error. A stuck CEA may be caused by mechanical jamming of the CEA fingers or of the gripper. Inadvertent withdrawal of a single CEA may be caused by the opening of the electrical circuit of the CEDM holding coil for a full length or part length CEA. A dropped CEA could be caused by an electrical failure in the CEA coil power programmers~~.

5

The acceptance criteria for addressing CEA inoperability or misalignment are that:

a. There shall be no violations of either:

1. Specified acceptable fuel design limits or

2. Reactor Coolant System (RCS) pressure boundary integrity and

b. The core must remain subcritical after accident transients.

1

BASES

APPLICABLE SAFETY ANALYSES (continued)

accidents

Three types of misalignment are distinguished in the safety analysis (Ref. 1). During movement of a group, one CEA may stop moving while the other CEAs in the group continue. This condition may cause excessive power peaking. The second type of misalignment occurs if one CEA fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition requires an evaluation to determine that sufficient reactivity worth is held in the remaining CEAs to meet the SDM requirement with the maximum worth CEA stuck fully withdrawn. If a CEA is stuck in the fully withdrawn position, its worth is added to the SDM requirement, since the safety analysis does not take two stuck CEAs into account. The third type of misalignment occurs when one CEA drops partially or fully into the reactor core. This event causes an initial power reduction followed by a return towards the original power, due to positive reactivity feedback from the negative moderator temperature coefficient. Increased peaking during the power increase may result in excessive local linear heat rates (LHRs). 5

also

Two types of analyses are performed in regard to static CEA misalignment (Ref. 4). With CEA banks at their insertion limits, one type of analysis considers the case when any one CEA is inserted [ ] inches into the core. The second type of analysis considers the case of a single CEA withdrawn [4] inches from a bank inserted into its insertion limit. Satisfying limits on departure from nucleate boiling ratio (DNBR) in both of these cases bounds the situation when a CEA is misaligned from its group by [7 inches].

3 7.5 15 7.5 5 3 6 6 6

Another type of misalignment occurs if one CEA fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition is assumed in the evaluation to determine that the required SDM is met with the maximum worth CEA also fully withdrawn (Ref. 5). 3

3

Since the CEA drop incidents result in the most rapid approach to specified acceptable fuel design limits (SAFDLs) caused by a CEA misoperation, the accident analysis analyzed a single full length CEA drop. The most rapid approach to the DNBR SAFDL may be caused by a single full length CEA drop or a CEA subgroup drop, depending upon initial conditions.

All of the above CEA misoperations will result in an automatic reactor trip. 3
In the case of the full length CEA drop, a prompt decrease in core average power and a distortion in radial power are initially produced, which, when conservatively coupled, result in a local power and heat flux increase, and a decrease in DNBR parameters.

1

BASES

APPLICABLE SAFETY ANALYSES (continued)

The results of the CEA misoperation analysis show that during the most limiting misoperation events, no violations of the SAFDLs, fuel centerline temperature, or RCS pressure occur.

CEA alignment limits and OPERABILITY requirements satisfy Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The limits on shutdown and regulating CEA alignments ensure that the assumptions in the safety analysis will remain valid. The requirements on CEA OPERABILITY ensure that upon reactor trip, the CEAs will be available and will be inserted to provide enough negative reactivity to shut down the reactor. The CEA OPERABILITY requirements (i.e., trippability) are separate from alignment requirements which ensure that the CEA banks maintain the correct power distribution and CEA alignment. The CEA OPERABILITY requirement is satisfied provided the CEA will fully insert in the required CEA drop time assumed in the safety analysis. CEA control malfunctions that result in the inability to move a CEA (e.g., CEA lift rod failures), but do not impact trippability, do not result in CEA inoperability.

7.5

The requirement is to maintain the CEA alignment to within [7 inches] between any CEA and its group. The minimum misalignment assumed in safety analysis is [15 inches], and in some cases, a total misalignment from fully withdrawn to fully inserted is assumed. 6

Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and LHRs, or unacceptable SDMS, all of which may constitute initial conditions inconsistent with the safety analysis.

APPLICABILITY

The requirements on CEA OPERABILITY and alignment are applicable in MODES 1 and 2 because these are the only MODES in which neutron (or fission) power is generated, and the OPERABILITY (i.e., trippability) and alignment of CEAs have the potential to affect the safety of the plant. In MODES 3, 4, 5, and 6, the alignment limits do not apply because the CEAs are bottomed, and the reactor is shut down and not producing fission power. In the shutdown Modes, the OPERABILITY of the shutdown and regulating CEAs has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the RCS. See LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM in MODES 3, 4, and 5, and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling.

3

1

BASES

ACTIONS

A.1 and A.2

< from their group 7.5

If one or more CEAs (regulating or shutdown) are misaligned by > [7 inches] and ≤ [15 inches], or one CEA is misaligned by > [15 inches], continued operation in MODES 1 and 2 may continue, provided, within 1 hour, the power is reduced to ≤ 70% RTP, and within 2 hours CEA alignment is restored. Regulating CEA alignment can be restored by either aligning the misaligned CEA(s) to within [7 inches] of its group or aligning the misaligned CEA's group to within [7 inches] of the misaligned CEA. Shutdown CEA alignment can be restored by aligning the misaligned CEA(s) to within [7 inches] of its group.

CEA alignment must be restored to within the LCO limit in

7.5 7.5 7.5 7 6 8 6 6

Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned. Reducing THERMAL POWER in accordance with Figure 3.1.4-1 (in the associated LCO) ensures acceptable power distributions are maintained (Ref. 6). For small misalignments (< [15 inches]) of the CEAs, there is:

minor alignment deviations

8 6

a. A small effect on the time dependent long term power distributions relative to those used in generating LCOs and limiting safety system settings (LSSS) setpoints,

b. A negligible effect on the available SDM, and

c. A small effect on the ejected CEA worth used in the accident analysis.

With a large CEA misalignment (≥ [15 inches]), however, this misalignment would cause distortion of the core power distribution. This distortion may, in turn, have a significant effect on the time dependent, long term power distributions relative to those used in generating LCOs and LSSS setpoints. The effect on the available SDM and the ejected CEA worth used in the accident analysis remain small. Therefore, this condition is limited to a single CEA misalignment, while still allowing 2 hours for recovery.

s

A Completion Time of

In both cases, a 2 hour time period is sufficient to:

a. Identify cause of a misaligned CEA, and

b. Take appropriate corrective action to realign the CEAs, and

c. Minimize the effects of xenon redistribution.

8

Bases Insert 1

3

8

BASES INSERT 1

B.1

If one CEA is misaligned from its group by ≥ 15 inches, CEA alignment must be restored to < 15 inches in 1 hour. Regulating CEA alignment can be restored by either aligning the misaligned CEA to < 15 inches of its group or aligning the misaligned CEA's group to < 15 inches of the misaligned CEA. Shutdown CEA alignment can be restored by aligning the misaligned CEA to < 15 inches of its group.

Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned. With a major CEA alignment deviation (≥ 15 inches), misalignment could cause distortion of the core power distribution. This distortion may, in turn, have a significant effect on the time dependent, long term power distributions relative to those used in generating LCOs and LSSS setpoints. The effect on the available SDM and the ejected CEA worth used in the accident analysis remain small. Therefore, this condition is limited to a single major CEA alignment deviation and the time constraints provided in the applicable COLR figure for recovery. A higher total integrated peaking factor (F_r^T) prior to the misalignment could result in a shorter time constraint, further limiting the Completion Time before requiring a power reduction.

The Completion Time in accordance with the COLR is dependent upon the F_r^T prior to the major CEA alignment deviation. A worst case analysis has shown that a DNBR SAFDL violation may occur during this condition. This potential DNBR SAFDL violation is eliminated by limiting the time operation is permitted at full power before a power reduction is required.

C.1 and C.2

If the Required Action and associated Completion Time of Condition B cannot be met, operation in MODES 1 and 2 may continue provided power is promptly reduced to ≤ 70% RTP within 1 hour and the CEA is restored to within alignment limits in one additional hour. Operation with THERMAL POWER ≤ 70% RTP provides additional margin to offset the increase in F_r^T, thereby avoiding violation of the fuel design limits.

The Completion Time of Required Action C.1 provides the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System. The Completion Time of C.2 to restore the CEA to within alignment limits is sufficient to take appropriate corrective action to realign the CEA following the power reduction while recognizing the importance of minimizing the effects of xenon redistribution.

BASES

ACTIONS (continued) D

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B.1, B.2.1, and B.2.2

block circuit

The CEA motion inhibit permits CEA motion within the requirements of LCO 3.1.6, "Regulating Control Element Assembly Insertion Limits," and prevents regulating CEAs from being misaligned from other CEAs in the group. 3

Performing SR 3.1.4.1 within 1 hour and every 4 hours thereafter, is considered acceptable in view of other information continuously available to the operator in the control room.

block circuit block circuit

and

With the CEA motion inhibit inoperable, a Completion Time of 6 hours is allowed for restoring the CEA motion inhibit to OPERABLE status, or placing and maintaining the CEA drive switch in either the "off" or "manual" position,. fully withdrawing the CEAs in groups 3 and 4, and withdrawing all CEAs in group 5 to < 5% insertion., 3 3

7 3, 4, 5 and 6

D

Placing the CEA drive switch in the "off" or "manual" position ensures the CEAs will not move in response to Reactor Regulating System automatic motion commands. Withdrawal of the CEAs to the positions required in the Required Action B.2.2 ensures that core perturbations in local burnup, perking factors, and SDM will not be more adverse than the Conditions assumed in the safety analyses and LCO setpoint determination (Ref. 6). 2 8 9 3

a

D 3

The 6 hour Completion Time takes into account Required Action B.1, the protection afforded by the CEA deviation circuits, and other information continuously available to the operator in the control room, so that during actual CEA motion, deviations can be detected.

D

Required Action B.2.2 is modified by a Note indicating that this Required Action shall not be performed when in conflict with either Required Action A.1, A.2, or C.1. 8

C E

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BASES

ACTIONS (continued)

E C.1

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When the CEA deviation circuit is inoperable, performing SR 3.1.4.1, within 1 hour and every 4 hours thereafter, ensures improper CEA alignments are identified before unacceptable flux distributions occur. The specified Completion Times take into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and the protection provided by the CEA inhibit and deviation circuit is not required.

F D.1

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If the Required Action or associated Completion Time of Condition A, Condition B, or Condition C , D, or E is not met, one or more regulating or shutdown CEAs are inoperable, or two or more CEAs are misaligned by ≥ > [15 inches], the unit is required to be brought to MODE 3. By being brought to MODE 3, the unit is brought outside its MODE of applicability. Continued operation is not allowed in the case of more than one CEA misaligned from any other CEA in its group by ≥ > [15 inches], or one or more CEAs inoperable. This is because these cases are indicative of a loss of SDM and power distribution, and a loss of safety function, respectively.

6 7 6 7

When a Required Action cannot be completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1

Verification is required that individual CEA positions are within 7.5 [7 inches] (indicated reed switch positions) of all other CEAs in the group within 1 hour of any CEA movement of > 7.5 inches. The CEA position verification after each movement of > 7.5 inches ensures that the CEAs in that group are properly aligned at the time when CEA misalignments are most likely to have occurred. [The 12 hour Frequency allows the operator to detect a CEA that is beginning to deviate from its expected position. The specified Frequency takes into account other CEA position information that is continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA motion inhibit and deviation circuits.

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3

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BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.2

prevents any CEA from being misaligned from all other CEAs in its group by more than the LCO limit (indicated position), maintains the CEA group overlap and sequencing requirements of LCO 3.1.6, and prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of COLR Figure 3.1-2

10

block circuit

Demonstrating the CEA motion inhibit OPERABLE verifies that the CEA motion inhibit is functional, even if it is not regularly operated. [The 92 day Frequency takes into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA deviation circuits.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.3

Demonstrating the CEA deviation circuit is OPERABLE verifies the circuit is functional. [The 92 day Frequency takes into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA motion inhibit.

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3

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BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.4

Verifying each CEA is trippable would require that each CEA be tripped. In MODES 1 and 2, tripping each CEA would result in radial or axial power tilts, or oscillations. Therefore, individual CEAs are exercised to provide increased confidence that all CEAs continue to be trippable, even if they are not regularly tripped. A movement of [5 7.5 inches] is adequate to demonstrate motion without exceeding the alignment limit when only one CEA is being moved. [The 92 day Frequency takes into consideration other information available to the operator in the control room and other surveillances being performed more frequently, which add to the determination of OPERABILITY of the CEAs.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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Between required performances of SR 3.1.4.4, if a CEA(s) is discovered to be immovable, but remains trippable, the CEA is considered to be OPERABLE. At any time, if a CEA(s) is immovable, a determination of the trippability (OPERABILITY) of the CEA(s) must be made, and appropriate action taken.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.4.5

Performance of a CHANNEL FUNCTIONAL TEST of each reed switch position transmitter channel ensures the channel is OPERABLE and capable of indicating CEA position over the entire length of the CEA's travel. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. [Since this Surveillance must be performed when the reactor is shut down, an 18 month Frequency to be coincident with refueling outage was selected. Operating experience has shown that these components usually pass this Surveillance when performed at a Frequency of once every 18 months. Furthermore, the Frequency takes into account other surveillances being performed at shorter Frequencies, which determine the OPERABILITY of the CEA Reed Switch Indication System. 11

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.6

and installation 3

Verification of CEA drop times determined that the maximum CEA drop time permitted is consistent with the assumed drop time used in that safety analysis (Ref. 7). Measuring drop times prior to reactor criticality, after reactor vessel head removal, ensures that reactor internals and CEDM will not interfere with CEA motion or drop time and that no degradation in these systems has occurred that would adversely affect CEA motion or drop time. Individual CEAs whose drop times are greater than safety analysis assumptions are not OPERABLE. This SR is

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The individual (shutdown and regulating) CEA drop time from the fully withdrawn position shall be determined from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches the 90% insertion position with Tavg greater than or equal to 515°F. 12

BASES

SURVEILLANCE REQUIREMENTS (continued)

performed prior to criticality, based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned unit transient if the Surveillance were performed with the reactor at power.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.

2. 10 CFR 50.46.

3. U FSAR, Section [ ] Chapter 15. 6

4. FSAR, Section [ ].

5. FSAR, Section [ ]. 3

6. FSAR, Section [ ].

7. FSAR, Section [ ].

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~ 1

B 3.1.4 Control Element Assembly (CEA) Alignment ~~(Analog)~~

BASES

BACKGROUND

The OPERABILITY (i.e., trippability) of the shutdown and regulating Control Element Assemblies (CEAs) is an initial assumption in all safety analyses that assume CEA insertion upon reactor trip. Maximum CEA misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10 and GDC 26 (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants" (Ref. 2).

Mechanical or electrical failures may cause a CEA to become inoperable or to become misaligned from its group. CEA inoperability or misalignment may cause increased power peaking, due to the asymmetric reactivity distribution and a reduction in the total available CEA worth for reactor shutdown. Therefore, CEA alignment and OPERABILITY are related to core operation in design power peaking limits and the core design requirement of a minimum SDM.

Limits on CEA alignment and OPERABILITY have been established, and all CEA positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

CEAs are moved by their control element drive mechanisms (CEDMs). ~~Each CEDM moves its CEA~~ one step (approximately ¾ inch) at a time~~, but at varying rates (steps per minute) depending on the signal output from the Control Element Drive Mechanism Control System (CEDMCS)~~. 2

The CEAs are arranged into groups that are radially symmetric. Therefore, movement of the CEAs does not introduce radial asymmetries in the core power distribution. The shutdown and regulating CEAs provide the required reactivity worth for immediate reactor shutdown upon a reactor trip. The regulating CEAs also provide reactivity (power level) control during normal operation and transients. ~~Their movement may be automatically controlled by the Reactor Regulating System.~~ 2

The axial position of shutdown and regulating CEAs is indicated by two separate and independent systems, which are the ~~Plant Computer CEA~~ [Pulse counting] Position Indication System and the Reed Switch Position Indication System. 3

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BASES

BACKGROUND (continued)

Pulse Counting

The Plant Computer CEA Position Indication System counts the commands sent to the CEA gripper coils from the CEDM Control System that moves the CEAs. There is a one step counter for each group of CEA. Individual CEAs in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. Plant Computer CEA Position Indication System is considered highly precise (± 1 step or ± ¾ inch). If a CEA does not move one step for each command signal, the step counter will still count the command and incorrectly reflect the position of the CEA.

3 3 4 4

An individual CEA may be moved in the Manual Individual Mode. The Pulse Counting

A step is counted after the Step Complete signal is received.

The Reed Switch Position Indication System provides a highly accurate indication of actual CEA position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of reed switches spaced along a tube with a center to center distance of 1.5 inches, which is two steps. To increase the reliability of the system, there are redundant reed switches at each position.

magnetically actuated
position transmitters
at
intervals

4 3

APPLICABLE SAFETY ANALYSES

CEA misalignment accidents are analyzed in the safety analysis (Ref. 3). The accident analysis defines CEA misoperation as any event, with the exception of sequential group withdraws, which could result from a single malfunction in the reactivity control systems. For example, CEA misalignment may be caused by a malfunction of the CEDM, CEDMCS, or by operator error. A stuck CEA may be caused by mechanical jamming of the CEA fingers or of the gripper. Inadvertent withdrawal of a single CEA may be caused by the opening of the electrical circuit of the CEDM holding coil for a full length or part length CEA. A dropped CEA could be caused by an electrical failure in the CEA coil power programmers.

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The acceptance criteria for addressing CEA inoperability or misalignment are that:

a. There shall be no violations of either:

   1. Specified acceptable fuel design limits or

   2. Reactor Coolant System (RCS) pressure boundary integrity and

b. The core must remain subcritical after accident transients.

3

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BASES

APPLICABLE SAFETY ANALYSES (continued)

accidents

Three types of misalignment are distinguished in the safety analysis (Ref. 1). During movement of a group, one CEA may stop moving while the other CEAs in the group continue. This condition may cause excessive power peaking. The second type of misalignment occurs if one CEA fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition requires an evaluation to determine that sufficient reactivity worth is held in the remaining CEAs to meet the SDM requirement with the maximum worth CEA stuck fully withdrawn. If a CEA is stuck in the fully withdrawn position, its worth is added to the SDM requirement, since the safety analysis does not take two stuck CEAs into account. The third type of misalignment occurs when one CEA drops partially or fully into the reactor core. This event causes an initial power reduction followed by a return towards the original power, due to positive reactivity feedback from the negative moderator temperature coefficient. Increased peaking during the power increase may result in excessive local linear heat rates (LHRs). 5

also

Two types of analyses are performed in regard to static CEA misalignment (Ref. 4). With CEA banks at their insertion limits, one type of analysis considers the case when any one CEA is inserted [ ] inches into the core. The second type of analysis considers the case of a single CEA withdrawn [ ] inches from a bank inserted into its insertion limit. Satisfying limits on departure from nucleate boiling ratio (DNBR) in both of these cases bounds the situation when a CEA is misaligned from its group by [7 inches]. 5 3 6 6 6

3 7 15

Another type of misalignment occurs if one CEA fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition is assumed in the evaluation to determine that the required SDM is met with the maximum worth CEA also fully withdrawn (Ref. 5). 3

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Since the CEA drop incidents result in the most rapid approach to specified acceptable fuel design limits (SAFDLs) caused by a CEA misoperation, the accident analysis analyzed a single full length CEA drop. The most rapid approach to the DNBR SAFDL may be caused by a single full length CEA drop or a CEA subgroup drop, depending upon initial conditions.

All of the above CEA misoperations will result in an automatic reactor trip. 3
In the case of the full length CEA drop, a prompt decrease in core average power and a distortion in radial power are initially produced, which, when conservatively coupled, result in a local power and heat flux increase, and a decrease in DNBR parameters.

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BASES

APPLICABLE SAFETY ANALYSES (continued)

The results of the CEA misoperation analysis show that during the most limiting misoperation events, no violations of the SAFDLs, fuel centerline temperature, or RCS pressure occur.

CEA alignment limits and OPERABILITY requirements satisfy Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The limits on shutdown and regulating CEA alignments ensure that the assumptions in the safety analysis will remain valid. The requirements on CEA OPERABILITY ensure that upon reactor trip, the CEAs will be available and will be inserted to provide enough negative reactivity to shut down the reactor. The CEA OPERABILITY requirements (i.e., trippability) are separate from alignment requirements which ensure that the CEA banks maintain the correct power distribution and CEA alignment. The CEA OPERABILITY requirement is satisfied provided the CEA will fully insert in the required CEA drop time assumed in the safety analysis. CEA control malfunctions that result in the inability to move a CEA (e.g., CEA lift rod failures), but do not impact trippability, do not result in CEA inoperability.

The requirement is to maintain the CEA alignment to within [7 inches] between any CEA and its group. The minimum misalignment assumed in safety analysis is [15 inches], and in some cases, a total misalignment from fully withdrawn to fully inserted is assumed. 6

Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and LHRs, or unacceptable SDMS, all of which may constitute initial conditions inconsistent with the safety analysis.

APPLICABILITY

The requirements on CEA OPERABILITY and alignment are applicable in MODES 1 and 2 because these are the only MODES in which neutron (or fission) power is generated, and the OPERABILITY (i.e., trippability) and alignment of CEAs have the potential to affect the safety of the plant. In MODES 3, 4, 5, and 6, the alignment limits do not apply because the CEAs are bottomed, and the reactor is shut down and not producing fission power. In the shutdown Modes, the OPERABILITY of the shutdown and regulating CEAs has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the RCS. See LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM in MODES 3, 4, and 5, and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling.

 1

BASES

ACTIONS

A.1 and A.2

from their group

If one or more CEAs (regulating or shutdown) are misaligned by > [7 inches] and ≤ [15 inches], or one CEA is misaligned by > [15 inches], continued operation in MODES 1 and 2 may continue, provided, within 1 hour, the power is reduced to ≤ 70% RTP, and within 2 hours CEA alignment is restored. Regulating CEA alignment can be restored by either aligning the misaligned CEA(s) to within [7 inches] of its group or aligning the misaligned CEA's group to within [7 inches] of the misaligned CEA. Shutdown CEA alignment can be restored by aligning the misaligned CEA(s) to within [7 inches] of its group. 7 6 8 6 6

CEA alignment must be restored to within the LCO limit in

Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned. Reducing THERMAL POWER in accordance with Figure 3.1.4-1 (in the associated LCO) ensures acceptable power distributions are maintained (Ref. 6). For small misalignments (< [15 inches]) of the CEAs, there is: 8 6

minor alignment deviations

≤

a. A small effect on the time dependent long term power distributions relative to those used in generating LCOs and limiting safety system settings (LSSS) setpoints,

b. A negligible effect on the available SDM, and

c. A small effect on the ejected CEA worth used in the accident analysis.

With a large CEA misalignment (≥ [15 inches]), however, this misalignment would cause distortion of the core power distribution. This distortion may, in turn, have a significant effect on the time dependent, long term power distributions relative to those used in generating LCOs and LSSS setpoints. The effect on the available SDM and the ejected CEA worth used in the accident analysis remain small. Therefore, this condition is limited to a single CEA misalignment, while still allowing 2 hours for recovery.

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A Completion Time of

In both cases, a 2 hour time period is sufficient to: 8

a. Identify cause of a misaligned CEA, and

b. Take appropriate corrective action to realign the CEAs, and

c. Minimize the effects of xenon redistribution.

Bases Insert 1

 3

8

BASES INSERT 1

B.1

If one CEA is misaligned from its group by > 15 inches, CEA alignment must be restored to ≤ 15 inches in 1 hour. Regulating CEA alignment can be restored by either aligning the misaligned CEA to ≤ 15 inches of its group or aligning the misaligned CEA's group to ≤ 15 inches of the misaligned CEA. Shutdown CEA alignment can be restored by aligning the misaligned CEA to ≤ 15 inches of its group.

Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned. With a major CEA alignment deviation (> 15 inches), misalignment could cause distortion of the core power distribution. This distortion may, in turn, have a significant effect on the time dependent, long term power distributions relative to those used in generating LCOs and LSSS setpoints. The effect on the available SDM and the ejected CEA worth used in the accident analysis remain small. Therefore, this condition is limited to a single major CEA alignment deviation and the time constraints provided in the applicable COLR figure for recovery. A higher total integrated peaking factor (F_r^T) prior to the misalignment could result in a shorter time constraint, further limiting the Completion Time before requiring a power reduction.

The Completion Time in accordance with the COLR is dependent upon the F_r^T prior to the major CEA alignment deviation. A worst case analysis has shown that a DNBR SAFDL violation may occur during this condition. This potential DNBR SAFDL violation is eliminated by limiting the time operation is permitted at full power before a power reduction is required.

C.1 and C.2

If the Required Action and associated Completion Time of Condition B cannot be met, operation in MODES 1 and 2 may continue provided power is promptly reduced to ≤ 70% RTP within 1 hour and the CEA is restored to within alignment limits in one additional hour. Operation with THERMAL POWER ≤ 70% RTP provides additional margin to offset the increase in F_r^T, thereby avoiding violation of the fuel design limits.

The Completion Time of Required Action C.1 provides the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System. The Completion Time of C.2 to restore the CEA to within alignment limits is sufficient to take appropriate corrective action to realign the CEA following the power reduction while recognizing the importance of minimizing the effects of xenon redistribution.

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BASES

ACTIONS (continued)

D

B.1, B.2.1, and B.2.2 8

block circuit

The CEA motion inhibit permits CEA motion within the requirements of LCO 3.1.6, "Regulating Control Element Assembly Insertion Limits," and prevents regulating CEAs from being misaligned from other CEAs in the group. 3

Performing SR 3.1.4.1 within 1 hour and every 4 hours thereafter, is considered acceptable in view of other information continuously available to the operator in the control room.

block circuit block circuit

and

With the CEA motion inhibit inoperable, a Completion Time of 6 hours is allowed for restoring the CEA motion inhibit to OPERABLE status, or placing and maintaining the CEA drive switch in either the "off" or "manual" position, fully withdrawing the CEAs in groups 3 and 4, and withdrawing all CEAs in group 5 to < 5% insertion., 3 3

15 1, 2,

Placing the CEA drive switch in the "off" or "manual" position ensures the CEAs will not move in response to Reactor Regulating System automatic motion commands. Withdrawal of the CEAs to the positions required in the Required Action B.2.2 ensures that core perturbations in local burnup, perking factors, and SDM will not be more adverse than the Conditions assumed in the safety analyses and LCO setpoint determination (Ref. 6). 2 8 9 3

D a D 3

The 6 hour Completion Time takes into account Required Action B.1, the protection afforded by the CEA deviation circuits, and other information continuously available to the operator in the control room, so that during actual CEA motion, deviations can be detected.

D

Required Action B.2.2 is modified by a Note indicating that this Required Action shall not be performed when in conflict with either Required Action A.1, A.2, or C.1. 8

C E

3

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BASES

ACTIONS (continued)

E C.1

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When the CEA deviation circuit is inoperable, performing SR 3.1.4.1, within 1 hour and every 4 hours thereafter, ensures improper CEA alignments are identified before unacceptable flux distributions occur. The specified Completion Times take into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and the protection provided by the CEA inhibit and deviation circuit is not required.

F D.1

8

If the Required Action or associated Completion Time of Condition A, Condition B, or Condition C , D, or E is not met, one or more regulating or shutdown CEAs are inoperable, or two or more CEAs are misaligned by > [15 inches], the unit is required to be brought to MODE 3. By being brought to MODE 3, the unit is brought outside its MODE of applicability. Continued operation is not allowed in the case of more than one CEA misaligned from any other CEA in its group by > [15 inches], or one or more CEAs inoperable. This is because these cases are indicative of a loss of SDM and power distribution, and a loss of safety function, respectively.

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When a Required Action cannot be completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1

Verification is required that individual CEA positions are within [7 inches] (indicated reed switch positions) of all other CEAs in the group within 1 hour of any CEA movement of > 7.5 inches. The CEA position verification after each movement of > 7.5 inches ensures that the CEAs in that group are properly aligned at the time when CEA misalignments are most likely to have occurred. [The 12 hour Frequency allows the operator to detect a CEA that is beginning to deviate from its expected position. The specified Frequency takes into account other CEA position information that is continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA motion inhibit and deviation circuits.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 6
-----]

SR 3.1.4.2

prevents any CEA from being misaligned from all other CEAs in its group by more than the LCO limit (indicated position), maintains the CEA group overlap and sequencing requirements of LCO 3.1.6, and prevents the regulating CEAs from being inserted beyond the Power Dependent Insertion Limit of COLR Figure 3.1-2 10

block circuit

Demonstrating the CEA motion inhibit OPERABLE verifies that the CEA motion inhibit is functional even if it is not regularly operated. [The 92 day Frequency takes into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA deviation circuits.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 6

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.3

Demonstrating the CEA deviation circuit is OPERABLE verifies the circuit is functional. [The 92 day Frequency takes into account other information continuously available to the operator in the control room, so that during CEA movement, deviations can be detected, and protection can be provided by the CEA motion inhibit. 6

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BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.4

Verifying each CEA is trippable would require that each CEA be tripped. In MODES 1 and 2, tripping each CEA would result in radial or axial power tilts, or oscillations. Therefore, individual CEAs are exercised to provide increased confidence that all CEAs continue to be trippable, even if they are not regularly tripped. A movement of [5 7 inches] is adequate to demonstrate motion without exceeding the alignment limit when only one CEA is being moved. [The 92 day Frequency takes into consideration other information available to the operator in the control room and other surveillances being performed more frequently, which add to the determination of OPERABILITY of the CEAs.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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Between required performances of SR 3.1.4.4, if a CEA(s) is discovered to be immovable, but remains trippable, the CEA is considered to be OPERABLE. At any time, if a CEA(s) is immovable, a determination of the trippability (OPERABILITY) of the CEA(s) must be made, and appropriate action taken.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.4.5

Performance of a CHANNEL FUNCTIONAL TEST of each reed switch position transmitter channel ensures the channel is OPERABLE and capable of indicating CEA position over the entire length of the CEA's travel. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. [Since this Surveillance must be performed when the reactor is shut down, an 18 month Frequency to be coincident with refueling outage was selected. Operating experience has shown that these components usually pass this Surveillance when performed at a Frequency of once every 18 months. Furthermore, the Frequency takes into account other surveillances being performed at shorter Frequencies, which determine the OPERABILITY of the CEA Reed Switch Indication System. 11

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.1.4.6

and installation 3

Verification of CEA drop times determined that the maximum CEA drop time permitted is consistent with the assumed drop time used in that safety analysis (Ref. 7). Measuring drop times prior to reactor criticality, after reactor vessel head removal, ensures that reactor internals and CEDM will not interfere with CEA motion or drop time and that no degradation in these systems has occurred that would adversely affect CEA motion or drop time. Individual CEAs whose drop times are greater than safety analysis assumptions are not OPERABLE. This SR is

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The individual (shutdown and regulating) CEA drop time from the fully withdrawn position shall be determined from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches the 90% insertion position with Tavg greater than or equal to 515°F. 12

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BASES

SURVEILLANCE REQUIREMENTS (continued)

performed prior to criticality, based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned unit transient if the Surveillance were performed with the reactor at power.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.

2. 10 CFR 50.46.

3. U FSAR, Chapter 15 Section [ ].

6

4. FSAR, Section [ ].

5. FSAR, Section [ ].

6. FSAR, Section [ ].

7. FSAR, Section [ ].

3

3

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.4, BASES, CONTROL ELEMENT ASSEMBLY (CEA) ALIGNMENT

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. The ISTS Bases states that the CEAs may be moved at varying rates (steps per minute), and that the CEA movement may be automatically controlled by the Reactor Regulating System. Moving CEA(s) at varying rates and automatic control of CEA(s) is not a design feature for PSL Unit 1 and Unit 2 due to the incorporation of the ARCH (Advanced Rod Control Hybrid) system that controls CEA movement. Therefore, the associated text is deleted.

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

4. ISTS Bases is changed to incorporate ARCH (Advanced Rod Control Hybrid) system design features installed at PSL Unit 1 and PSL Unit 2. For ARCH, an individual CEA may be moved in the Manual Individual Mode, therefore, the description is added. ISTS states that if a CEA does not move one step for each command signal, the step counter will still count the command and incorrectly reflect the position of the CEA. For ARCH, a step is counted only after the Step Complete signal is received. The associated text is changed. The ISTS states that the system is based on analog signals. For ARCH, the system uses a resistance voltage divider network. Therefore, the associated text “inductive analog” is deleted. The ISTS states that during movement of a group, one CEA may stop moving while the other CEAs in the group continue. This condition may cause excessive power peaking. For ARCH, this is not a valid failure mode. Therefore, this text is deleted.

5. ISTS includes numerous examples of failure modes for CEA alignment accidents. These examples are unnecessary information in the Applicable Safety Analysis and are deleted. The deleted examples do not affect the subsequent description for the Applicable Safety Analysis.

6. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

7. The ISTS alignment limits are changed to the PSL Unit 1 current licensing basis. PSL Unit 2 current licensing basis is also retained and matches the ISTS without change.

8. ACTIONS A and B are added to ITS 3.1.4 and ISTS 3.1.4, Condition A (ITS 3.1.4, Condition C) is modified to reflect PSL CTS 3.1.3.1 Actions as modified by the CTS Discussion of Changes. The ISTS Bases changes reflect the changes associated with the ISTS Specification.

9. Changes made to the PSL ITS Bases to correct a grammatical error in the ISTS Bases or align the text with the PSL ITS Specification.

10. Surveillance Requirement details removed from CTS 4.1.3.1.3 and CTS 4.1.3.1.4 and relocated to the ITS Bases of SR 3.1.4.2. See CTS DOC LA03.

11. ISTS SR 3.1.4.5 is deleted and subsequent Surveillance is renumbered. PSL developed ITS 3.1.7, Control Element Assembly (CEA) Position Indication, and requires performance of ITS SR 3.1.7.1 to determine OPERABILITY of the reed switch position indicating channels and the pulse counting position indicating channels in accordance with the Surveillance Frequency Control Program.

12. CTS 3.1.3.4 requires the individual (shutdown and regulating) CEA drop time from the fully withdrawn position shall be less than or equal to 3.1 seconds (PSL Unit 1) and less than or equal to 3.25 seconds (PSL Unit 2) from when the electrical power is interrupted to the CEA drive mechanism until the CEA reaches the 90% insertion position with Tavg greater than or equal to 515°F. These details for the CEA drop time surveillance are relocated to the ITS 3.1.4 Bases. See DOC LA04.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.4, CONTROL ELEMENT ASSEMBLY (CEA) ALIGNMENT

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 5

3.1.5 Shutdown Control Element Assembly (CEA) Insertion Limits

Current Technical Specifications (CTS) Markup
and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

SHUTDOWN CEA INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

LCO 3.1.5 — 3.1.3.5 All shutdown CEAs shall be withdrawn to [≥] at least 129.0 inches.

Applicability — **APPLICABILITY**: MODES 1 [,] and [MODE] 2*# [with any regulating CEA not fully inserted]. A02 M01

ACTION:

ACTION A / Applicability Note — With a maximum of one [or more] shutdown CEA[s] withdrawn, [not within limit.] except for surveillance testing pursuant to Specification 4.1.3.1.2, [This LCO is not applicable while performing SR 3.1.4.4.] to less than 129.0 inches, within one [2] hour either: L01 L01

Required Action A.1 — a. Withdraw the [Restore shutdown] CEA[(s)] to at least 129.0 inches, or [within limit.]

Required Action B.1 — b. Declare the CEA inoperable and apply Specification 3.1.3.1. [Be in MODE 3 within 6 hours.] L02

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1 — 4.1.3.5 [Verify] Each shutdown CEA shall be determined to be [is] withdrawn to at least [≥] 129.0 inches: [.]

Applicability MODE 2 — a. Within 15 minutes prior to withdrawal of any CEAs in regulating groups during an approach to reactor criticality, and L03

SR 3.1.5.1 Frequency — b. In accordance with the Surveillance Frequency Control Program.

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* See Special Test Exception 3.10.2. A02

\# With $K_{eff} \geq 1.0$. M01

REACTIVITY CONTROL SYSTEMS

SHUTDOWN CEA INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

LCO 3.1.5 3.1.3.5 All shutdown CEAs shall be withdrawn to greater than or equal to ≥ 129.0 inches.

Applicability **APPLICABILITY**: MODES 1 , and MODE 2 *# with any regulating CEA not fully inserted. A02 M01

ACTION:

ACTION A — With a maximum of or more one shutdown CEA s withdrawn to less than 129.0 inches, not within limit. except This LCO is not applicable while performing SR 3.1.4.4. L01

Applicability Note — for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 2 hour either: L01

Required Action A.1 — a. Withdraw the Restore shutdown CEA (s) to greater than or equal to 129.0 inches, or within limit.

Required Action B.1 — b. Declare the CEA inoperable and apply Specification 3.1.3.1. Be in MODE 3 within 6 hours. L02

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1 4.1.3.5 Verify Each shutdown CEA shall be is determined to be withdrawn to greater than or equal to ≥ 129.0 inches .

Applicability MODE 2 — a. Within 15 minutes prior to withdrawal of any CEAs in regulating groups during an approach to reactor criticality, and L03

SR 3.1.5.1 Frequency — b. In accordance with the Surveillance Frequency Control Program thereafter.

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* See Special Test Exception 3.10.2. A02

\# With K_{eff} greater than or equal to 1.0. M01

DISCUSSION OF CHANGES
ITS 3.1.5, SHUTDOWN CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.3.5 Applicability is MODES 1 and 2 with a footnote (footnote *) for MODE 2 stating "See Special Test Exception 3.10.2," and a footnote (footnote #) for MODE 2 stating "With $K_{eff} \geq 1.0$." ITS 3.1.5 does not contain the footnotes or a reference to the Special Test Exception or reference to the K_{eff}. This changes the CTS by not including footnote * and footnote # in the ITS.

The purpose of the footnote references is to alert the user that conditions exist that may modify the Applicability of the Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS. See DOC M01 for additional discussion of change for the footnote # for MODE 2 stating "With $K_{eff} \geq 1.0$."

MORE RESTRICTIVE CHANGES

M01 CTS 3.1.3.5 is applicable in MODES 1 and 2 with $k_{eff} \geq 1.0$. MODE 2 is modified by CTS 3.1.3.5 footnote #. ITS 3.1.5 is applicable in MODES 1 and 2. This changes the CTS by expanding the Applicability from MODE 2 with the reactor critical to all of MODE 2.

The purpose of CTS 3.1.3.5 is to ensure that the shutdown CEAs are fully withdrawn prior to withdrawing the regulating CEAs to ensure that there is sufficient shutdown margin available to quickly shutdown the reactor. This change is acceptable because applying the requirement prior to moving the CEAs and bringing the reactor critical ensures that the shutdown margin is available and is consistent with plant operation, in that the shutdown CEAs are withdrawn to at least 129.0 inches before beginning to withdraw the regulating CEAs and approaching criticality. This change is designated as more restrictive because it increases the conditions under which Technical Specification controls will be applied.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 (*Category 4 – Relaxation of Required Action)* CTS 3.1.3.5 ACTION states that with one shutdown CEA withdrawn to less than 129.0 inches, then withdraw the CEA to at least 129.0 inches within 1 hour. ITS 3.1.5 Required Action A.1 requires that the shutdown CEA be withdrawn to at least 129.0 inches within 2 hours. This changes the CTS by changing the Completion Time from one hour to two hours.

The purpose of CTS 3.1.3.5 ACTION is to restore a shutdown CEA not withdrawn to at least 129.0 inches, to within limits within 1 hour. Prior to entering this Condition, the shutdown CEAs were fully withdrawn. If a shutdown CEA is then inserted into the core, its potential negative reactivity is added to the core as it is inserted. The 2 hour Completion Time allows the operator adequate time to adjust the CEA(s) in an orderly manner and is consistent with the Completion Times in LCO 3.1.4, "Control Element Assembly (CEA) Alignment." This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, the capacity and capability of remaining features, and the low probability of a DBA occurring during the allowed Completion Time. The Completion Time of 2 hours gives the operator sufficient time to adjust the CEA(s) in an orderly manner. This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.1.3.5 ACTION a. and ACTION B provide compensatory actions for a maximum of one shutdown CEA withdrawn to less than 129.0 inches. The actions require within one hour either restore the CEA to at least 129.0 inches or declare the CEA inoperable and apply ACTION Specification 3.1.3.1. For more than one shutdown CEA not withdrawn to at least 129.0 inches, CTS 3.1.3.5 does not contain a specific requirement; therefore, entry into CTS 3.0.3 is required. ITS 3.1.5 ACTION A and ACTION B provide Required Actions for one or more shutdown CEAs not within limits. ITS 3.1.5 Required Action A.1 requires restoring the shutdown CEA(s) to within the limit within 2 hours. Additionally, ITS 3.1.5 Required Action B.1 requires if any Required Action and associated Completion Time is not met, the unit must be in MODE 3 within 6 hours. This changes the CTS by allowing more than one shutdown CEA to be outside the limits specified in the LCO, eliminates the allowance to declare the CEA inoperable and to take the ACTIONS of Specification 3.1.3.1, and eliminates the requirement to enter CTS 3.0.3 if more than one shutdown CEA is not within the limits specified in the LCO, or if any Required Action and associated Completion Time is not met.

The purpose of CTS 3.1.3.5 ACTION a. is to ensure the shutdown CEAs are withdrawn to at least 129.0 inches to ensure that there is sufficient margin available to quickly shutdown the reactor. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering that only a small amount of time is provided to establish the required features, and the low probability of a DBA occurring during the repair period. Allowing an additional hour to restore one or more shutdown CEAs to within the limit is appropriate allows the operator adequate time to adjust the CEA(s) in an orderly manner and is consistent with the Completion Times in LCO 3.1.4, "Control Element Assembly (CEA) Alignment." .

This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.5.a requires verification that each shutdown CEA is within the limit specified in the LCO within 15 minutes prior to withdrawal of any CEAs in the regulating groups during an approach to reactor criticality. ITS 3.1.5 does not require verification that each shutdown CEA is within the limit specified in the LCO within 15 minutes prior to withdrawal of any CEAs in the regulating groups during an approach to reactor criticality. This changes the CTS by eliminating the requirement that each CEA is within the limit specified in the LCO within 15 minutes prior to withdrawal of any CEAs in the regulating groups during an approach to reactor criticality.

The purpose of CTS 4.1.3.5.a is to verify the shutdown CEAs are withdrawn to at least 129.0 inches prior to withdrawing the regulating CEAs. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify the equipment being used to meet the LCO can perform its required function. Thus, appropriate equipment continues to be tested in a manner and at a Frequency necessary to give confidence the equipment can perform its assumed safety function. Under the ITS Applicability of MODE 2 and the requirement of ITS LCO 3.0.4, the shutdown CEAs must be withdrawn to at least 129.0 inches prior to entering the ITS Applicability of MODE 2. However, it is not required to verify compliance within a specified time prior to initial withdrawal of regulating CEAs. Specifying a time is not necessary to ensure the shutdown CEAs are withdrawn to at least 129.0 inches prior to initial withdrawal of regulating CEA withdrawal if the shutdown CEAs are withdrawn to at least 129.0 before withdrawing the regulating CEAs.

This change is designated as less restrictive because a Surveillance which was required in CTS will not be required in the ITS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS (Analog) 3

3.1.5 Shutdown Control Element Assembly (CEA) Insertion Limits (Analog)

LCO 3.1.3.5 LCO 3.1.5 All shutdown CEAs shall be withdrawn to ≥ [129] inches. 2

Applicability APPLICABILITY: MODE 1,
MODE 2 with any regulating CEA not fully inserted.

---NOTE---
Action This LCO is not applicable while performing SR 3.1.4.4.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a.	A. One or more shutdown CEAs not within limit.	A.1 Restore shutdown CEA(s) to within limit.	2 hours
Action b.	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
SR 4.1.3.5 SR 4.1.3.5.b	SR 3.1.5.1	Verify each shutdown CEA is withdrawn ≥ [129] inches.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2

3

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3

3.1.5 Shutdown Control Element Assembly (CEA) Insertion Limits (Analog)

LCO 3.1.3.5 LCO 3.1.5 All shutdown CEAs shall be withdrawn to ≥ [129] inches. 2

Applicability APPLICABILITY: MODE 1,
MODE 2 with any regulating CEA not fully inserted.

--NOTE--
Action This LCO is not applicable while performing SR 3.1.4.4.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a.	A. One or more shutdown CEAs not within limit.	A.1 Restore shutdown CEA(s) to within limit.	2 hours
Action b.	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
SR 4.1.3.5 SR 4.1.3.5.b	SR 3.1.5.1 Verify each shutdown CEA is withdrawn ≥ [129] inches.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2

1

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.5, SHUTDOWN CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

 4

B 3.1 REACTIVITY CONTROL SYSTEMS (Analog) 4

B 3.1.5 Shutdown Control Element Assembly (CEA) Insertion Limits (Analog)

BASES

BACKGROUND

The insertion limits of the shutdown Control Element Assemblies (CEAs) are initial assumptions in all safety analyses that assume CEA insertion upon reactor trip. The insertion limits directly affect core power distributions and assumptions of available SDM, ejected CEA worth, and initial reactivity insertion rate.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," and GDC 26, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2). Limits on shutdown CEA insertion have been established, and all CEA positions are monitored and controlled during power operation to ensure that the reactivity limits, ejected CEA worth, and SDM limits are preserved.

The shutdown CEAs are arranged into groups that are radially symmetric. Therefore, movement of the shutdown CEAs does not introduce radial asymmetries in the core power distribution. The shutdown and regulating CEAs provide the required reactivity worth for immediate reactor shutdown upon a reactor trip.

The design calculations are performed with the assumption that the shutdown CEAs are withdrawn prior to the regulating CEAs. The shutdown CEAs can be fully withdrawn without the core going critical. This provides available negative reactivity for SDM in the event of boration errors. The shutdown CEAs are controlled manually or automatically by the control room operator. During normal unit operation, the shutdown CEAs are fully withdrawn. The shutdown CEAs must be completely withdrawn from the core prior to withdrawing any regulating CEAs during an approach to criticality. The shutdown CEAs are then left in this position until the reactor is shut down. They affect core power, burnup distribution, and add negative reactivity to shut down the reactor upon receipt of a reactor trip signal. 3

APPLICABLE SAFETY ANALYSES

Accident analysis assumes that the shutdown CEAs are fully withdrawn any time the reactor is critical. This ensures that:

a. The minimum SDM is maintained and

b. The potential effects of a CEA ejection accident are limited to acceptable limits.

BASES

APPLICABLE SAFETY ANALYSES (continued)

CEAs are considered fully withdrawn at 129 inches, since this position places them outside the active region of the core.

On a reactor trip, all CEAs (shutdown and regulating), except the most reactive CEA, are assumed to insert into the core. The shutdown and regulating CEAs shall be at their insertion limits and available to insert the maximum amount of negative reactivity on a reactor trip signal. The regulating CEAs may be partially inserted in the core as allowed by LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits." The shutdown CEA insertion limit is established to ensure that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") following a reactor trip from full power. The combination of regulating CEAs and shutdown CEAs (less the most reactive CEA, which is assumed to be fully withdrawn) is sufficient to take the reactor from full power conditions at rated temperature to zero power, and to maintain the required SDM at rated no load temperature (Ref. 3). The shutdown CEA insertion limit also limits the reactivity worth of an ejected shutdown CEA.

The acceptance criteria for addressing shutdown CEA as well as regulating CEA insertion limits and inoperability or misalignment are that:

a. There be no violation of either:

    1. Specified acceptable fuel design limits or

    2. Reactor Coolant System pressure boundary damage and

b. The core remains subcritical after accident transients.

As such, the shutdown CEA insertion limits affect safety analyses involving core reactivity, ejected CEA worth, and SDM (Ref. 3).

The shutdown CEA insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The shutdown CEAs must be within their insertion limits any time the reactor is critical or approaching criticality. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip.

BASES

APPLICABILITY

The shutdown CEAs must be within their insertion limits, with the reactor in MODES 1 and 2. The Applicability in MODE 2 begins anytime any regulating CEA is not fully inserted. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. In MODE 3, 4, 5, or 6, the shutdown CEAs are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM requirements in MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6.

This LCO has been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.4. This SR verifies the freedom of the CEAs to move, and requires the shutdown CEAs to move below the LCO limits, which would normally violate the LCO.

ACTIONS

A.1

Prior to entering this condition, the shutdown CEAs were fully withdrawn. If a shutdown CEA(s) is then inserted into the core, its potential negative reactivity is added to the core as it is inserted.

~~If the CEA(s) is not restored to within limits within 1 hour, then an additional 1 hour is allowed for restoring the CEA(s) to within limits.~~ The 2 hour total Completion Time allows the operator adequate time to adjust the CEA(s) in an orderly manner and is consistent with the required Completion Times in LCO 3.1.4, "Control Element Assembly (CEA) Alignment." 1

B.1

When Required Action A.1 ~~or A.2~~ cannot be met or completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems. 1

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown CEAs are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown CEAs will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip. This SR and Frequency ensure that the shutdown CEAs are withdrawn before the regulating CEAs are withdrawn during a unit startup.

BASES

SURVEILLANCE REQUIREMENTS (continued)

[Since the shutdown CEAs are positioned manually by the control room operator, verification of shutdown CEA position at a Frequency of 12 hours is adequate to ensure that the shutdown CEAs are within their insertion limits. Also, the 12 hour Frequency takes into account other information available to the operator in the control room for the purpose of monitoring the status of the shutdown CEAs. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.
2. 10 CFR 50.46.
3. U FSAR, Section [4.2]. 2

B 3.1 REACTIVITY CONTROL SYSTEMS (Analog) 4

B 3.1.5 Shutdown Control Element Assembly (CEA) Insertion Limits (Analog)

BASES

BACKGROUND	The insertion limits of the shutdown Control Element Assemblies (CEAs) are initial assumptions in all safety analyses that assume CEA insertion upon reactor trip. The insertion limits directly affect core power distributions and assumptions of available SDM, ejected CEA worth, and initial reactivity insertion rate.
	The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," and GDC 26, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2). Limits on shutdown CEA insertion have been established, and all CEA positions are monitored and controlled during power operation to ensure that the reactivity limits, ejected CEA worth, and SDM limits are preserved.
	The shutdown CEAs are arranged into groups that are radially symmetric. Therefore, movement of the shutdown CEAs does not introduce radial asymmetries in the core power distribution. The shutdown and regulating CEAs provide the required reactivity worth for immediate reactor shutdown upon a reactor trip.
	The design calculations are performed with the assumption that the shutdown CEAs are withdrawn prior to the regulating CEAs. The shutdown CEAs can be fully withdrawn without the core going critical. This provides available negative reactivity for SDM in the event of boration errors. The shutdown CEAs are controlled manually ~~or automatically~~ by the control room operator. During normal unit operation, the shutdown CEAs are fully withdrawn. The shutdown CEAs must be completely withdrawn from the core prior to withdrawing any regulating CEAs during an approach to criticality. The shutdown CEAs are then left in this position until the reactor is shut down. They affect core power, burnup distribution, and add negative reactivity to shut down the reactor upon receipt of a reactor trip signal. 3
APPLICABLE SAFETY ANALYSES	Accident analysis assumes that the shutdown CEAs are fully withdrawn any time the reactor is critical. This ensures that: a. The minimum SDM is maintained and b. The potential effects of a CEA ejection accident are limited to acceptable limits.

BASES

APPLICABLE SAFETY ANALYSES (continued)

CEAs are considered fully withdrawn at 129 inches, since this position places them outside the active region of the core.

On a reactor trip, all CEAs (shutdown and regulating), except the most reactive CEA, are assumed to insert into the core. The shutdown and regulating CEAs shall be at their insertion limits and available to insert the maximum amount of negative reactivity on a reactor trip signal. The regulating CEAs may be partially inserted in the core as allowed by LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits." The shutdown CEA insertion limit is established to ensure that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") following a reactor trip from full power. The combination of regulating CEAs and shutdown CEAs (less the most reactive CEA, which is assumed to be fully withdrawn) is sufficient to take the reactor from full power conditions at rated temperature to zero power, and to maintain the required SDM at rated no load temperature (Ref. 3). The shutdown CEA insertion limit also limits the reactivity worth of an ejected shutdown CEA.

The acceptance criteria for addressing shutdown CEA as well as regulating CEA insertion limits and inoperability or misalignment are that:

a. There be no violation of either:

   1. Specified acceptable fuel design limits or

   2. Reactor Coolant System pressure boundary damage and

b. The core remains subcritical after accident transients.

As such, the shutdown CEA insertion limits affect safety analyses involving core reactivity, ejected CEA worth, and SDM (Ref. 3).

The shutdown CEA insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The shutdown CEAs must be within their insertion limits any time the reactor is critical or approaching criticality. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip.

BASES

APPLICABILITY

The shutdown CEAs must be within their insertion limits, with the reactor in MODES 1 and 2. The Applicability in MODE 2 begins anytime any regulating CEA is not fully inserted. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. In MODE 3, 4, 5, or 6, the shutdown CEAs are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM requirements in MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6.

This LCO has been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.4. This SR verifies the freedom of the CEAs to move, and requires the shutdown CEAs to move below the LCO limits, which would normally violate the LCO.

ACTIONS

A.1

Prior to entering this condition, the shutdown CEAs were fully withdrawn. If a shutdown CEA(s) is then inserted into the core, its potential negative reactivity is added to the core as it is inserted.

~~If the CEA(s) is not restored to within limits within 1 hour, then an additional 1 hour is allowed for restoring the CEA(s) to within limits.~~ The 2 hour total Completion Time allows the operator adequate time to adjust the CEA(s) in an orderly manner and is consistent with the required Completion Times in LCO 3.1.4, "Control Element Assembly (CEA) Alignment." 1

B.1

When Required Action A.1 ~~or A.2~~ cannot be met or completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems. 1

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown CEAs are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown CEAs will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip. This SR and Frequency ensure that the shutdown CEAs are withdrawn before the regulating CEAs are withdrawn during a unit startup.

BASES

SURVEILLANCE REQUIREMENTS (continued)

[Since the shutdown CEAs are positioned manually by the control room operator, verification of shutdown CEA position at a Frequency of 12 hours is adequate to ensure that the shutdown CEAs are within their insertion limits. Also, the 12 hour Frequency takes into account other information available to the operator in the control room for the purpose of monitoring the status of the shutdown CEAs. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.
2. 10 CFR 50.46.
3. U FSAR, Section [4.2]. 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.5, BASES, SHUTDOWN CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The ISTS Bases states that the shutdown CEAs are controlled manually or automatically by the control room operator. Automatic control of CEAs is not a design feature for PSL Unit 1 and Unit 2. Therefore, the text “or automatic” is deleted.

4. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.5, SHUTDOWN CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 6

3.1.6 Regulating Control Element Assembly (CEA) Insertion Limits

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

REGULATING CEA INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

LCO 3.1.6 3.1.3.6 The [power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and the] regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits specified in the COLR (regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches) with CEA insertion [Regulating CEA groups inserted] between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits restricted to: A04 LA01

Condition B and C

Condition B a. ≤ [>] 4 hours per 24 hour interval,

Condition C b. ≤ [>] 5 Effective Full Power Days [(EFPD)] per 30 [EFPD] Effective Full Power Day interval, and

Condition C c. ≤ [>] 14 [EFPD] Effective Full Power Days per [365 EFPD] calendar year.

Applicability **APPLICABILITY**: MODES 1* and 2*#. M01 A02

ACTION:

Condition A a. With the regulating CEA groups inserted beyond the Power Dependent Insertion Limits, except for surveillance testing pursuant to Specification 4.1.3.1.2, within two hours either:

Applicability Note [This LCO is not applicable while performing SR 3.1.4.4.]

Required Action A.1 1. Restore the regulating CEA groups to within the limits, or

Required Action A.2 2. Reduce THERMAL POWER to less than or equal to [the] that fraction of [RTP] RATED THERMAL POWER which is allowed by the CEA group position and insertion limits specified in the COLR.

ACTION B b. With the regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits for intervals > 4 hours per 24 hour interval, except during operation pursuant to the provisions of ACTION items c. and d. of Specification 3.1.3.1, operation may proceed provided either: [within 15 minutes] A03 L01

Required Action B.1 1. [Verify] The Short Term Steady State Insertion Limits are not exceeded, or

Required Action B.2 2. [Restrict] Any subsequent increase[s] in THERMAL POWER is restricted to ≤ 5% of [RTP] RATED THERMAL POWER per hour.

* See Special Test Exception 3.10.2 and 3.10.5. A02

\# With K_{eff} ≥ 1.0. M01

REACTIVITY CONTROL SYSTEMS

REGULATING CEA INSERTION LIMITS (Continued)

LIMITING CONDITION FOR OPERATION

ACTION C

c. With the regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits for intervals > 5 EFPD per 30 EFPD interval or > 14 EFPD per calendar year, except during operations pursuant to the provisions of ACTION items c. and d. of Specification 3.1.3.1, either:

effective full power days ( ) 365 EFPD. A03

Required Action C.1 — 1. Restore the regulating CEA groups to within the Long Term Steady State Insertion Limits within two hours, or

Required Action E.1 — 2. Be in HOT STANDBY MODE 3 within 6 hours.

SR 3.1.6.1 NOTE — NOTE Not required to be performed until 12 hours after entry into MODE 2. L02

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1 — 4.1.3.6 The position of Verify each regulating CEA group position shall be determined to be is within its the Power Dependent Insertion Limits in accordance with the Surveillance Frequency Control Program except during time intervals when the PDIL Auctioneer Alarm Circuit is inoperable, then verify the individual CEA positions at least once per 4 hours.

ACTION D Required Action D.1 — thereafter

SR 3.1.6.2 — Verify The accumulated times during which the regulating CEA groups are inserted between beyond the Long Term Steady State Insertion Limits and the but within the Power Dependent Insertion Limits shall be determined in accordance with the Surveillance Frequency Control Program.

1 hour AND Perform SR 3.1.6.1. M02

SR 3.1.6.3 — Verify PDIL alarm circuit is OPERABLE in accordance with the Surveillance Frequency Control Program. A04

~~DELETED~~

3/4.1 REACTIVITY CONTROL SYSTEMS

A01

3/4.1.1 BORATION CONTROL

See ITS 3.1.1

SHUTDOWN MARGIN - T_{avg} > 200 °F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

Applicability **APPLICABILITY:** MODES 1, 2*, 3 and 4.

ACTION:

With the SHUTDOWN MARGIN not within limits immediately initiate and continue boration at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

SR 3.1.6.1 b. ~~When in MODES 1 or 2#,~~ in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

~~c. When in MODE 2## at least once during CEA withdrawal and in accordance with the Surveillance Frequency Control Program until the reactor is critical.~~ L03

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6.

See ITS 3.1.1

~~* See Special Test Exception 3.10.1.~~

~~# With K_{eff} ≥ 1.0.~~

~~## With K_{eff} < 1.0.~~

A02

See ITS 3.2.1

3/4.2 POWER DISTRIBUTION LIMITS

LINEAR HEAT RATE

LIMITING CONDITION FOR OPERATION

3.2.1 The linear heat rate shall not exceed the limits specified in the COLR.

APPLICABILITY: MODE 1.

ACTION:

With the linear heat rate exceeding its limits, as indicated by four or more coincident incore channels or by the AXIAL SHAPE INDEX outside of the power dependent control limits of COLR Figure 3.2-2, within 15 minutes initiate corrective action to reduce the linear heat rate to within the limits and either:

a. Restore the linear heat rate to within its limits within one hour, or

b. Be in HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The provisions of Specification 4.0.4 are not applicable.

4.2.1.2 The linear heat rate shall be determined to be within its limits by continuously monitoring the core power distribution with either the excore detector monitoring system or wi th the incore detector monitoring system.

4.2.1.3 Excore Detector Monitoring System – The excore detector monitoring system may be used for monitoring the linear heat rate by:

SR 3.1.6.1
SR 3.1.6.2

a. Verifying in accordance with the Surveillance Frequency Control Program that the ~~full length~~ CEAs are withdrawn to and maintained at or beyond the Long Term Steady State Insertion Limit of Specification 3.1.3.6. A05

b. Verifying in accordance with the Surveillance Frequency Control Program that the AXIAL SHAPE INDEX alarm setpoints are adjusted to within the limits shown on COLR Figure 3.2-2.

REACTIVITY CONTROL SYSTEMS

REGULATING CEA INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

LCO 3.1.6 ~~3.1.3.6~~ The [power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and the] regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits ~~shown on~~ [specified in the] COLR ~~Figure 3.1-2 (regulating CEAs are considered to be fully withdrawn in accordance with COLR Figure 3.1-2 when withdrawn to greater than or equal to 129.0 inches), with CEA insertion~~ between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits ~~restricted to:~~ A04 LA01

Condition B and C [Regulating CEA groups inserted] [>]

Condition B ~~a. Less than or equal to~~ 4 hours per 24 hour interval,

Condition C ~~b. Less than or equal to~~ 5 Effective Full Power Days [(EFPD)] per 30 [EFPD] ~~Effective Full Power Day~~ interval~~, and~~

Condition C ~~c. Less than or equal to~~ 14 [EFPD] ~~Effective Full Power Days~~ per [365 EFPD] ~~calendar year~~.

Applicability **APPLICABILITY**: MODES 1~~*~~ and 2~~*#~~. M01 A02

ACTION:

Condition A ~~a. With the~~ regulating CEA groups inserted beyond the Power Dependent Insertion Limits~~, except for surveillance testing pursuant to Specification 4.1.3.1.2,~~ within 2 hours ~~either:~~

Applicability Note [This LCO is not applicable while performing SR 3.1.4.4.]

Required Action A.1 ~~1.~~ Restore ~~the~~ regulating CEA groups to within ~~the~~ limits~~, or~~

Required Action A.2 ~~2.~~ Reduce THERMAL POWER to less than or equal to ~~that~~ [the] fraction of [RTP] ~~RATED THERMAL POWER which is~~ allowed by the CEA group position and insertion limits ~~specified~~ in the COLR.

ACTION B ~~b. With the~~ regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits for ~~intervals greater than~~ 4 hours per 24 hour interval~~, operation may proceed provided either:~~ [within 15 minutes] L01

Required Action B.1 ~~1.~~ [Verify] ~~The~~ Short Term Steady State Insertion Limits are not exceeded~~, or~~

Required Action B.2 ~~2.~~ [Restrict] ~~Any subsequent~~ increase[s] in THERMAL POWER ~~is restricted to less than or equal~~ to [≤] 5% [RTP] ~~of RATED THERMAL POWER~~ per hour.

~~* See Special Test Exception 3.10.2, 3.10.4 and 3.10.5.~~ A02

~~# With K_{eff} greater than or equal to 1.0.~~ M01

REACTIVITY CONTROL SYSTEMS

ACTION: (Continued)

ACTION C

c. With the regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits for intervals greater than 5 EFPD per 30 EFPD interval or greater than 14 EFPD per calendar year, either:

[>] [effective full power days (] [)] [>] [365 EFPD.]

Required Action C.1

1. Restore the regulating [CEA] groups to within the Long Term Steady State Insertion Limits within 2 hours, or

Required Action E.1

2. Be in at least HOT STANDBY [MODE 3] within 6 hours.

SR 3.1.6.1 NOTE — NOTE Not required to be performed until 12 hours after entry into MODE 2. — L02

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1 — 4.1.3.6 The position of [Verify] each regulating CEA group [position] shall be determined to be [is] within [its] the Power Dependent Insertion Limits in accordance with the Surveillance Frequency Control Program except during time intervals when the PDIL Auctioneer Alarm Circuit is inoperable, then verify the individual CEA positions at least once per 4 hours.

ACTION D, Required Action D.1 — [thereafter] [1 hour AND] [Perform SR 3.1.6.1.] M02

SR 3.1.6.2 — [Verify] The accumulated times during which the regulating CEA groups are inserted beyond the Long Term Steady State Insertion Limits but within the Power Dependent Insertion Limits shall be determined in accordance with the Surveillance Frequency Control Program.

SR 3.1.6.3 — Verify PDIL alarm circuit is OPERABLE in accordance with the Surveillance Frequency Control Program. — A04

A01

ITS **3/4.1 REACTIVITY CONTROL SYSTEMS**

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} GREATER THAN 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

Applicability **APPLICABILITY:** MODES 1, 2*, 3 and 4.

See ITS 3.1.1

ACTION:

With the SHUTDOWN MARGIN outside the COLR limits, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

See ITS 3.1.4

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is not fully inserted, and is immovable as a result of excessive friction or mechanical interference or is known to be untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 1.1

SR 3.1.6.1 b. ~~When in MODE 1 or MODE 2 with Keff greater than or equal to 1.0,~~ in accordance with the Surveillance Frequency Control Program by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

~~c. When in MODE 2 with Keff less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical CEA position is within the limits of Specification 3.1.3.6.~~ L03

~~* See Special Test Exception 3.10.1~~. A02

3/4.2 POWER DISTRIBUTION LIMITS

See ITS 3.2.1

3/4 2.1 LINEAR HEAT RATE

LIMITING CONDITION FOR OPERATION

3.2.1 The linear heat rate shall not exceed the limits specified in the COLR.

APPLICABILITY: MODE 1.

ACTION:

With the linear heat rate exceeding its limits, as indicated by four or more coincident incore channels or by the AXIAL SHAPE INDEX outside of the power dependent control limits of COLR Figure 3.2-2, within 15 minutes initiate corrective action to reduce the linear heat rate to within the limits and either:

a. Restore the linear heat rate to within its limits within 1 hour, or

b. Be in at least HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The provisions of Specification 4.0.4 are not applicable.

4.2.1.2 The linear heat rate shall be determined to be within its limits by continuously monitoring the core power distribution with either the excore detector monitoring system or with the incore detector monitoring system.

4.2.1.3 Excore Detector Monitoring System – The excore detector monitoring system may be used for monitoring the linear heat rate by:

SR 3.1.6.1 SR 3.1.6.2

a. Verifying in accordance with the Surveillance Frequency Control Program that the ~~full-length~~ CEAs are withdrawn to and maintained at or beyond the Long Term Steady State Insertion Limit of Specification 3.1.3.6. A05

b. Verifying in accordance with the Surveillance Frequency Control Program that the AXIAL SHAPE INDEX alarm setpoints are adjusted to within the limits shown on COLR Figure 3.2-2.

DISCUSSION OF CHANGES
ITS 3.1.6, REGULATING CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.3.6 Applicability is MODES 1 and 2 with a footnote (footnote *) for MODE 2 stating "See Special Test Exception 3.10.2 and 3.10.5," and a footnote (footnote #) for MODE 2 stating "With $K_{eff} \geq 1.0$." CTS 3.1.1.1 Applicability is, in part, MODE 2 with a footnote (footnote *) stating "See Special Test Exception 3.10.1," and Unit 1 CTS 4.1.1.1.1.b and c contain footnotes (footnotes # and ##) for MODE 2 stating "With $K_{eff} \geq 1.0$," and "With $K_{eff} < 1.0$," respectively. ITS 3.1.6 does not contain the footnotes or a reference to the Special Test Exception or reference to the K_{eff}. This changes the CTS by not including footnote * and footnotes # and ## in the ITS.

The purpose of the footnote references is to alert the user that conditions exist that may modify the Applicability of the Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS. See DOC M01 for additional discussion of change for the footnote # for MODE 2 stating "With $K_{eff} \geq 1.0$."

A03 **Unit 1 only:** PSL Unit 1 CTS 3.1.3.6 ACTION b. states, in part, that power operation may proceed provided ACTIONS b.1or b.2 are met, " except during operation pursuant to the provisions of ACTION items c. and d. of Specification 3.1.3.1." PSL Unit 1 CTS 3.1.3.6 ACTION c. states, in part, that power operation may proceed provided ACTIONS c.1 or c.2 are met, "except during operation pursuant to the provisions of ACTION items c. and d. of Specification 3.1.3.1." ITS 3.1.6 does not provide a reference to ITS 3.1.4.

The purpose of the CTS statement "except during operation pursuant to the provisions of ACTION items c. and d. of Specification 3.1.3.1." is to provide a reference to another Specification that may apply under these conditions. This changes the CTS by not including the cross-reference in the ITS. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A04 CTS 4.1.3.6 states that with the Power Dependent Insertion Limits (PDIL) alarm circuit inoperable, verification of the individual CEA positions is required once per 4 hours. However, the PDIL alarm circuit operability is not specifically addressed. CTS does not require that the PDIL alarm circuit be OPERABLE in the LCO statement, and CTS does not provide a Surveillance to verify the PDIL alarm circuit is OPERABLE. ITS 3.1.6 LCO requires the PDIL alarm circuit be OPERABLE, and ITS SR 3.1.6.3 verifies the PDIL alarm circuit is OPERABLE. the LCO statement, and CTS does not provide a Surveillance to verify the PDIL alarm circuit is OPERABLE.

The purpose of CTS 4.1.3.6 is to ensure that with the Power Dependent Insertion Limits (PDIL) alarm circuit is OPERABLE, since CTS requires ACTIONS be taken if the PDIL alarm circuit is inoperable. To ensure the position of the individual CEA positions is within limits to avoid improper CEA alignment, it is necessary to initially verify the individual CEA positions within one hour. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A05 PSL Unit 1 CTS 4.2.1.3.a and PSL Unit 2 CTS 4.2.1.3.a include the descriptor “full length” in reference to CEA(s). The purpose of the CTS 3.1.3.1 descriptor is to distinguish between full length and partial length CEA(s). PSL Unit 1 and PSL Unit 2 no longer use partial length CEA(s). Therefore, since partial length CEA(s) are no longer a design feature for PSL Unit 1 and PSL Unit 2, the “full length” descriptors used for CEA(s) are deleted.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.1.3.6 is applicable in MODES 1 and 2 with $k_{eff} \geq 1.0$. MODE 2 is modified by CTS 3.1.3.6 footnote [#]. ITS 3.1.6 is applicable in MODES 1 and 2. This changes the CTS by expanding the Applicability from MODE 2 with the reactor critical to all of MODE 2.

The purpose of CTS 3.1.3.6 is to maintain the regulating CEA sequence, overlap, and physical insertion limits with the reactor in MODES 1 and 2 with the reactor critical. These limits must be maintained, since they preserve power distribution, ejected CEA worth, SDM, and reactivity rate insertion assumptions. This change is acceptable because applying the requirement prior to bringing the reactor critical ensures The limits on regulating CEAs sequence, overlap, and physical insertion, as defined in the COLR, are maintained and serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected CEA worth is maintained, and ensuring adequate negative reactivity insertion on trip. This change is designated as more restrictive because it increases the conditions under which Technical Specification controls will be applied.

M02 CTS 4.1.3.6 states that with the Power Dependent Insertion Limits (PDIL) alarm circuit inoperable, verification of the individual CEA positions is required once per 4 hours. ITS 3.1.6 ACTION D requires with the PDIL alarm circuit inoperable, verification of the individual CEA positions must be completed within 1 hour and once per 4 hours thereafter. This changes the CTS by requiring the initial verification of the individual CEA positions be performed within 1 hour.

The purpose of CTS 4.1.3.6 is to ensure that with the Power Dependent Insertion Limits (PDIL) alarm circuit inoperable, improper CEA alignments are identified before unacceptable flux distributions occur. To ensure the position of the individual CEA positions is within limits to avoid improper CEA alignment, it is necessary to initially verify the individual CEA positions within one hour. This change is designated as more restrictive because it increases the conditions under which Technical Specification controls will be applied.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 (Type 1 – Removing Details of System Design and System Description, Including Design Limits) CTS 3.1.3.6 LCO states that regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches. ITS LCO 3.1.6 does not retain this detail. This changes the CTS by relocating the details that regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches to the Bases.

The removal of these details, that are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for the regulating CEA groups to be limited to the withdrawal sequence and to the insertion limits specified in the COLR) with CEA insertion between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.3.6 ACTION b. states that with the regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits for intervals > 4 hours per 24 hour interval, operation may proceed provided either (CTS ACTION b.1) the Short Term Steady State Insertion Limits are not exceeded, or (CTS ACTION b.2) any subsequent increase in THERMAL POWER is restricted to < 5% of RATED THERMAL POWER per hour. The CTS completion time is assumed to be “immediately” since a Completion Time for ACTION b. is not provided. ITS 3.1.6, Required Action B.1 requires verification within 15 minutes that the Short Term Steady State Insertion Limits are not exceeded. ITS 3.1.6 Required Action B.2 requires that within 15 minutes any subsequent increase in THERMAL POWER is restricted to < 5% of RATED THERMAL POWER per hour. This changes the CTS by relaxing the Completion Time from "immediately" to 15 minutes.

The purpose of CTS 3.1.2.6 ACTION b. is to ensure peaking factors remain within limits with the regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Power Dependent Insertion Limits for extended intervals. If the CEAs are inserted between the long term steady state insertion limits and the transient insertion limits for intervals > 4 hours per 24 hour period, and the short term steady state insertions are exceeded, peaking factors can develop that are of immediate concern. Fifteen minutes provides adequate time for the operator to verify if the short term steady state insertion limits are exceeded. Experience has shown that rapid power increases in areas of the core, in which the flux has been depressed, can result in fuel damage, as the LHR in those areas rapidly increases. Restricting the rate of THERMAL POWER increases to ≤ 5% RTP per hour, following CEA insertion beyond the long term steady state insertion limits, ensures the power transients experienced by the fuel will not result in fuel failure

This change is acceptable because the Completion Time is consistent with safe operation under the specific Condition, considering the operability status of the redundant systems of required features, the capacity and capability of remaining features, and the low probability of a DBA occurring during the allowed Completion Time. This ITS Completion Time of 15 minutes is adequate for an operator to perform the verification and implement measures to restrict the rate of THERMAL POWER increases.

This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L02 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.1.3.6 requires verification of regulating CEA groups position and regulating CEA groups time Inside Long Term Steady State Insertion Limits in accordance with the Surveillance Frequency Control Program (SFCP). The SFCP frequencies are at least once per 12 hours and at least per 24 hours, respectively. ITS SR 3.1.6.1 provides a Note that states “Not required to be performed until 12 hours after entry into MODE 2” indicating that entry is allowed into MODE 2 for 12 hours without having performed the SR. This is necessary, since the unit must be in the applicable MODES in order to perform Surveillances that demonstrate the LCO limits are met. CTS does not contain this Note.

The purpose of CTS 4.1.3.6 is to verify regulating CEA groups position and regulating CEA groups time Inside Long Term Steady State Insertion Limits in accordance with the Surveillance Frequency Control Program (SFCP). ITS 3.1.6 Note indicates that entry is allowed into MODE 2 for 12 hours without having performed the SR. This is necessary, since the unit must be in MODE 2 in order to perform the Surveillance that verifies each regulating CEA group position is within its insertion limits. CTS does not contain this Note.

This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

L03 (*Category 5 – Deletion of Surveillance Requirement*) CTS 4.1.1.1.1.c requires verification of SDM, when in MODE 2 with keff < 1.0, at least once during CEA withdrawal and in accordance with the Surveillance Frequency Control Program until the reactor is critical. ITS 3.1.6 does not require an explicit requirement to verify SDM in MODE 2 with keff < 1.0. This changes the CTS by eliminating the explicit statement that a SDM verification is required to be performed in MODE 2 with keff < 1.0.

The purpose of CTS 4.1.1.1.1.c is to verify SDM is within the required limit more frequently from entry into MODE 2 until the reactor is critical. Limits on shutdown and regulating CEA insertion ensure SDM limits are preserved. This change is acceptable because the shutdown CEAs must be withdrawn to ≥ 129 inches and the regulating CEAs are required to be within the insertion limits specified in the COLR upon entry into MODE 2 per the requirements of CTS 3.0.1 (ITS LCO 3.0.1) and CTS 3.0.4 (ITS LCO 3.0.4). Therefore, it is unnecessary to verify SDM more frequently in MODE 2 until the reactor is critical. ITS SR 3.1.1.1 requires SDM to verified in accordance with the Surveillance Frequency Control Program while in MODE 3 and, prior to entry into MODE 2, SR 3.1.5.1 and 3.1.6.1 (i.e., verifying shutdown and regulating CEAs are within the required insertion limits) must be met per ITS SR 3.0.4. Thus, there is continued confidence that SDM will be within limits during a plant startup in MODE 2 until the reactor is critical. The surveillance testing associated with SDM and CEA insertion limits is considered adequate to assure, pursuant to the requirements of 10 CFR 50.36(c)(3), that facility operation will be within safety limits and that the limiting condition for operation associated with the shutdown and regulating CEA insertion limits will be met. This change is designated as less restrictive because a Surveillance that was required in the CTS will not be performed in the ITS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3

3.1.6 Regulating Control Element Assembly (CEA) Insertion Limits (Analog)

LCO 3.1.3.6

LCO 3.1.6 The power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and the regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits specified in the COLR.

Applicability

APPLICABILITY: MODES 1 and 2.

Action a.

--NOTE--
This LCO is not applicable while performing SR 3.1.4.4 [or during reactor power cutback operation].

2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Regulating CEA groups inserted beyond the transient insertion limit.	A.1 Restore regulating CEA groups to within limits. OR A.2 Reduce THERMAL POWER to less than or equal to the fraction of RTP allowed by the CEA group position and insertion limits specified in the COLR.	2 hours 2 hours
B. Regulating CEA groups inserted between the long term steady state insertion limit and the transient insertion limit for > 4 hours per 24 hour interval.	B.1 Verify short term steady state insertion limits are not exceeded. OR B.2 Restrict increases in THERMAL POWER to ≤ 5% RTP per hour.	15 minutes 15 minutes

Action a., a.1

Action a.2

power dependent

1

Action b., b.1

Action b.2

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1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action C, c.1 — C. Regulating CEA groups inserted between the long term steady state insertion limit and the transient [power dependent] insertion limit for intervals > 5 effective full power days (EFPD) per 30 EFPD interval or > 14 EFPD per 365 EFPD.	C.1 Restore regulating CEA groups to within limits.	2 hours
D. PDIL alarm circuit inoperable.	D.1 Perform SR 3.1.6.1.	1 hour AND Once per 4 hours thereafter
Action c.2 — E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
SR 4.1.3.6 SR 4.1.1.1.1.b	SR 3.1.6.1	------------------------------NOTE------------------------------ Not required to be performed until 12 hours after entry into MODE 2. --- Verify each regulating CEA group position is within its insertion limits.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
SR 4.1.3.6	SR 3.1.6.2	Verify the accumulated times during which the regulating CEA groups are inserted beyond the steady state insertion limits but within the transient insertion limits. power dependent	[24 hours OR In accordance with the Surveillance Frequency Control Program]	2
SR 4.1.3.6	SR 3.1.6.3	Verify PDIL alarm circuit is OPERABLE.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2

3.1 REACTIVITY CONTROL SYSTEMS (Analog) 3

3.1.6 Regulating Control Element Assembly (CEA) Insertion Limits (Analog)

LCO 3.1.3.6 LCO 3.1.6 The power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and the regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits specified in the COLR.

Applicability APPLICABILITY: MODES 1 and 2.

Action a.

--NOTE--
This LCO is not applicable while performing SR 3.1.4.4 [or during reactor power cutback operation]. 2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a., a.1 A. Regulating CEA groups inserted beyond the ~~transient~~ power dependent insertion limit.	A.1 Restore regulating CEA groups to within limits. <u>OR</u> Action a.2 A.2 Reduce THERMAL POWER to less than or equal to the fraction of RTP allowed by the CEA group position and insertion limits specified in the COLR.	2 hours 2 hours
Action b., b.1 B. Regulating CEA groups inserted between the long term steady state insertion limit and the ~~transient~~ power dependent insertion limit for > 4 hours per 24 hour interval.	B.1 Verify short term steady state insertion limits are not exceeded. <u>OR</u> Action b.2 B.2 Restrict increases in THERMAL POWER to $\leq$ 5% RTP per hour.	15 minutes 15 minutes

1

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
power dependent Action C, c.1 C. Regulating CEA groups inserted between the long term steady state insertion limit and the transient insertion limit for intervals > 5 effective full power days (EFPD) per 30 EFPD interval or > 14 EFPD per 365 EFPD.	C.1	Restore regulating CEA groups to within limits.	2 hours 1
D. PDIL alarm circuit inoperable.	D.1	Perform SR 3.1.6.1.	1 hour AND Once per 4 hours thereafter
Action c.2 E. Required Action and associated Completion Time not met.	E.1	Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
SR 4.1.3.6 SR 4.1.1.1.1.b	SR 3.1.6.1	------------------------------NOTE------------------------------ Not required to be performed until 12 hours after entry into MODE 2. --- Verify each regulating CEA group position is within its insertion limits.	[12 hours OR In accordance with the Surveillance Frequency Control Program] (2)
SR 4.1.3.6	SR 3.1.6.2	Verify the accumulated times during which the regulating CEA groups are inserted beyond the steady state insertion limits but within the transient (power dependent) insertion limits.	[24 hours OR In accordance with the Surveillance Frequency Control Program] (2)
SR 4.1.3.6	SR 3.1.6.3	Verify PDIL alarm circuit is OPERABLE.	[31 days OR In accordance with the Surveillance Frequency Control Program] (2)

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.6, REGULATING CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

 6

B 3.1 REACTIVITY CONTROL SYSTEMS (Analog) 6

B 3.1.6 Regulating Control Element Assembly (CEA) Insertion Limits (Analog)

BASES

BACKGROUND

The insertion limits of the regulating Control Element Assemblies (CEAs) are initial assumptions in all safety analyses that assume CEA insertion upon reactor trip. The insertion limits directly affect core power distributions, assumptions of available SDM, and initial reactivity insertion rate. The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," and GDC 26, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2).

Limits on regulating CEA insertion have been established, and all CEA positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking, ejected CEA worth, reactivity insertion rate, and SDM limits are preserved.

The regulating CEA groups operate with a predetermined amount of position overlap, in order to approximate a linear relation between CEA worth and CEA position (integral CEA worth). The regulating CEA groups are withdrawn and operate in a predetermined sequence. The group sequence and overlap limits are specified in the COLR.

The regulating CEAs are used for precise reactivity control of the reactor. The positions of the regulating CEAs are manually controlled. They are capable of adding reactivity very quickly (compared to borating or diluting).

The power density at any point in the core must be limited to maintain specified acceptable fuel design limits, including limits that preserve the criteria specified in 10 CFR 50.46 (Ref. 2). Together, LCO 3.1.6, [3] LCO 3.2.4, "AZIMUTHAL POWER TILT (Tq)," and LCO 3.2.5 [4], "AXIAL SHAPE INDEX (ASI)," provide limits on control component operation and on monitored process variables to ensure the core operates within the linear heat rate (LCO 3.2.1, "Linear Heat Rate (LHR)"), total planar radial peaking factor (F^T_{XY}) (LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY})"), and total integrated radial peaking factor (F^T_r) (LCO 3.2.3, "Total Integrated Radial Peaking Factor (F^T_r)") limits in the COLR. Operation within the LHR limits given in the COLR prevents power peaks that would exceed the loss of coolant accident (LOCA) limits derived by the Emergency Core Cooling System analysis. Operation within the F^T_{XY} and 3 3 3

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BASES

BACKGROUND (continued)

F_r^T limits given in the COLR prevents departure from nucleate boiling (DNB) during a loss of forced reactor coolant flow accident. In addition to the LHR, F_{XY}^T, and F^T_r limits, certain reactivity limits are preserved by regulating CEA insertion limits. The regulating CEA insertion limits also restrict the ejected CEA worth to the values assumed in the safety analysis and preserve the minimum required SDM in MODES 1 and 2. 3

The establishment of limiting safety system settings and LCOs requires that the expected long and short term behavior of the radial peaking factors be determined. The long term behavior relates to the variation of the steady state radial peaking factors with core burnup and is affected by the amount of CEA insertion assumed, the portion of a burnup cycle over which such insertion is assumed, and the expected power level variation throughout the cycle. The short term behavior relates to transient perturbations to the steady state radial peaks, due to radial xenon redistribution. The magnitudes of such perturbations depend upon the expected use of the CEAs during anticipated power reductions and load maneuvering. Analyses are performed, based on the expected mode of operation of the Nuclear Steam Supply System (base loaded, maneuvering, etc.). From these analyses, CEA insertions are determined and a consistent set of radial peaking factors defined. The long term steady state and short term insertion limits are determined, based upon the assumed mode of operation used in the analyses, and provide a means of preserving the assumption on CEA insertions used. The long and short term insertion limits of LCO 3.1.6 are specified for the plant, which has been designed primarily for base loaded operation, but has the ability to accommodate a limited amount of load maneuvering.

The regulating CEA insertion and alignment limits are process variables that together characterize and control the three dimensional power distribution of the reactor core. Additionally, the regulating bank insertion limits control the reactivity that could be added in the event of a CEA ejection accident, and the shutdown and regulating bank insertion limits ensure the required SDM is maintained.

Operation within the subject LCO limits will prevent fuel cladding failures that would breach the primary fission product barrier and release fission products to the reactor coolant in the event of a LOCA, loss of flow, ejected CEA, or other accident requiring termination by a Reactor Protection System trip function.

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BASES

APPLICABLE SAFETY ANALYSES

The fuel cladding must not sustain damage as a result of normal operation (Condition I) and anticipated operational occurrences (Condition II). The acceptance criteria for the regulating CEA insertion, ASI, and T_q LCOs are such as to preclude core power distributions from occurring that would violate the following fuel design criteria:

a. During a large break LOCA, the peak cladding temperature must not exceed a limit of 2200°F, 10 CFR 50.46 (Ref. 2),

b. During a loss of forced reactor coolant flow accident, there must be at least a 95% probability at a 95% confidence level (the 95/95 DNB criterion) that the hot fuel CEA in the core does not experience a DNB condition,

c. During an ejected CEA accident, the fission energy input to the fuel must not exceed 2~~8~~0 cal/gm (Ref. 3), and 1
3

d. The CEAs must be capable of shutting down the reactor with a minimum required SDM, with the highest worth CEA stuck fully withdrawn, GDC 26 (Ref. 1).

Regulating CEA position, ASI, and T_q are process variables that together characterize and control the three dimensional power distribution of the reactor core.

Fuel cladding damage does not occur when the core is operated outside these LCOs during normal operation. However, fuel cladding damage could result, should an accident occur with simultaneous violation of one or more of these LCOs. Changes in the power distribution can cause increased power peaking and corresponding increased local LHRs.

The SDM requirement is ensured by limiting the regulating and shutdown CEA insertion limits, so that the allowable inserted worth of the CEAs is such that sufficient reactivity is available to shut down the reactor to hot zero power. SDM assumes the maximum worth CEA remains fully withdrawn upon trip (Ref. 4). 1
3

The most limiting SDM requirements for MODE 1 and 2 conditions at BOC are determined by the requirements of several transients, e.g., loss of flow, seized rotor, etc. However, the most limiting SDM requirements for MODES 1 and 2 at EOC come from just one transient, Steam Line Break (SLB). The requirements of the SLB event at EOC for both the full power and no load conditions are significantly larger than those of any other event at that time in cycle and, also, considerably larger than the most limiting requirements at BOC.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Although the most limiting SDM requirements at EOC are much larger than those at BOC, the available SDMs obtained via the scramming of the CEAs are also substantially larger due to the much lower boron concentration at EOC. To verify that adequate SDMs are available throughout the cycle to satisfy the changing requirements, calculations are performed at both BOC and EOC. It has been determined that calculations at these two times in cycle are sufficient since the differences between available SDMs and the limiting SDM requirements are the smallest at these times in cycle. The measurement of CEA bank worth performed as part of the Startup Testing Program demonstrates that the core has the expected shutdown capability. Consequently, adheraence to LCOs 3.1.5 and 3.1.6 provides assurance that the available SDMs at any time in cycle will exceed the limiting SDM requirements at that time in cycle. 1

Operation at the insertion limits or ASI limits may approach the maximum allowable linear heat generation rate or peaking factor, with the allowed T_q present. Operation at the insertion limit may also indicate the maximum ejected CEA worth could be equal to the limiting value in fuel cycles that have sufficiently high ejected CEA worths.

The regulating and shutdown CEA insertion limits ensure that safety analyses assumptions for reactivity insertion rate, SDM, ejected CEA worth, and power distribution peaking factors are preserved (Ref. 5 3). 1

The regulating CEA insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The limits on regulating CEAs sequence, overlap, and physical insertion, as defined in the COLR, must be maintained because they serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected CEA worth is maintained, and ensuring adequate negative reactivity insertion on trip. The overlap between regulating banks provides more uniform rates of reactivity insertion and withdrawal and is imposed to maintain acceptable power peaking during regulating CEA motion. Regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches 4

The power dependent insertion limit (PDIL) alarm circuit is required to be OPERABLE for notification that the CEAs are outside the required insertion limits. When the PDIL alarm circuit is inoperable, the verification of CEA positions is increased to ensure improper CEA alignment is identified before unacceptable flux distribution occurs.

BASES

APPLICABILITY

The regulating CEA sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2. These limits must be maintained, since they preserve the assumed power distribution, ejected CEA worth, SDM, and reactivity rate insertion assumptions. Applicability in MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected CEA worth assumptions would be exceeded in these MODES. SDM is preserved in MODES 3, 4, and 5 by adjustments to the soluble boron concentration.

This LCO has been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.4. This SR verifies the freedom of the CEAs to move, and requires the regulating CEAs to move below the LCO limits, which would normally violate the LCO. ~~The Note also allows the LCO to be not applicable during reactor power cutback operation, which inserts a selected CEA group (usually group 5) during loss of load events.~~ 5

ACTIONS

A.1 and A.2

Operation beyond the transient insertion limit may result in a loss of SDM and excessive peaking factors. The transient insertion limit should not be violated during normal operation; this violation, however, may occur during transients when the operator is manually controlling the CEAs in response to changing plant conditions. When the regulating groups are inserted beyond the transient insertion limits, actions must be taken to either withdraw the regulating groups beyond the limits or to reduce THERMAL POWER to less than or equal to that allowed for the actual CEA insertion limit. Two hours provides a reasonable time to accomplish this, allowing the operator to deal with current plant conditions while limiting peaking factors to acceptable levels.

B.1 and B.2

If the CEAs are inserted between the long term steady state insertion limits and the transient insertion limits for intervals > 4 hours per 24 hour period, and the short term steady state insertions are exceeded, peaking factors can develop that are of immediate concern (Ref. ~~6~~ 3). 1

Verifying the short term steady state insertion limits are not exceeded ensures that the peaking factors that do develop are within those allowed for continued operation. Fifteen minutes provides adequate time for the operator to verify if the short term steady state insertion limits are exceeded.

6

BASES

ACTIONS (continued)

Experience has shown that rapid power increases in areas of the core, in which the flux has been depressed, can result in fuel damage, as the LHR in those areas rapidly increases. Restricting the rate of THERMAL POWER increases to ≤ 5% RTP per hour, following CEA insertion beyond the long term steady state insertion limits, ensures the power transients experienced by the fuel will not result in fuel failure (Ref. ~~7~~ 3). 1

C.1

With the regulating CEAs inserted between the long term steady state insertion limit and the ~~transient~~ power dependent insertion limit, and with the core approaching the 5 effective full power days (EFPD) per 30 EFPD or 14 EFPD per 365 EFPD limits, the core approaches the acceptable limits placed on operation with flux patterns outside those assumed in the long term burnup assumptions (Ref. ~~8~~ 3). In this case, the CEAs must be returned to within the long term steady state insertion limits, or the core must be placed in a condition in which the abnormal fuel burnup cannot continue. A Completion Time of 2 hours is allotted to return the CEAs to within the long term steady state insertion limits. 1 1

The required Completion Time of 2 hours from initial discovery of a regulating CEA group outside the limits until its restoration to within the long term steady state limits, shown on the figures in the COLR, allows sufficient time for borated water to enter the Reactor Coolant System from the chemical addition and makeup systems, and ~~to cause~~ allowing the regulating CEAs to ~~withdraw~~ be withdrawn to the acceptable region. It is reasonable to continue operation for 2 hours after it is discovered that the 5 day or 14 day EFPD limit has been exceeded. This Completion Time is based on limiting the potential xenon redistribution, the low probability of an accident, and the steps required to complete the action. 1

D.1

When the PDIL alarm circuit is inoperable, performing SR 3.1.6.1 within 1 hour and once per 4 hours thereafter ensures improper CEA alignments are identified before unacceptable flux distributions occur.

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BASES

ACTIONS (continued)

E.1

When a Required Action cannot be completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

With the PDIL alarm circuit OPERABLE, verification of each regulating CEA group position is sufficient to detect CEA positions that may approach the acceptable limits, and to provide the operator with time to undertake the Required Action(s) should the sequence or insertion limits be found to be exceeded. [The 12 hour Frequency also takes into account the indication provided by the PDIL alarm circuit and other information about CEA group positions available to the operator in the control room. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------REVIEWER'S NOTE-----------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
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SR 3.1.6.1 is modified by a Note indicating that entry is allowed into MODE 2 for 12 hours without having performed the SR. This is necessary, since the unit must be in the applicable MODES in order to perform Surveillances that demonstrate the LCO limits are met.

SR 3.1.6.2

Verification of the accumulated time of CEA group insertion between the long term steady state insertion limits and the transient insertion limits ensures the cumulative time limits are not exceeded. [The 24 hour Frequency ensures the operator identifies a time limit that is being approached before it is reached. 2

power dependent

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
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SR 3.1.6.3

Demonstrating the PDIL alarm circuit OPERABLE verifies that the PDIL alarm circuit is functional. [The 31 day Frequency takes into account other Surveillances being performed at shorter Frequencies that identify improper CEA alignments. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
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REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.
2. 10 CFR 50.46
3. U FSAR, Section 15 [ ], Section [ ], and Section [ ].
4. FSAR, Section [ ].
5. FSAR, Section [ ].
6. FSAR, Section [ ]. 2

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BASES

REFERENCES (continued)

7. FSAR, Section [ ]. 2

8. FSAR, Section [ ].

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B 3.1 REACTIVITY CONTROL SYSTEMS (Analog) 6

B 3.1.6 Regulating Control Element Assembly (CEA) Insertion Limits (Analog)

BASES

BACKGROUND

The insertion limits of the regulating Control Element Assemblies (CEAs) are initial assumptions in all safety analyses that assume CEA insertion upon reactor trip. The insertion limits directly affect core power distributions, assumptions of available SDM, and initial reactivity insertion rate. The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," and GDC 26, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2).

Limits on regulating CEA insertion have been established, and all CEA positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking, ejected CEA worth, reactivity insertion rate, and SDM limits are preserved.

The regulating CEA groups operate with a predetermined amount of position overlap, in order to approximate a linear relation between CEA worth and CEA position (integral CEA worth). The regulating CEA groups are withdrawn and operate in a predetermined sequence. The group sequence and overlap limits are specified in the COLR.

The regulating CEAs are used for precise reactivity control of the reactor. The positions of the regulating CEAs are manually controlled. They are capable of adding reactivity very quickly (compared to borating or diluting).

The power density at any point in the core must be limited to maintain specified acceptable fuel design limits, including limits that preserve the criteria specified in 10 CFR 50.46 (Ref. 2). Together, LCO 3.1.6, 3 LCO 3.2.4, "AZIMUTHAL POWER TILT (Tq)," and LCO 3.2.5, "AXIAL 4 SHAPE INDEX (ASI)," provide limits on control component operation and on monitored process variables to ensure the core operates within the linear heat rate (LCO 3.2.1, "Linear Heat Rate (LHR)"), total planar radial peaking factor (F^T_{XY}) (LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY})"), and total integrated radial peaking factor (F^T_r) (LCO 3.2.3, "Total Integrated Radial Peaking Factor (F^T_r)") limits in the COLR. Operation within the LHR limits given in the COLR prevents power peaks that would exceed the loss of coolant accident (LOCA) limits derived by the Emergency Core Cooling System analysis. Operation within the F^T_{XY} and

3 3 3

 6

BASES

BACKGROUND (continued)

F_r^T limits given in the COLR prevents departure from nucleate boiling (DNB) during a loss of forced reactor coolant flow accident. In addition to the LHR, F^T_{XY}, and $F^T{}_r$ limits, certain reactivity limits are preserved by regulating CEA insertion limits. The regulating CEA insertion limits also restrict the ejected CEA worth to the values assumed in the safety analysis and preserve the minimum required SDM in MODES 1 and 2. 3

The establishment of limiting safety system settings and LCOs requires that the expected long and short term behavior of the radial peaking factors be determined. The long term behavior relates to the variation of the steady state radial peaking factors with core burnup and is affected by the amount of CEA insertion assumed, the portion of a burnup cycle over which such insertion is assumed, and the expected power level variation throughout the cycle. The short term behavior relates to transient perturbations to the steady state radial peaks, due to radial xenon redistribution. The magnitudes of such perturbations depend upon the expected use of the CEAs during anticipated power reductions and load maneuvering. Analyses are performed, based on the expected mode of operation of the Nuclear Steam Supply System (base loaded, maneuvering, etc.). From these analyses, CEA insertions are determined and a consistent set of radial peaking factors defined. The long term steady state and short term insertion limits are determined, based upon the assumed mode of operation used in the analyses, and provide a means of preserving the assumption on CEA insertions used. The long and short term insertion limits of LCO 3.1.6 are specified for the plant, which has been designed primarily for base loaded operation, but has the ability to accommodate a limited amount of load maneuvering.

The regulating CEA insertion and alignment limits are process variables that together characterize and control the three dimensional power distribution of the reactor core. Additionally, the regulating bank insertion limits control the reactivity that could be added in the event of a CEA ejection accident, and the shutdown and regulating bank insertion limits ensure the required SDM is maintained.

Operation within the subject LCO limits will prevent fuel cladding failures that would breach the primary fission product barrier and release fission products to the reactor coolant in the event of a LOCA, loss of flow, ejected CEA, or other accident requiring termination by a Reactor Protection System trip function.

 1

BASES

APPLICABLE SAFETY ANALYSES

The fuel cladding must not sustain damage as a result of normal operation (Condition I) and anticipated operational occurrences (Condition II). The acceptance criteria for the regulating CEA insertion, ASI, and T_q LCOs are such as to preclude core power distributions from occurring that would violate the following fuel design criteria:

a. During a large break LOCA, the peak cladding temperature must not exceed a limit of 2200°F, 10 CFR 50.46 (Ref. 2),

b. During a loss of forced reactor coolant flow accident, there must be at least a 95% probability at a 95% confidence level (the 95/95 DNB criterion) that the hot fuel CEA in the core does not experience a DNB condition,

c. During an ejected CEA accident, the fission energy input to the fuel must not exceed 2~~8~~0 cal/gm (Ref. 3), and 1
3

d. The CEAs must be capable of shutting down the reactor with a minimum required SDM, with the highest worth CEA stuck fully withdrawn, GDC 26 (Ref. 1).

Regulating CEA position, ASI, and T_q are process variables that together characterize and control the three dimensional power distribution of the reactor core.

Fuel cladding damage does not occur when the core is operated outside these LCOs during normal operation. However, fuel cladding damage could result, should an accident occur with simultaneous violation of one or more of these LCOs. Changes in the power distribution can cause increased power peaking and corresponding increased local LHRs.

The SDM requirement is ensured by limiting the regulating and shutdown CEA insertion limits, so that the allowable inserted worth of the CEAs is such that sufficient reactivity is available to shut down the reactor to hot zero power. SDM assumes the maximum worth CEA remains fully withdrawn upon trip (Ref. 4). 1
3

The most limiting SDM requirements for MODE 1 and 2 conditions at BOC are determined by the requirements of several transients, e.g., loss of flow, seized rotor, etc. However, the most limiting SDM requirements for MODES 1 and 2 at EOC come from just one transient, Steam Line Break (SLB). The requirements of the SLB event at EOC for both the full power and no load conditions are significantly larger than those of any other event at that time in cycle and, also, considerably larger than the most limiting requirements at BOC.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Although the most limiting SDM requirements at EOC are much larger than those at BOC, the available SDMs obtained via the scramming of the CEAs are also substantially larger due to the much lower boron concentration at EOC. To verify that adequate SDMs are available throughout the cycle to satisfy the changing requirements, calculations are performed at both BOC and EOC. It has been determined that calculations at these two times in cycle are sufficient since the differences between available SDMs and the limiting SDM requirements are the smallest at these times in cycle. The measurement of CEA bank worth performed as part of the Startup Testing Program demonstrates that the core has the expected shutdown capability. Consequently, adher~~a~~ e nce to LCOs 3.1.5 and 3.1.6 provides assurance that the available SDMs at any time in cycle will exceed the limiting SDM requirements at that time in cycle. 1

Operation at the insertion limits or ASI limits may approach the maximum allowable linear heat generation rate or peaking factor, with the allowed T_q present. Operation at the insertion limit may also indicate the maximum ejected CEA worth could be equal to the limiting value in fuel cycles that have sufficiently high ejected CEA worths.

The regulating and shutdown CEA insertion limits ensure that safety analyses assumptions for reactivity insertion rate, SDM, ejected CEA worth, and power distribution peaking factors are preserved (Ref. ~~5~~ 3). 1

The regulating CEA insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The limits on regulating CEAs sequence, overlap, and physical insertion, as defined in the COLR, must be maintained because they serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected CEA worth is maintained, and ensuring adequate negative reactivity insertion on trip. The overlap between regulating banks provides more uniform rates of reactivity insertion and withdrawal and is imposed to maintain acceptable power peaking during regulating CEA motion. Regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches 4

The power dependent insertion limit (PDIL) alarm circuit is required to be OPERABLE for notification that the CEAs are outside the required insertion limits. When the PDIL alarm circuit is inoperable, the verification of CEA positions is increased to ensure improper CEA alignment is identified before unacceptable flux distribution occurs.

BASES

APPLICABILITY

The regulating CEA sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2. These limits must be maintained, since they preserve the assumed power distribution, ejected CEA worth, SDM, and reactivity rate insertion assumptions. Applicability in MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected CEA worth assumptions would be exceeded in these MODES. SDM is preserved in MODES 3, 4, and 5 by adjustments to the soluble boron concentration.

This LCO has been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.4. This SR verifies the freedom of the CEAs to move, and requires the regulating CEAs to move below the LCO limits, which would normally violate the LCO. ~~The Note also allows the LCO to be not applicable during reactor power cutback operation, which inserts a selected CEA group (usually group 5) during loss of load events.~~ 5

ACTIONS

A.1 and A.2

Operation beyond the transient insertion limit may result in a loss of SDM and excessive peaking factors. The transient insertion limit should not be violated during normal operation; this violation, however, may occur during transients when the operator is manually controlling the CEAs in response to changing plant conditions. When the regulating groups are inserted beyond the transient insertion limits, actions must be taken to either withdraw the regulating groups beyond the limits or to reduce THERMAL POWER to less than or equal to that allowed for the actual CEA insertion limit. Two hours provides a reasonable time to accomplish this, allowing the operator to deal with current plant conditions while limiting peaking factors to acceptable levels.

B.1 and B.2

If the CEAs are inserted between the long term steady state insertion limits and the transient insertion limits for intervals > 4 hours per 24 hour period, and the short term steady state insertions are exceeded, peaking factors can develop that are of immediate concern (Ref. ~~6~~ 3). 1

Verifying the short term steady state insertion limits are not exceeded ensures that the peaking factors that do develop are within those allowed for continued operation. Fifteen minutes provides adequate time for the operator to verify if the short term steady state insertion limits are exceeded.

BASES

ACTIONS (continued)

Experience has shown that rapid power increases in areas of the core, in which the flux has been depressed, can result in fuel damage, as the LHR in those areas rapidly increases. Restricting the rate of THERMAL POWER increases to ≤ 5% RTP per hour, following CEA insertion beyond the long term steady state insertion limits, ensures the power transients experienced by the fuel will not result in fuel failure (Ref. ~~7~~ 3). 1

C.1

With the regulating CEAs inserted between the long term steady state insertion limit and the ~~transient~~ power dependent insertion limit, and with the core approaching the 5 effective full power days (EFPD) per 30 EFPD or 14 EFPD per 365 EFPD limits, the core approaches the acceptable limits placed on operation with flux patterns outside those assumed in the long term burnup assumptions (Ref. ~~8~~ 3). In this case, the CEAs must be returned to within the long term steady state insertion limits, or the core must be placed in a condition in which the abnormal fuel burnup cannot continue. A Completion Time of 2 hours is allotted to return the CEAs to within the long term steady state insertion limits. 1 1

The required Completion Time of 2 hours from initial discovery of a regulating CEA group outside the limits until its restoration to within the long term steady state limits, shown on the figures in the COLR, allows sufficient time for borated water to enter the Reactor Coolant System from the chemical addition and makeup systems, and ~~to cause~~ allowing the regulating CEAs to ~~withdraw~~ be withdrawn to the acceptable region. It is reasonable to continue operation for 2 hours after it is discovered that the 5 day or 14 day EFPD limit has been exceeded. This Completion Time is based on limiting the potential xenon redistribution, the low probability of an accident, and the steps required to complete the action. 1

D.1

When the PDIL alarm circuit is inoperable, performing SR 3.1.6.1 within 1 hour and once per 4 hours thereafter ensures improper CEA alignments are identified before unacceptable flux distributions occur.

BASES

ACTIONS (continued)

E.1

When a Required Action cannot be completed within the required Completion Time, a controlled shutdown should be commenced. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

With the PDIL alarm circuit OPERABLE, verification of each regulating CEA group position is sufficient to detect CEA positions that may approach the acceptable limits, and to provide the operator with time to undertake the Required Action(s) should the sequence or insertion limits be found to be exceeded. [The 12 hour Frequency also takes into account the indication provided by the PDIL alarm circuit and other information about CEA group positions available to the operator in the control room. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

SR 3.1.6.1 is modified by a Note indicating that entry is allowed into MODE 2 for 12 hours without having performed the SR. This is necessary, since the unit must be in the applicable MODES in order to perform Surveillances that demonstrate the LCO limits are met.

SR 3.1.6.2

Verification of the accumulated time of CEA group insertion between the long term steady state insertion limits and the transient (power dependent) insertion limits ensures the cumulative time limits are not exceeded. [The 24 hour Frequency ensures the operator identifies a time limit that is being approached before it is reached. 2

 6

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--] 2

SR 3.1.6.3

Demonstrating the PDIL alarm circuit OPERABLE verifies that the PDIL alarm circuit is functional. [The 31 day Frequency takes into account other Surveillances being performed at shorter Frequencies that identify improper CEA alignments. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--] 2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.
2. 10 CFR 50.46
3. U FSAR, Section [15], Section [ ], and Section [ ].
4. FSAR, Section [ ].
5. FSAR, Section [ ].
6. FSAR, Section [ ].

2

 1

BASES

REFERENCES (continued)

~~7. FSAR, Section [ ].~~ 2

~~8. FSAR, Section [ ].~~

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.6, BASES, REGULATING CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The ISTS includes ISTS 3.2.1, Linear Heat Rate (LHR), ISTS 3.2.2, Total Planar Radial Peaking Factor (F_{xy}^T), ISTS 3.2.3, Total Integrated Radial Peaking Factor (F_r^T), ISTS 3.2.4, Azimuthal Power Tilt (T_q), and ISTS 3.2.5, Axial Shape Index (ASI). CTS do not include a Specification for ISTS 3.2.2, Total Planar Radial Peaking Factor (F_{xy}^T). The CTS and ISTS are renumbered. CTS 3.2.3, Total Integrated Radial Peaking Factor (F_r^T), CTS 3.2.4, Azimuthal Power Tilt (T_q), and CTS 3.2.5, Axial Shape Index (ASI), are renumbered as ITS 3.2.2, ITS 3.2.3, and ITS 3.2.4, respectively.

4. CTS 3.1.3.6 LCO states that regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches. ITS LCO 3.1.6 does not retain this detail. This changes the CTS by relocating the details that regulating CEAs are considered to be fully withdrawn when withdrawn to at least 129.0 inches to the Bases. See DOC LA01.

5. The ISTS Bases states "The Note also allows the LCO to be not applicable during reactor power cutback operation, which inserts a selected CEA group (usually group 5) during loss of load events." Reactor power cutback design feature is not applicable to PSL Unit 1 and Unit 2. Therefore, this statement is deleted.

6. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.6, REGULATING CONTROL ELEMENT ASSEMBLY (CEA) INSERTION LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 7

3.1.7 Control Element Assembly (CEA) Position Indication

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

POSITION INDICATOR CHANNELS

LIMITING CONDITION FOR OPERATION

LCO 3.1.7 ~~3.1.3.3~~ ~~All shutdown and~~ regulating CEA reed switch position indicator channel~~s~~ and ~~CEA~~ pulse counting position indicator channel~~s~~ [for each CEA] shall be OPERABLE ~~and capable of determining the absolute CEA positions within ± 2.25 inches.~~ A05

Applicability **APPLICABILITY**: MODES 1 and 2.

ACTION:

[Separate Condition entry is allowed for each CEA group.] L01

~~a. Deleted.~~

Condition A ~~b. With a maximum of~~ [One or more CEA groups with] one reed switch position indicator channel [inoperable] ~~per group~~ or one ~~(except as permitted by ACTION item d. below)~~ pulse counting position indicator channel ~~per group~~ inoperable A02

Condition A Note ~~and the CEA(s) with the~~ inoperable position indicator channel [is associated with] [Only applicable when] [CEA] partially inserted, within 6 hours either: [ITS Required Action A.1, A.2, and Note] L04

~~1. Restore the inoperable position indicator channel to OPERABLE status, or~~

Required Action D.1 ~~2.~~ Be in ~~HOT STANDBY, or~~ [MODE 3]

Required Action A.3.1 ~~3.~~ Reduce THERMAL POWER to ≤ 70% [RTP] ~~of the maximum allowable THERMAL POWER level for the existing Reactor Coolant Pump combination; if negative reactivity insertion is required to reduce THERMAL POWER, boration shall be used. Operation at or below this reduced THERMAL POWER level may continue provided that~~ within the next 4 hours ~~either:~~ A03 A04

Required Action A.3.2.1

Required Action A.3.2.1 Note

Required Action B.1

~~a)~~ ~~The~~ CEA ~~group(s)~~ with ~~the~~ inoperable position indicator ~~is~~ fully withdraw~~n~~ [within 10 hours] while maintaining the withdrawal sequence required by Specification 3.1.3.6 ~~and when this~~ [Verify associated] CEA ~~group reaches its fully withdrawn position, the~~ "Full Out" limit ~~of the CEA with the inoperable~~ position indicator is actuated ~~and verifies this CEA to be fully withdrawn~~. ~~Subsequent to fully withdrawing this CEA group(s), the THERMAL POWER level may be returned to a level consistent with all other applicable specifications;~~ or A01 A04

REACTIVITY CONTROL SYSTEMS

POSITION INDICATOR CHANNELS (Continued)

LIMITING CONDITION FOR OPERATION

Required Action A.3.2.2
Required Action A.3.2.2 Note
Required Action B.2

within 6 hours [A.2], within 10 hours [A.3.2.2]

b) The CEA group(s) with the inoperable position indicator is fully inserted, and subsequently maintained fully inserted, while maintaining the withdrawal sequence and THERMAL POWER level required by Specification 3.1.3.6 and when this CEA group reaches its fully inserted position, the "Full In" limit of the CEA with the inoperable position indicator is actuated and verifies this CEA to be fully inserted. Subsequent operation shall be within the limits of Specification 3.1.3.6. A01 A04

Verify associated

Condition B
Condition B Note

One or more CEA groups with · inoperable · Only applicable when · is associated with · CEA

c. With a maximum of one reed switch position indicator channel per group or one pulse counting position indicator channel per group inoperable and the CEA(s) with the inoperable position indicator channel at either its fully inserted position or fully withdrawn position, operation may continue provided:

Required Action B.1 and B.2

Verify associated · position indicator is actuated

1. The position of this CEA is verified immediately and at least once per 12 hours thereafter by its "Full In" or "Full Out" limit (as applicable),

2. The fully inserted CEA group(s) containing the inoperable position indicator channel is subsequently maintained fully inserted, and A06

3. Subsequent operation is within the limits of Specification 3.1.3.6. A04

Condition C
Require Action C.1
Require Action C.2

One or more groups · two · Verify no more than one · per group is inoperable

d. With one or more pulse counting position indicator channels inoperable, operation in MODES 1 and 2 may continue for up to 24 hours provided all of the reed switch position indicator channels are OPERABLE. L02 L03

Restore pulse counting position indicator channels to OPERABLE status within 72

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1

4.1.3.3 Each position indicator channel shall be determined to be OPERABLE by verifying the pulse counting position indicator channels and the reed switch position indicator channels agree within 4.5 inches in accordance with the Surveillance Frequency Control Program except during time intervals when the Deviation circuit is inoperable, then compare the pulse counting position indicator and reed switch position indicator channels at least once per 4 hours.

REACTIVITY CONTROL SYSTEMS

POSITION INDICATOR CHANNELS - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.1.7

3.1.3.2 The shutdown and regulating CEA reed switch position indicator channels and CEA pulse counting position indicator channels shall be OPERABLE for each CEA and capable of determining the absolute CEA positions within ± 2.50 inches. A05

Applicability

APPLICABILITY: MODES 1 and 2.

Separate Condition entry is allowed for each CEA group. L01

ACTION:

Condition A

a. With a maximum of One or more CEA groups with one reed switch position indicator channel inoperable per group or one (except as permitted by ACTION item c. below) pulse counting position indicator channel per group inoperable and the CEA(s) with the inoperable position indicator channel partially inserted, within 6 hours either: A02

Condition A Note — Only applicable when CEA is associated with — ITS Required Action A.1, A.2, and Note L04

1. Restore the inoperable position indicator channel to OPERABLE status, or

Required Action D.1

2. Be in HOT STANDBY, or MODE 3

Required Action A.3.1

3. Reduce THERMAL POWER to ≤ 70% RTP of the maximum allowable THERMAL POWER level for the existing Reactor Coolant pump combination; if negative reactivity insertion is required to reduce THERMAL POWER, boration shall be used. Operation at or below this reduced THERMAL POWER level may continue provided that within the next 4 hours either: A03 A04

Required Action A.3.2.1

Required Action A.3.2.1 Note

Required Action B.1

within 10 hours

a) The CEA group(s) with the inoperable position indicator is fully withdrawn while maintaining the withdrawal sequence required by Specification 3.1.3.6 and when this CEA group reaches its fully withdrawn position, the Verify associated "Full Out" limit of the CEA with the inoperable position indicator is actuated and verifies this CEA to be fully withdrawn. Subsequent to fully withdrawing this CEA group(s), the THERMAL POWER level may be returned to a level consistent with all other applicable specifications; or A01 A04

Required Action A.3.2.2

Required Action A.3.2.2 Note

Required Action B.2

within 6 hours [A.2], within 10 hours [A.3.2.2]

b) The CEA group(s) with the inoperable position indicator is fully inserted, and subsequently maintained fully inserted, while maintaining the withdrawal sequence and THERMAL POWER level required by Specification 3.1.3.6 and when this CEA group reaches its fully inserted position, the Verify associated "Full In" limit of the CEA with the inoperable position indicator is actuated and verifies this CEA to be fully inserted. Subsequent operation shall be within the limits of Specification 3.1.3.6. A01 A04

A01

REACTIVITY CONTROL SYSTEMS

POSITION INDICATOR CHANNELS - OPERATING

ACTION: (Continued)

Condition B — One or more CEA groups with — inoperable

b. With a maximum of one reed switch position indicator channel per group or one pulse counting position indicator channel per group inoperable and the full-length CEA(s) with the inoperable position indicator channel at either its fully inserted position or fully withdrawn position, operation may continue provided:

Condition B Note — Only applicable when — is associated with — CEA

Required Action B.1 and B.2 — Verify associated

1. The position of an affected full-length CEA is verified immediately and at least once per 12 hours thereafter by its "Full In" or "Full Out" limit (as applicable), and — position indicator is actuated

2. The fully inserted full-length CEA group(s) containing the inoperable position indicator channel is subsequently maintained fully inserted, and — A06

3. Subsequent operation is within the limits of Specification 3.1.3.6. — A04

Condition C — One or more groups — two

c. With two or more pulse counting position indicators channels per group inoperable, operation in MODES 1 and 2 may continue for up to 72 hours provided no more than one reed switch position indicator per group is inoperable.

Require Action C.1 — Verify — per group is inoperable

Require Action C.2 — Restore pulse counting position indicator channels to OPERABLE status within

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1 4.1.3.2 Each position indicator channel shall be determined to be OPERABLE by verifying the pulse counting position indicator channels and the reed switch position indicator channels agree within 5.0 inches in accordance with the Surveillance Frequency Control Program except during time intervals when the Deviation Circuit is inoperable, then compare the pulse counting position indicator and reed switch position indicator channels at least once per 4 hours.

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 Unit 1 CTS 3.1.3.3 ACTION b. covers the inoperability for a maximum of one reed switch position indicator channel per group (except as permitted by ACTION d.). Unit 1 CTS 3.1.3.3 ACTION d. covers the inoperability for one or more pulse counting position indicator channels inoperable and the maximum allowed inoperable reed switch position indicator channels per group to allow continued operation in MODES 1 and 2.

Unit 2 CTS 3.1.3.2 ACTION a. covers the inoperability for a maximum of one reed switch position indicator channel per group except as permitted by ACTION d.). Unit 2 CTS 3.1.3.2 ACTION c. covers the inoperability for one or more pulse counting position indicator channels inoperable and the maximum allowed inoperable reed switch position indicator channels per group to allow continued operation in MODES 1 and 2.

The purpose of the CTS "(except as permitted by ACTION d.)" statement is to alert the user to a limitation on inoperable reed switch position indicator channels per group, when one or more pulse counting indicator channels is inoperable. This changes the CTS by not including the cross-reference in the ITS. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A03 Unit 1 CTS 3.1.3.3 ACTION b.3, and Unit 2 CTS 3.1.3.2 ACTION a.3, each state that THERMAL POWER be reduced to ≤ 70% of the maximum allowable THERMAL POWER level for the existing Reactor Coolant Pump combination, and if negative reactivity insertion is required to reduce THERMAL POWER, boration shall be used.

The purpose of the CTS is to provide the THERMAL POWER limit should it be necessary to reduce THERMAL POWER. The ITS retains this requirement but does not contain a method to be used to reduce THERMAL POWER. PSL only operates in the four reactor coolant pump combination; therefore, subsequent operation is allowable provided the THERMAL POWER is reduced to ≤ 70% RTP – the equivalent THERMAL POWER for the CTS four reactor coolant pump combination. Additionally, the method to be used to reduce THERMAL POWER is determined by Licensed Operators based upon plant conditions and without challenging plant systems. This changes the CTS by changing the statement that THERMAL POWER be reduced to ≤ 70% of the maximum allowable THERMAL POWER level for the existing Reactor Coolant Pump combination to THERMAL POWER be reduced to ≤ 70% RTP, and by removing the method to be used to reduce THERMAL POWER. This changes the ITS by stating the specific THERMAL POWER limit should it be necessary to reduce THERMAL POWER.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A04 Unit 1 CTS 3.1.3.3 ACTIONS b.3, b.3.a, b.3.b, c.3, and Unit 2 CTS 3.1.3.2 ACTIONS a.3, a.3.a, a.3.b, b.3, each contain statements in reference to CTS 3.1.3.6 requirements including; (b.3, a.3) operation at or below this reduced THERMAL POWER level may continue provided requirements in Specification 3.1.3.6 are maintained; (b.3.a, a.3.a) subsequent to fully withdrawing this CEA group(s), the THERMAL POWER level may be returned to a level consistent with all other applicable specifications; (b.3.b, a.3.b) subsequent operation shall be within the limits of Specification 3.1.3.6.; and (c.3, b.3) subsequent operation is within the limits of Specification 3.1.3.6. Each CTS statement is in reference to requirements in CTS 3.1.3.6, "Regulating CEA Insertion Limits."

The purpose of the CTS is to provide reference to CTS 3.1.3.6 to determine if the CEA Insertion Limits are met. The ITS does not contain these references. This changes the CTS by not including the reference to the CEA insertion limits in the ITS. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A05 Unit 1 CTS 3.1.3.3 LCO states that shutdown and regulating CEA reed switch position indicator channels and CEA pulse counting position indicator channels shall be OPERABLE and capable of determining the absolute CEA positions within ± 2.25 inches. Similarly, Unit 2 CTS 3.1.3.2 LCO states that shutdown and regulating CEA reed switch position indicator channels and CEA pulse counting position indicator channels shall be OPERABLE and capable of determining the absolute CEA positions within ± 2.50 inches.

The purpose of the CTS is to provide acceptance criteria for the accuracy of the CEA reed switch position indicator channels and CEA pulse counting position indicator channels. The acceptance criteria are provided in the ITS 3.1.7 Bases. ITS 3.1.7 Bases LCO description states that for a CEA position indicator channel to be considered OPERABLE, the position indicator must be capable of determining the absolute CEA position within ± 2.25 inches for Unit 1, and ± 2.50 inches for Unit 2. ITS Bases Surveillance Requirements, SR 3.1.7.1, description states that CEA pulse counting indicator position channels and reed switch position indicator channels for the CEAs in each group agree within 4.5 inches for Unit 1, and within 5.0 inches for Unit 2. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A06 Unit 1 CTS 3.1.3.3 Action c.2 states that the fully inserted CEA group(s) containing the inoperable position indicator channel is subsequently maintained fully inserted. Similarly, Unit 2 CTS 3.1.3.3 Action b.2 states that the fully inserted full-length CEA group(s) containing the inoperable position indicator channel is subsequently maintained fully inserted.

The purpose of the CTS is to provide Action to maintain a fully inserted CEA group(s) containing the inoperable position indicator channel in the fully inserted position. For ITS Condition A, with one or more CEA groups with one reed switch or one pulse counting position indicator channel inoperable, Required Actions A.1 and A.2 require fully withdrawing or fully inserting the CEA with the inoperable position indicator. These actions place the CEA in a condition where the position can be verified using the CEA Limits Indication System. The associated CEA “full out” or “full in” limit position indicator actuation provides assurance the CEA is at a known position. Once the CEA is fully withdrawn or fully inserted, Condition A no longer applies, and Condition B is entered.

For ITS Condition B, with one or more CEA groups with one reed switch or one pulse counting position indicator channel inoperable and the associated CEA is fully withdrawn or fully inserted, a verification is required to ensure that either the CEA “full out” or “full in” limit indicator is actuated immediately and every 12 hours thereafter. The associated CEA “full out” or “full in” limit position indicator actuation provides assurance the CEA is at a known position. Use of the CEA limit indicator is an acceptable method to determine CEA position since the CEA Limits Indication System is separate and independent from the reed switch and the pulse counting position indication systems. This change is designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* Unit 1 CTS 3.1.3.3 ACTION b. covers the inoperability for a maximum of one reed switch position indicator channel per group or a maximum of one pulse counting position indicator channel per group with the CEA partially inserted, and CTS 3.1.3.3 ACTION c.

covers the inoperability for a maximum of one rod position indicator channel per group with the CEA fully withdrawn or inserted.
Unit 2 CTS 3.1.3.2 ACTION a. covers the inoperability for a maximum of one reed switch position indicator channel per group or a maximum of one pulse counting position indicator channel per group with the CEA partially inserted, and CTS 3.1.3.2 ACTION b. covers the inoperability for a maximum of one rod position indicator channel per group with the CEA fully withdrawn or inserted.

ITS 3.1.7 ACTIONS are modified by Note 1 that states "Separate Condition entry is allowed for each CEA group." ITS 3.1.7 ACTION A covers inoperability for one or more CEA groups with one reed switch position indicator channel inoperable, or one or more CEA groups with one pulse counting position indicator channel inoperable with the CEA partially inserted. ITS 3.1.7 ACTION B covers inoperability for one or more CEA groups with one reed switch position indicator channel inoperable, or one or more CEA groups with one pulse counting position indicator channel inoperable with the CEA fully withdrawn or inserted.

The purpose of Unit 1 CTS 3.1.3.3 ACTION b. (Unit 2 CTS 3.1.3.2 ACTION a.) is to provide compensatory actions for a maximum of one rod position indicator per group. The purpose of Unit 1 CTS 3.1.3.3 ACTION c. (Unit 2 CTS 3.1.3.2 ACTION b.) is to provide compensatory actions for more than one rod position indicator per group with the CEA fully withdrawn or inserted. This change is acceptable because the Required Actions provide appropriate compensatory actions for one or more inoperable position indicator channels in each CEA group. The actions that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period.

This change will allow separate Condition entry for each inoperable CEA group while the CTS does not. The ITS will allow each inoperable CEA group with an inoperable reed rod position indicator or inoperable pulse counting position indicator to be tracked separately. This change is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for inoperable CEA position indication.

This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 **Unit 1 only:** *(Category 4 – Relaxation of Required Action)* CTS 3.1.3.3 ACTION d. states “With one or more pulse counting position indicator channels inoperable, operation in MODES 1 and 2 may continue for up to 24 hours provided all of the reed switch position indicator channels are OPERABLE.” ITS 3.1.7 Required Action C.1 states “Verify no more than one reed switch position indicator channel per group is inoperable.” This changes the CTS by relaxing the allowable number of inoperable pulse counting position indicator channels and concurrent inoperable reed switch position indicator channels per group from “one or more pulse counting position indicator channels inoperable” to “one or more CEA groups with two or more pulse counting position indicator channels inoperable”, and from “provided all of the reed switch position indicator channels are OPERABLE” to “no more than one reed switch position indicator channel per group is inoperable.”

The purpose of CTS 3.1.3.3 ACTION d. is to continue to determine CEA position using reed switch position indicator channels, with two or more inoperable pulse counting position indicator channels. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the operability status of the specified redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the allowed Completion Time.

This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 **Unit 1 only:** *(Category 3 – Relaxation of Completion Time)* CTS 3.1.3.3 ACTION d. states “With one or more pulse counting position indicator channels inoperable, operation in MODES 1 and 2 may continue for up to 24 hours provided all of the reed switch position indicator channels are OPERABLE.” ITS 3.1.7 Required Action C.2 states that the pulse counting position indicator channels be restored to OPERABLE status within 72 hours. This changes the CTS by relaxing the Completion Time from 24 hours to 72 hours.

This change is acceptable because the Completion Time is consistent with safe operation under the specific Condition, considering the operability status of the redundant systems of required features, the capacity and capability of remaining features, and the low probability of a DBA occurring during the allowed Completion Time. This ITS Completion Time of 72 hours is adequate time to restore the inoperable pulse counting position indicator channels to OPERABLE status, considering the reed switch position indicator channels will continue to provide indication of CEA position.

This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L04 *(Category 4 – Relaxation of Required Action)* Unit 1 CTS 3.1.3.3 ACTION b. covers the inoperability for a maximum of one reed switch position indicator channel per group or a maximum of one pulse counting position indicator channel per group with the CEA partially inserted, and CTS 3.1.3.3 ACTION c. covers the inoperability for a maximum of one rod position indicator channel per group with the CEA fully withdrawn or inserted. Unit 2 CTS 3.1.3.2 ACTION a. covers the inoperability for a maximum of one reed switch position indicator channel per group or a maximum of one pulse counting position indicator channel per group with the CEA partially inserted, and CTS 3.1.3.2 ACTION b. covers the inoperability for a maximum of one rod position indicator channel per group with the CEA fully withdrawn or inserted.

ITS 3.1.7 adds Required Action A.1, which states "Fully withdraw CEA with inoperable position indicator channel" with a Completion Time or 6 hours, and adds Required Action A.2, which states "Fully insert CEA with inoperable position indicator channel" with a Completion Time or 6 hours. Unit 1 CTS 3.1.3.3 ACTION b. and Unit 2 CTS 3.1.3.2 ACTION a. are changed by adding an option to fully insert or fully withdraw the affected individual CEA, rather than the CEA group, provided the CEA alignment is maintained in accordance with LCO 3.1.4, "Control Element Assembly Alignment" as annotated in the ITS 3.1.7 Required Action A.1 and Required Action A.2 Note.

The purpose of the Unit 1 CTS 3.1.3.3 ACTION b. (Unit 2 CTS 3.1.3.2 ACTION a. and b.) is to provide compensatory actions for a maximum of one rod position indicator per group inoperable with the CEA partially inserted. The purpose of Unit 1 CTS 3.1.3.3 ACTION c. (Unit 2 CTS 3.1.3.2 ACTION b.) is to provide compensatory actions for a maximum of one rod position indicator channel per group inoperable with the CEA fully withdrawn or inserted. The CTS Required Actions are not affected. Rather, the individual CEA with the inoperable position indicator channel may be moved to the fully withdrawn or fully inserted position rather than moving its CEA group, provided the that contains the individual CEA with the inoperable position indicator channel is maintained in accordance with LCO 3.1.4, "Control Element Assembly Alignment." The Completion Time is the same as the Completion Time allowed by CTS for alignment of the CEA group with an inoperable position indicator channel.

This change is acceptable because the ITS Required Actions A.1 and A.2 provide appropriate compensatory actions for an inoperable CEA position indication. ITS Required Action A.1 or A.2 may be taken when the CEA group is within the LCO 3.1.4 group alignment limit of the fully inserted or fully withdrawn position. These ACTIONS minimize CEA movements and reduce the likelihood that a reduction in THERMAL POWER. Upon Completion of Required Action A.1 or A.2, Condition A is exited, and Condition B is entered and ACTIONS consistent with the CTS ACTIONS are taken. When the CEA group with the inoperable position indicator channel is not within the LCO 3.1.4 group alignment limit of the fully inserted or fully withdrawn position, then the ITS 3.1.7 Required Action A.3.1 to reduce THERMAL POWER within 6 hours, and Required Action A.3.2.1 to fully withdraw the CEA group with the inoperable position indicator channel within 10 hours, or Required Action A.3.2.2 to fully insert the CEA group with the inoperable position indicator channel within 10 hours, are taken. ITS Required Actions A.1 and A.2 provide appropriate compensatory actions for one inoperable position indicator channel within a CEA group. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period.

This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Control Element Assembly (CEA) Position Indication

LCO 3.1.7 Reed switch position indicator channel and pulse counting position indicator channel for each CEA shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each CEA group.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ------------ NOTE ----------- Only applicable when inoperable position indicator channel is associated with partially inserted CEA. -------------------------------	--------------------NOTE----------------- Required Actions A.1 and A.2 are only applicable while maintaining CEA alignment in accordance with LCO 3.1.4, "Control Element Assembly (CEA) Alignment." --	
One or more CEA groups with one reed switch position indicator channel inoperable.	A.1 Fully withdraw CEA with inoperable position indicator channel.	6 hours
<u>OR</u>	<u>OR</u>	
One or more CEA groups with one pulse counting position indicator channel inoperable.	A.2 Fully insert CEA with the inoperable position indicator channel.	6 hours
	<u>OR</u>	
	A.3.1 Reduce THERMAL POWER to ≤ 70% RTP.	6 hours
	<u>AND</u>	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	--------------------NOTE------------------ Required Actions A.3.2.1 and A.3.2.2 are only applicable while maintaining CEA group insertion and withdrawal sequence limits specified in the COLR. --	
	A.3.2.1 Fully withdraw CEA group with inoperable position indicator channel.	10 hours
	<u>OR</u>	
	A.3.2.2 Fully insert CEA group with the inoperable position indicator channel.	10 hours
B. ------------ NOTE ----------- Only applicable when inoperable position indicator channel is associated with fully withdrawn or inserted CEA. -------------------------------- One or more CEA groups with one reed switch position indicator channel inoperable. <u>OR</u> One or more CEA groups with one pulse counting position indicator channel inoperable.	B.1 Verify associated CEA "full out" limit position indicator is actuated. <u>OR</u> B.2 Verify associated CEA "full in" limit position indicator is actuated.	Immediately <u>AND</u> Once per 12 hours thereafter Immediately <u>AND</u> Once per 12 hours thereafter

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more CEA groups with two or more pulse counting position indicator channels inoperable.	C.1	Verify no more than one reed switch position indicator channel per group is inoperable.	Immediately
	AND		
	C.2	Restore pulse counting position indicator channels to OPERABLE status.	72 hours
D. One or more CEA groups with two or more reed switch position indicator channels inoperable. OR Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify CEA pulse counting position indicator channels and reed switch position indicator channels agree within 4.5 inches.	4 hours when deviation circuit is inoperable <u>AND</u> In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Control Element Assembly (CEA) Position Indication

LCO 3.1.7 Reed switch position indicator channel and pulse counting position indicator channel for each CEA shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each CEA group.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ------------ NOTE ----------- Only applicable when inoperable position indicator channel is associated with partially inserted CEA. --------------------------------	--------------------NOTE----------------- Required Actions A.1 and A.2 are only applicable while maintaining CEA alignment in accordance with LCO 3.1.4, "Control Element Assembly (CEA) Alignment." --	
One or more CEA groups with one reed switch position indicator channel inoperable. <u>OR</u> One or more CEA groups with one pulse counting position indicator channel inoperable.	A.1 Fully withdraw CEA with inoperable position indicator channel.	6 hours
	<u>OR</u>	
	A.2 Fully insert CEA with the inoperable position indicator channel.	6 hours
	<u>OR</u>	
	A.3.1 Reduce THERMAL POWER to ≤ 70% RTP. <u>AND</u>	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	--------------------NOTE------------------ Required Actions A.3.2.1 and A.3.2.2 are only applicable while maintaining CEA group insertion and withdrawal sequence limits specified in the COLR. --	
	A.3.2.1 Fully withdraw CEA group with inoperable position indicator channel.	10 hours
	<u>OR</u>	
	A.3.2.2 Fully insert CEA group with the inoperable position indicator channel.	10 hours
B. ------------ NOTE ----------- Only applicable when inoperable position indicator channel is associated with fully withdrawn or inserted CEA. -------------------------------- One or more CEA groups with one reed switch position indicator channel inoperable. <u>OR</u> One or more CEA groups with one pulse counting position indicator channel inoperable.	B.1 Verify associated CEA "full out" limit position indicator is actuated.	Immediately <u>AND</u> Once per 12 hours thereafter
	<u>OR</u>	
	B.2 Verify associated CEA "full in" limit position indicator is actuated.	Immediately <u>AND</u> Once per 12 hours thereafter

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more CEA groups with two or more pulse counting position indicator channels inoperable.	C.1	Verify no more than one reed switch position indicator channel per group is inoperable.	Immediately
	AND		
	C.2	Restore pulse counting position indicator channels to OPERABLE status.	72 hours
D. One or more CEA groups with two or more reed switch position indicator channels inoperable. OR Required Action and associated Completion Time not met.	D.1	Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify CEA pulse counting position indicator channels and reed switch position indicator channels agree within 5.0 inches.	4 hours when deviation circuit is inoperable AND In accordance with the Surveillance Frequency Control Program

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.7, CONTROL ELEMENT ASSEMBLY (CEA) POSITION INDICATION

1. NUREG 1432, “Standard Technical Specifications, Combustion Engineering Plants”, Revision 5.0, ISTS 3.1.4 includes one Surveillance Requirement (SR) related to CEA position indication, ISTS SR 3.1.4.5. However, the LCO statement of ISTS 3.1.4 does not specifically delineate position indication as being required for a CEA. It only requires OPERABILITY of CEAs to be within the alignment limits. Furthermore, the LCO Section of the ISTS 3.1.4 Bases does not describe indication as a necessary feature for the CEA to be OPERABLE. However, the ISTS Bases for SR 3.1.4.5 provides a requirement that each reed switch position indication channel ensures the channel is OPERABLE and capable of indicating CEA position over the entire length of the CEA's travel. In addition, ISTS 3.1.4 does not provide any specific actions to take if one or more of the required CEA position indicators is inoperable. Consistent with the approach taken in NUREG 1431, “Standard Technical Specifications, Westinghouse Plants”, Revision 5.0, a new LCO has been provided for the CEA Position Indicators.

   PSL Unit 1 CTS 3.1.3.3 and PSL Unit 2 CTS 3.1.3.2 are adapted using NUREG 1431, ISTS 3.1.7, to develop the new LCO 3.1.7. PSL LCO 3.1.7 maintains the current licensing basis while adapting the new LCO to NUREG 1431 requirements. Specifically, PSL requires two CEA position indicator channels for each CEA to be OPERABLE; the reed switch position indicator channels and the pulse counting indicator channel. The ACTIONS are adapted from the ACTIONS in NUREG-1431. The Surveillance Requirement ensures the reed switch position indicator channels and the pulse counting indicator channels for a group agree within an allowable tolerance.

   Refer to the PSL Unit 1 CTS 3.1.3.3 and PSL Unit 2 CTS 3.1.3.2 markups and discussion of changes for the details of changes from CTS to ITS 3.1.7.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Control Element Assembly (CEA) Position Indication

BASES

BACKGROUND

According to GDC 13 (Ref. 1), instrumentation to monitor variables and systems over their operating ranges during normal operation, anticipated operational occurrences, and accident conditions must be OPERABLE. The purpose of this LCO is to ensure OPERABILITY of the shutdown and regulating CEA position indicators so CEA position can be determined thereby ensuring compliance with the CEA alignment and insertion limits.

The OPERABILITY (i.e., trippability) of the shutdown and regulating CEAs is an initial assumption in the safety analyses that assume CEA insertion upon reactor trip. Maximum CEA misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10 and GDC 26 (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants" (Ref. 2).

Limits on CEA alignment and OPERABILITY have been established, and CEA positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

CEAs are moved by their control element drive mechanisms (CEDMs). Each CEDM moves its CEA one step (approximately 0.75 inches) at a time. Step in and step out signals are totalized within the CEA Control System to provide one of the means of determining CEA position.

The axial position of shutdown and regulating CEAs is indicated by two separate and independent systems: Pulse Counting Position Indication System and the Reed Switch Position Indication System. Additionally, the CEA Limits Indication System independently provides indication of a CEA that is fully withdrawn or fully inserted.

BASES

BACKGROUND (continued)

The Pulse Counting Position Indication System counts the pulses sent to the CEA gripper coils from the CEDM Control System that moves the CEAs. There is a step counter for each CEA. Individual CEAs in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the pulse counter. The Pulse Counting Position Indication System is considered highly precise (± 1 step or ± 0.75 inches).

The Reed Switch Position Indication System provides an independent and diverse means of providing indication of actual CEA position, but at a lower precision than the step counters. This system is based on signals from a series of magnetically actuated reed switch position transmitters spaced at 1.5-inch intervals along the CEDM housing. The reed switch position transmitters provide voltage signals for CEA position monitoring in the control room. The reed switch position transmitters also provide signals for alarm information and CEA motion inhibit on CEA deviation within a group.

The CEA Limits Indication System provides indication of a fully withdrawn or fully inserted CEA from distinct contact closure signals from the reed switch position transmitter assembly. The limit reed switch position transmitter assembly, on each CEA, transmits an upper electrical limit signal when the CEA is fully withdrawn and transmits a lower electrical limit signal when the CEA is fully inserted. The CEA Limits Indication System is separate from the Reed Switch Position Indication System.

A detailed description of the CEA position indication systems is found in the UFSAR, Chapter 7 (Ref. 3)

APPLICABLE SAFETY ANALYSES

CEA misalignment accidents are analyzed in the safety analysis (Ref. 4). The accident analysis defines CEA misoperation as any event, with the exception of sequential group withdraws, which could result from a single malfunction in the reactivity control systems. For example, CEA misalignment may be caused by a malfunction of the CEDM, CEDM Control System, or by operator error. Therefore, the acceptance criteria for CEA position indication is that CEA positions must be known with sufficient accuracy in order to verify the core is operating within the limits of LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits," and LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits". The CEA positions must also be known in order to verify the alignment limits are preserved (LCO 3.1.4, "Control Element Assembly (CEA) Alignment"). CEA positions are continuously monitored to provide operators with information that ensures the plant is operating within the bounds of the accident analysis assumptions.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The position of the CEAs satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). The CEA position indication systems monitor CEA position, which is an initial condition of the accident.

LCO

OPERABILITY of the CEA reed switch and pulse counting position indicator channels ensure that the CEA alignment assumptions in the safety analysis will remain valid. The CEA alignment requirements specified in LCO 3.1.4 ensure that the CEA groups maintain the correct power distribution and CEA alignment.

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned CEAs can be detected. Therefore, power peaking and SDM can be controlled within acceptable limits.

For a CEA position indicator channel to be considered OPERABLE, the position indicator must be capable of determining the absolute CEA position within $\pm$ 2.25 inches.

APPLICABILITY

The requirements on CEA position indicator channels are applicable in MODES 1 and 2 because these are the MODES power is generated, and the OPERABILITY and alignment of CEAs and CEA insertion limits have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and regulating banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each CEA group. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for one or more inoperable position indicator channels in each CEA group.

Conditions A and B are modified by a Note. The Note to Condition A indicates that the Condition only applies when the inoperable position indicator channel is associated with a partially inserted CEA and the Note to Condition B indicates that the Condition only applies when the inoperable position indicator channel is associated with a fully withdrawn or fully inserted CEA. Because the actions are different for partially inserted CEAs and CEAs that are fully inserted or fully withdrawn, these

BASES

ACTIONS (continued

Notes identify the applicable Condition when a CEA reed switch or pulse counting position indicator channel in one or more CEA groups is inoperable.

A.1 and A.2

With one or more CEA groups with one reed switch or one pulse counting position indicator channel inoperable, Required Actions A.1 and A.2 require fully withdrawing or fully inserting the CEA with the inoperable position indicator. These actions place the CEA in a condition where the position can be verified using the CEA Limits Indication System. The associated CEA “full out” or “full in” limit position indicator actuation provides assurance the CEA is at a known position. Once the CEA is fully withdrawn or fully inserted, Condition A no longer applies and Condition B is entered. The Completion Time for Required Actions A 1 and A.2 is reasonable, based on operating experience, to fully withdraw or fully insert a CEA during power operation.

Required Actions A.1 and A.2 are modified by a Note to restrict these options to only be applicable if the CEA with the inoperable position indicator channel can be maintained within the group alignment limits required by LCO 3.1.4 when the CEA is fully withdrawn or fully inserted. Otherwise, the CEA group must be fully withdrawn or fully inserted in accordance with Required Actions A.3.1, A.3.2.1, and A.3.2.2.

A.3.1, A.3.2.1, and A.3.2.2

If the CEA with an inoperable position indicator channel cannot be maintained within the group alignment limits of LCO 3.1.4 when withdrawing or inserting the CEA, Required Actions A.3.1, A.3.2.1, and A.3.2.2 allow withdrawing or inserting the CEA group to the fully withdrawn or fully inserted position provided THERMAL POWER is reduced to ≤ 70% RTP.

Required Action A.3.1 requires the THERMAL POWER reduction to place the core in a condition where moving a controlling CEA group will not result in core peaking factors exceeding associated limits (Ref. 3).

Required Action A.3.2.1 and A.3.2.2 require either fully withdrawing or fully inserting the CEA group with the inoperable position indicator channel so the position of the affected CEA can be verified using the CEA Limits Indication System.

The Completion Time of Required Action A.3.1 is reasonable, based on operating experience, for reducing power to ≤ 70% RTP from full power conditions without challenging plant systems.

BASES

ACTIONS (continued

The Completion Time of Required Actions A.3.2.1 and A.3.2.2 takes into account the time to reduce THERMAL POWER and the additional time needed to fully withdraw or fully insert the associated CEA group.

Required Actions A.3.2.1 and A.3.2.2 are modified by a Note to only allow fully withdrawing or fully inserting a CEA group with the inoperable position indicator channel if the CEA group can be maintained within the CEA group withdrawal sequence and insertion limits specified in the COLR, as required by LCO 3.1.6.

B.1 and B2

With one or more CEA groups with one reed switch or one pulse counting position indicator channel inoperable and the associated CEA is fully withdrawn or fully inserted, a verification is required to ensure that either the CEA “full out” or “full in” limit indicator is actuated immediately and every 12 hours thereafter. The associated CEA “full out” or “full in” limit position indicator actuation provides assurance the CEA is at a known position. Use of the CEA limit indicator is an acceptable method to determine CEA position since the CEA Limits Indication System is separate and independent from the reed switch and the pulse counting position indication systems. Performing the verification immediately, and every 12 hours thereafter, is considered acceptable in view of other information available to the operator in the control room to determine CEA position and that the actual CEA position is not expected to change.

C.1 and C.2

With one or more CEA groups with two or more pulse counting position indicator channels inoperable, continued operation in MODES 1 and 2 may continue provided verification that no more than one reed switch position indicator channel per group is inoperable. Required Action C.1 ensures no more than one CEA per group has lost position indication. The Completion Time of immediately ensures that prompt action is taken to verify the status of the remaining CEA position indicator channels within the group.

Required Action C.2 requires the pulse counting position indicator channels be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is adequate time to restore the inoperable pulse counting position indicator channels to OPERABLE status, considering the reed switch position indicators will continue to provide indication of CEA position.

ACTIONS (continued)

D.1

If two or more reed switch position indicator channels are inoperable in one or more CEA groups, or the Required Actions cannot be completed within the associated Completion Times, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1

This SR verifies that CEA pulse counting indicator position channels and reed switch position indicator channels for the CEAs in each group agree within 4.5 inches. This Surveillance is performed every 4 hours when the alignment deviation circuit is inoperable. Performing the verification every 4 hours when the alignment deviation circuit is inoperable, is considered acceptable in view of other information continuously available to the operator in the control room. The periodic Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13.
2. 10 CFR 50.46
3. UFSAR, Chapter 7.5.1.3.
4. UFSAR, Chapter 15.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Control Element Assembly (CEA) Position Indication

BASES

BACKGROUND

According to GDC 13 (Ref. 1), instrumentation to monitor variables and systems over their operating ranges during normal operation, anticipated operational occurrences, and accident conditions must be OPERABLE. The purpose of this LCO is to ensure OPERABILITY of the shutdown and regulating CEA position indicators so CEA position can be determined thereby ensuring compliance with the CEA alignment and insertion limits.

The OPERABILITY (i.e., trippability) of the shutdown and regulating CEAs is an initial assumption in the safety analyses that assume CEA insertion upon reactor trip. Maximum CEA misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10 and GDC 26 (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants" (Ref. 2).

Limits on CEA alignment and OPERABILITY have been established, and CEA positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

CEAs are moved by their control element drive mechanisms (CEDMs). Each CEDM moves its CEA one step (approximately 0.75 inches) at a time. Step in and step out signals are totalized within the CEA Control System to provide one of the means of determining CEA position.

The axial position of shutdown and regulating CEAs is indicated by two separate and independent systems: Pulse Counting Position Indication System and the Reed Switch Position Indication System. Additionally, the CEA Limits Indication System independently provides indication of a CEA that is fully withdrawn or fully inserted.

BASES

BACKGROUND (continued)

The Pulse Counting Position Indication System counts the pulses sent to the CEA gripper coils from the CEDM Control System that moves the CEAs. There is a step counter for each CEA. Individual CEAs in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the pulse counter. The Pulse Counting Position Indication System is considered highly precise (± 1 step or ± 0.75 inches).

The Reed Switch Position Indication System provides an independent and diverse means of providing indication of actual CEA position, but at a lower precision than the step counters. This system is based on signals from a series of magnetically actuated reed switch position transmitters spaced at 1.5-inch intervals along the CEDM housing. The reed switch position transmitters provide voltage signals for CEA position monitoring in the control room. The reed switch position transmitters also provide signals for alarm information and CEA motion inhibit on CEA deviation within a group.

The CEA Limits Indication System provides indication of a fully withdrawn or fully inserted CEA from distinct contact closure signals from the reed switch position transmitter assembly. The limit reed switch position transmitter assembly, on each CEA, transmits an upper electrical limit signal when the CEA is fully withdrawn and transmits a lower electrical limit signal when the CEA is fully inserted. The CEA Limits Indication System is separate from the Reed Switch Position Indication System.

A detailed description of the CEA position indication systems is found in the UFSAR, Chapter 7 (Ref. 3)

APPLICABLE SAFETY ANALYSES

CEA misalignment accidents are analyzed in the safety analysis (Ref. 4). The accident analysis defines CEA misoperation as any event, with the exception of sequential group withdraws, which could result from a single malfunction in the reactivity control systems. For example, CEA misalignment may be caused by a malfunction of the CEDM, CEDM Control System, or by operator error. Therefore, the acceptance criteria for CEA position indication is that CEA positions must be known with sufficient accuracy in order to verify the core is operating within the limits of LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits," and LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits". The CEA positions must also be known in order to verify the alignment limits are preserved (LCO 3.1.4, "Control Element Assembly (CEA) Alignment"). CEA positions are continuously monitored to provide operators with information that ensures the plant is operating within the bounds of the accident analysis assumptions.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The position of the CEAs satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). The CEA position indication systems monitor CEA position, which is an initial condition of the accident.

LCO

OPERABILITY of the CEA reed switch and pulse counting position indicator channels ensure that the CEA alignment assumptions in the safety analysis will remain valid. The CEA alignment requirements specified in LCO 3.1.4 ensure that the CEA groups maintain the correct power distribution and CEA alignment.

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned CEAs can be detected. Therefore, power peaking and SDM can be controlled within acceptable limits.

For a CEA position indicator channel to be considered OPERABLE, the position indicator must be capable of determining the absolute CEA position within ± 2.50 inches.

APPLICABILITY

The requirements on CEA position indicator channels are applicable in MODES 1 and 2 because these are the MODES power is generated, and the OPERABILITY and alignment of CEAs and CEA insertion limits have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and regulating banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each CEA group. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for one or more inoperable position indicator channels in each CEA group.

Conditions A and B are modified by a Note. The Note to Condition A indicates that the Condition only applies when the inoperable position indicator channel is associated with a partially inserted CEA and the Note to Condition B indicates that the Condition only applies when the inoperable position indicator channel is associated with a fully withdrawn or fully inserted CEA. Because the actions are different for partially inserted CEAs and CEAs that are fully inserted or fully withdrawn, these

ACTIONS (continued

Notes identify the applicable Condition when a CEA reed switch or pulse counting position indicator channel in one or more CEA groups is inoperable.

A.1 and A.2

With one or more CEA groups with one reed switch or one pulse counting position indicator channel inoperable, Required Actions A.1 and A.2 require fully withdrawing or fully inserting the CEA with the inoperable position indicator. These actions place the CEA in a condition where the position can be verified using the CEA Limits Indication System. The associated CEA “full out” or “full in” limit position indicator actuation provides assurance the CEA is at a known position. Once the CEA is fully withdrawn or fully inserted, Condition A no longer applies and Condition B is entered. The Completion Time for Required Actions A 1 and A.2 is reasonable, based on operating experience, to fully withdraw or fully insert a CEA during power operation.

Required Actions A.1 and A.2 are modified by a Note to restrict these options to only be applicable if the CEA with the inoperable position indicator channel can be maintained within the group alignment limits required by LCO 3.1.4 when the CEA is fully withdrawn or fully inserted. Otherwise, the CEA group must be fully withdrawn or fully inserted in accordance with Required Actions A.3.1, A.3.2.1, and A.3.2.2.

A.3.1, A.3.2.1, and A.3.2.2

If the CEA with an inoperable position indicator channel cannot be maintained within the group alignment limits of LCO 3.1.4 when withdrawing or inserting the CEA, Required Actions A.3.1, A.3.2.1, and A.3.2.2 allow withdrawing or inserting the CEA group to the fully withdrawn or fully inserted position provided THERMAL POWER is reduced to ≤ 70% RTP.

Required Action A.3.1 requires the THERMAL POWER reduction to place the core in a condition where moving a controlling CEA group will not result in core peaking factors exceeding associated limits (Ref. 3).

Required Action A.3.2.1 and A.3.2.2 require either fully withdrawing or fully inserting the CEA group with the inoperable position indicator channel so the position of the affected CEA can be verified using the CEA Limits Indication System.

The Completion Time of Required Action A.3.1 is reasonable, based on operating experience, for reducing power to ≤ 70% RTP from full power conditions without challenging plant systems.

ACTIONS (continued

The Completion Time of Required Actions A.3.2.1 and A.3.2.2 takes into account the time to reduce THERMAL POWER and the additional time needed to fully withdraw or fully insert the associated CEA group.

Required Actions A.3.2.1 and A.3.2.2 are modified by a Note to only allow fully withdrawing or fully inserting a CEA group with the inoperable position indicator channel if the CEA group can be maintained within the CEA group withdrawal sequence and insertion limits specified in the COLR, as required by LCO 3.1.6.

B.1 and B2

With one or more CEA groups with one reed switch or one pulse counting position indicator channel inoperable and the associated CEA is fully withdrawn or fully inserted, a verification is required to ensure that either the CEA “full out” or “full in” limit indicator is actuated immediately and every 12 hours thereafter. The associated CEA “full out” or “full in” limit position indicator actuation provides assurance the CEA is at a known position. Use of the CEA limit indicator is an acceptable method to determine CEA position since the CEA Limits Indication System is separate and independent from the reed switch and the pulse counting position indication systems. Performing the verification immediately, and every 12 hours thereafter, is considered acceptable in view of other information available to the operator in the control room to determine CEA position and that the actual CEA position is not expected to change.

C.1 and C.2

With one or more CEA groups with two or more pulse counting position indicator channels inoperable, continued operation in MODES 1 and 2 may continue provided verification that no more than one reed switch position indicator channel per group is inoperable. Required Action C.1 ensures no more than one CEA per group has lost position indication. The Completion Time of immediately ensures that prompt action is taken to verify the status of the remaining CEA position indicator channels within the group.

Required Action C.2 requires the pulse counting position indicator channels be restored to OPERABLE status within 72 hours. The Completion Time of 72 hours is adequate time to restore the inoperable pulse counting position indicator channels to OPERABLE status, considering the reed switch position indicators will continue to provide indication of CEA position.

ACTIONS (continued)

D.1

If two or more reed switch position indicator channels are inoperable in one or more CEA groups, or the Required Actions cannot be completed within the associated Completion Times, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1

This SR verifies that CEA pulse counting indicator position channels and reed switch position indicator channels for the CEAs in each group agree within 5.0 inches. This Surveillance is performed every 4 hours when the alignment deviation circuit is inoperable. Performing the verification every 4 hours when the alignment deviation circuit is inoperable, is considered acceptable in view of other information continuously available to the operator in the control room. The periodic Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13.
2. 10 CFR 50.46
3. UFSAR, Chapter 7.5.1.3.
4. UFSAR, Chapter 15.

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.7, BASES, CONTROL ELEMENT ASSEMBLY (CEA) POSITION INDICATION

1. NUREG 1432, “Standard Technical Specifications, Combustion Engineering Plants”, Revision 5.0, ISTS 3.1.4 includes one Surveillance Requirement (SR) related to CEA position indication, ISTS SR 3.1.4.5. However, the LCO statement of ISTS 3.1.4 does not specifically delineate position indication as being required for a CEA. It only requires OPERABILITY of CEAs to be within the alignment limits. Furthermore, the LCO Section of the ISTS 3.1.4 Bases does not describe indication as a necessary feature for the CEA to be OPERABLE. However, the ISTS Bases for SR 3.1.4.5 provides a requirement that each reed switch position indication channel ensures the channel is OPERABLE and capable of indicating CEA position over the entire length of the CEA's travel. In addition, ISTS 3.1.4 does not provide any specific actions to take if one or more of the required CEA position indicators is inoperable. Consistent with the approach taken in NUREG 1431, “Standard Technical Specifications, Westinghouse Plants”, Revision 5.0, a new LCO has been provided for the CEA Position Indicators.

   PSL Unit 1 CTS 3.1.3.3 and PSL Unit 2 CTS 3.1.3.2 are adapted using NUREG 1431, ISTS 3.1.7 and ISTS 3.1.7 Bases, to develop the new LCO 3.1.7. PSL LCO 3.1.7 maintains the current licensing basis while adapting the new LCO to NUREG 1431 requirements. Specifically, PSL requires two CEA position indicator channels for each CEA to be OPERABLE; the reed switch position indicator channels and the pulse counting indicator channel. The ACTIONS are adapted from the ACTIONS in NUREG-1431. The Surveillance Requirement ensures the reed switch position indicator channels and the pulse counting indicator channels for a group agree within an allowable tolerance.

   Refer to the PSL Unit 1 CTS 3.1.3.3 and PSL Unit 2 CTS 3.1.3.2 markups and discussion of changes for the details of changes from CTS to ITS 3.1.7.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.7, CONTROL ELEMENT ASSEMBLY (CEA) POSITION INDICATION

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 8

3.1.8, Special Test Exceptions (STE) - MODES 1 and 2

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

ITS

A01

SPECIAL TEST EXCEPTIONS (STE) – MODES 1 and 2

~~GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS~~

LIMITING CONDITION FOR OPERATION

LCO 3.1.8

3.10.2 The group height, insertion and power distribution limits of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3 and 3.2.4 may be suspended during the performance of PHYSICS TESTS provided:

a. The THERMAL POWER is restricted to the test power plateau which shall not exceed 85% of RATED THERMAL POWER, and

A02

~~b. The limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.2.2 below.~~

Applicability **APPLICABILITY:** MODES 1 and 2.

ACTION:

With any of the limits of Specification 3.2.1 being exceeded while the requirements of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3 and 3.2.4 are suspended, either:

to less than or equal to the test power plateau within 15 minutes — A02

ACTION A a. Reduce THERMAL POWER ~~sufficiently to satisfy the requirements of Specification 3.2.1~~, or

Add ITS 3.1.8 ACTION B — M01

ACTION B b. ~~Be in HOT STANDBY within 6 hours.~~

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1 4.10.2.1 The THERMAL POWER shall be determined in accordance with the Surveillance Frequency Control Program during PHYSICS TESTS in which the requirements of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3, or 3.2.4 are suspended and shall be verified to be within the test power plateau.

~~4.10.2.2 The linear heat rate shall be determined to be within the limits of Specification 3.2.1 by monitoring it continuously with the Incore Detector Monitoring System pursuant to the requirements of Specifications 4.2.1.4 during PHYSICS TESTS above 5% of RATED THERMAL POWER in which the requirements of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3, or 3.2.4 are suspended.~~ A02

A01

SPECIAL TEST EXCEPTIONS

PRESSURE/TEMPERATURE LIMITATION – REACTOR CRITICALITY

LIMITING CONDITION FOR OPERATION

3.10.3 This specification deleted.

SURVEILLANCE REQUIREMENTS

4.10.3 This specification deleted.

SPECIAL TEST EXCEPTIONS

A01

PHYSICS TESTS

LIMITING CONDITION FOR OPERATION

3.10.4 This specification deleted.

SURVEILLANCE REQUIREMENTS

4.10.4 This specification deleted.

A01

SPECIAL TEST EXCEPTIONS (STE) – MODES 1 and 2

A03

3/4.10.2 MODERATOR TEMPERATURE COEFFICIENT, GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION

LCO 3.1.8 3.10.2 The moderator temperature coefficient, group height, insertion and power distribution limits of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3 and 3.2.4 may be suspended during performance of PHYSICS TESTS provided:

a. The THERMAL POWER is restricted to the test power plateau which shall not exceed 85% of RATED THERMAL POWER, and

A02

b. The limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.2.2 below.

Applicability **APPLICABILITY:** MODES 1 and 2.

A02

ACTION:

to less than or equal to the test power plateau within 15 minutes

With any of the limits of Specification 3.2.1 being exceeded while the requirements of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3 and 3.2.4 are suspended, either:

ACTION A a. Reduce THERMAL POWER sufficiently to satisfy the requirements of Specification 3.2.1, or

Add ITS 3.1.8 ACTION B M01

ACTION B b. Be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1 4.10.2.1 The THERMAL POWER shall be determined in accordance with the Surveillance Frequency Control Program during PHYSICS TESTS in which the requirements of Specifications 3.1.1.4, 3.1.3.1,3.1.3.5, 3.1.3.6, 3.2.3, or 3.2.4 are suspended and shall be verified to be within the test power plateau.

4.10.2.2 The linear heat rate shall be determined to be within the limits of Specification 3.2.1 by monitoring it continuously with the Incore Detector Monitoring System pursuant to the requirements of Specifications 4.2.1.4 during PHYSICS TESTS above 5% of RATED THERMAL POWER in which the requirements of Specifications 3.1.1.4, 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.3, or 3.2.4 are suspended. A02

A01

SPECIAL TEST EXCEPTIONS (STE) – MODES 1 and 2

~~3/4.10.5 CEA INSERTION DURING ITC, MTC, AND POWER COEFFICIENT MEASUREMENTS~~ A03

LIMITING CONDITION FOR OPERATION

LCO 3.1.8 3.10.5 The requirements of Specifications 3.1.3.1 and 3.1.3.6 may be suspended during the performance of PHYSICS TESTS ~~to determine the isothermal temperature coefficient, moderator temperature coefficient, and power coefficient~~ ~~provided the limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.5.2 below.~~ LA01 A02

provided THERMAL POWER is restricted to the test power plateau, which shall not exceed 85% RTP. M02

Applicability **APPLICABILITY:** MODES 1 and 2.

ACTION:

With any of the limits of Specification 3.2.1 being exceeded while the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended, either:

to less than or equal to the test power plateau within 15 minutes A02

ACTION A a. Reduce THERMAL POWER ~~sufficiently to satisfy the requirements of Specification 3.2.1~~, or

Add ITS 3.1.8 ACTION B M01

ACTION B b. ~~Be in HOT STANDBY within 6 hours~~.

In accordance with the Surveillance Frequency Control Program LA02

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1 4.10.5.1 The THERMAL POWER shall be determined ~~at least once per hour~~ during PHYSICS TESTS in which the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended and shall be verified to be within the test power plateau.

~~4.10.5.2 The linear heat rate shall be determined to be within the limits of Specification 3.2.1 by monitoring it continuously with the Incore Detector Monitoring System pursuant to the requirements of Specification 4.2.1.4 during PHYSICS TESTS above 5% of RATED THERMAL POWER in which the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended.~~ A02

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2 Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications - Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.10.2 and Unit 2 CTS 3.10.5 require the linear heat rate (LHR) limits of Specification 3.2.1 to be maintained and determined in accordance with the applicable Surveillances (CTS 4.10.2.2 and 4.10.5.2, respectively). These Surveillances require verifying LHR is within limits by monitoring continuously with the Incore Detector Monitoring System during PHYSICS TESTS above 5% RTP when the applicable LCOs are suspended. Additionally, Action a of CTS 3.10.2 and Unit 2 CTS 3.10.5 require reducing THERMAL POWER sufficiently to satisfy the requirements of Specification 3.2.1. Neither CTS 3.10.2 nor Unit 2 CTS 3.10.5 allow suspension of CTS 3.2.1 requirements. Therefore, it is unnecessary to state that the LHR requirements of Specification 3.2.1 be maintained and determined to be within limits because CTS 3.2.1 (ITS 3.2.1) will continue to be required in MODE 1 (i.e., above 5% RTP) irrespective of whether PHYSICS TESTS are in progress.

In addition, testing maintains THERMAL POWER within the test power plateau and limits THERMAL POWER to < 85% RTP as specified in CTS 3.10.2.a. ITS LCO 3.1.8 retains this requirement. Limiting THERMAL POWER to < 85% RTP ensures that LHRs are maintained within acceptable limits. Therefore, the limits specified in CTS 3.2.1 (ITS 3.2.1) will be maintained in MODE 1 during PHYSICS TESTS.

This change is acceptable because the requirement to restrict THERMAL POWER to the test power plateau and not to exceed 85% RTP ensures the LHR requirement of Specification 3.2.1 is maintained within the limits specified in the COLR. Therefore, explicitly stating this as a requirement is unnecessary. Additionally, ITS 3.1.8 Required Action A.1, which requires reducing THERMAL POWER to less than or equal to the test power plateau within 15 minutes when the test power plateau is exceeded, ensures THERMAL power will be sufficiently reduced to satisfy the requirements of Specification 3.2.1.

This change is designated as administrative because the ITS requirements achieve the same result as the CTS requirements; maintain the LHR requirements of CTS 3.2.1 within the limits specified in the COLR.

A03 Combines Unit 2 CTS 3.10.2 and CTS 3.10.5 into one Specification, ITS 3.1.8. The requirements of CTS 3.10.5 are encompassed in ITS 3.1.8 by allowing the CEA alignment limits and regulating CEA insertion limits to be suspended to perform PHYSICS TESTS. Changes related to Unit 2 CTS 3.10.2 are discussed in other Discussion of Changes (DOCs) provided herein.

MORE RESTRICTIVE CHANGES

M01 CTS 3.10.2 and Unit 2 CTS 3.10.5 actions require the unit to be placed in Hot Standby within 6 hours when the limits of Specification 3.2.1 are exceeded while requirements are suspended during PHYSICS TESTS in MODE 1. ITS 3.1.8 requires the PHYSICS TESTS to be suspended within 1 hour when the Required Actions and associated Completion Times are not met. This changes the CTS by requiring the PHYSICS TESTS to be suspended within 1 hour instead of placing the unit in MODE 3 (Hot Standby) within 6 hours. Suspension of the PHYSICS TEST results in canceling the STE and application of the normal Technical Specifications. This change is designated as more restrictive because it requires a more restrictive action within a shorter Completion Time than CTS.

M02 **Unit 2 only:** CTS 3.10.5 allows CTS 3.1.3.1 and 3.1.3.6 to be suspended during performance of PHYSICS TESTS provided the limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.5.2 with no explicit restriction on THERMAL POWER. ITS 3.1.8 also allows suspension of LCO 3.1.4 (CTS 3.1.3.1) and LCO 3.1.6 (CTS 3.1.3.6) requirements provided THERMAL POWER is restricted to the test power plateau, which shall not exceed 85% RTP. This changes the CTS by restricting THERMAL POWER to the test power plateau not to exceed 85% RTP while performing these PHYSICS TESTS. Restricting THERMAL POWER to the test power plateau with a maximum restriction of 85% RTP ensures that adequate LHR and DNB parameter margins are maintained while the applicable LCOs are suspended. Therefore, as discussed in DOC A02 herein, the limits specified in CTS 3.2.1 (ITS 3.2.1) will be maintained in MODE 1 during PHYSICS TESTS.

This change is designated as more restrictive because THERMAL POWER is restricted to the test power plateau with a maximum restriction of 85% RTP.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 (*Type 1 – Removing Details of System Design and System Description, Including Design Limits*) Unit 2 CTS 3.10.5 states, in part, that the purpose of the STE is to "…determine the isothermal temperature coefficient, moderator temperature coefficient, and power coefficient..." ITS does not include the details of why the STE is used. This changes the CTS by eliminating the specific reason the STE is used.

The removal of these details, which are related to description of the STE, from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS explicitly requires THERMAL POWER to be restricted to the test power plateau and not to exceed 85% RTP while performing PHYSICS TEST with the specified LCOs not met. Also, this change is acceptable because the removed information will be adequately controlled in the Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design (i.e., description of the purpose of the STE) is being removed from the Technical Specifications.

LA02 (*Type 6 – Removal of SR Frequency to the Surveillance Frequency Control Program*) CTS 4.10.5.1 requires verification that THERMAL POWER be determined at least once per hour during PHYSICS TESTS in which the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended and shall be verified to be within the test power plateaus. ITS SR 3.1.8.1 requires a similar Surveillance and specifies a periodic Frequency of, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified periodic Frequency to the Surveillance Frequency Control Program.

The removal of periodic Surveillance Requirement Frequencies is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement to periodically verify THERMAL POWER is within the test power plateau. The existing Surveillance Frequency is removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. The control of changes to Surveillance Frequencies is in accordance with the Surveillance Frequency Control Program requirements specified in ITS Chapter 5.0. This program ensures that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change because Surveillance Frequencies are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

None

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

CTS

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Special Test Exceptions (STE) - MODES 1 and 2 (Analog) 1

3.10.2 LCO 3.1.8 During the performance of PHYSICS TESTS, the requirements of:

LCO 3.1.3, "Moderator Temperature Coefficient (MTC),"
LCO 3.1.4, "Control Element Assembly (CEA) Alignment,"
LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits,"
LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits,"
~~LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY}),"~~
LCO 3.2.~~3~~2, "Total Integrated Radial Peaking Factor (F^T_r)," and
LCO 3.2.~~4~~3, "AZIMUTHAL POWER TILT (T_q)," 2

may be suspended, provided THERMAL POWER is restricted to the test power plateau, which shall not exceed 85% RTP.

Applicability APPLICABILITY: MODES 1 and 2 during PHYSICS TESTS.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a DOC A02	A. Test power plateau exceeded.	A.1 Reduce THERMAL POWER to less than or equal to test power plateau.	15 minutes
Action b DOC M01	B. Required Action and associated Completion Time not met.	B.1 Suspend PHYSICS TESTS.	1 hour

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.10.2.1	SR 3.1.8.1	Verify THERMAL POWER is equal to or less than the test power plateau.	[1 hour OR In accordance with the Surveillance Frequency Control Program]	(3)

CTS

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Special Test Exceptions (STE) - MODES 1 and 2 (Analog) 1

3.10.2
3.10.5

LCO 3.1.8 During the performance of PHYSICS TESTS, the requirements of:

LCO 3.1.3, "Moderator Temperature Coefficient (MTC),"
LCO 3.1.4, "Control Element Assembly (CEA) Alignment,"
LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits,"
LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits,"
~~LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY}),"~~
LCO 3.2.32, "Total Integrated Radial Peaking Factor (F^T_r)," and
LCO 3.2.43, "AZIMUTHAL POWER TILT (T_q),"

2

DOC M02 may be suspended, provided THERMAL POWER is restricted to the test power plateau, which shall not exceed 85% RTP.

Applicability APPLICABILITY: MODES 1 and 2 during PHYSICS TESTS.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a DOC A02	A. Test power plateau exceeded.	A.1 Reduce THERMAL POWER to less than or equal to test power plateau.	15 minutes
Action b DOC M01	B. Required Action and associated Completion Time not met.	B.1 Suspend PHYSICS TESTS.	1 hour

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.10.2.1 4.10.5.1	SR 3.1.8.1	Verify THERMAL POWER is equal to or less than the test power plateau.	~~[1 hour~~ (3) ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ (3)

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.8, SPECIAL TEST EXCEPTIONS (STE) – MODES 1 and 2

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~

1

B 3.1.8 Special Test Exceptions (STE) - MODES 1 and 2 ~~(Analog)~~

BASES

BACKGROUND

The primary purpose of these MODES 1 and 2 Special Test Exceptions (STE) is to permit relaxation of existing LCOs to allow the performance of certain PHYSICS TESTS. These tests are conducted to determine specific reactor core characteristics.

Section XI of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants" (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. All functions necessary to ensure that specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. Testing is required as an integral part of the design, fabrication, construction, and operation of the power plant. Requirements for notification of the NRC, for the purpose of conducting tests and experiments, are specified in 10 CFR 50.59, "Changes, Tests, and Experiments" (Ref. 2).

The key objectives of a test program are to (Ref. 3):

a. Ensure that the facility has been adequately designed,

b. Validate the analytical models used in design and analysis,

c. Verify assumptions used for predicting plant response,

d. Ensure that installation of equipment in the facility has been accomplished in accordance with design, and

e. Verify that operating and emergency procedures are adequate.

To accomplish these objectives, testing is required prior to initial criticality, after each refueling shutdown, and during startup, low power operation, power ascension, and at power operation. The PHYSICS TESTS requirements for reload fuel cycles ensure that the operating characteristics of the core are consistent with the design predictions, and that the core can be operated as designed (Ref. 4).

BASES

BACKGROUND (continued)

PHYSICS TESTS procedures are written and approved in accordance with established formats. The procedures include all information necessary to permit a detailed execution of testing required to ensure that design intent is met. PHYSICS TESTS are performed in accordance with these procedures and test results are approved prior to continued power escalation and long term power operation.

Examples of PHYSICS TESTS include determination of critical boron concentration, control element assembly (CEA) group worths, reactivity coefficients, flux symmetry, and core power distribution.

APPLICABLE SAFETY ANALYSES

It is acceptable to suspend certain LCOs for PHYSICS TESTS because fuel damage criteria are not exceeded. Even if an accident occurs during a PHYSICS TEST with one or more LCOs suspended, fuel damage criteria are preserved because the limits on power distribution and shutdown capability are maintained during PHYSICS TESTS.

Reference 5 define~~s~~d the requirements for initial testing of the facility, 2
including PHYSICS TESTS. Requirements for reload fuel cycle PHYSICS TESTS are defined in ANSI/ANS-19.6.1-1985 (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits of all LCOs, conditions may occur when one or more LCOs must be suspended to make completion of PHYSICS TESTS possible or practical. This is acceptable as long as the fuel design criteria are not violated. As long as the linear heat rate (LHR) remains within its limit, fuel design criteria are preserved.

In this test, the following LCOs are suspended:

LCO 3.1.3, "Moderator Temperature Coefficient (MTC),"
LCO 3.1.4, "Control Element Assembly (CEA) Alignment,"
LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits,"
LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits,"
~~LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY}),"~~ 3
LCO 3.2.~~3~~2, "Total Integrated Radial Peaking Factor (F^T_r)" and
LCO 3.2.~~4~~3, "AZIMUTHAL POWER TILT (T_q)."

The ~~safety analysis (Ref. 6) places~~ limits on allowable THERMAL POWER during PHYSICS TESTS ~~and requires~~ ensure the LHR and the departure from nucleate boiling (DNB) parameter ~~to be~~ are maintained within limits. 2 The power plateau of < 85% RTP and the associated trip setpoints are required to ensure ~~[explain]~~ adequate margin is provided to the LHR and DNB parameter limits so that fuel design limits are not violated during PHYSICS TESTS. 4

BASES

APPLICABLE SAFETY ANALYSES (continued)

The individual LCOs governing CEA group height, insertion and alignment, ASI, F^T_{XY}, F^T_r, and T_q preserve the LHR limits. Additionally, the LCOs governing Reactor Coolant System (RCS) flow, reactor inlet temperature (T_c), and pressurizer pressure contribute to maintaining DNB parameter limits. The initial condition criteria for accidents sensitive to core power distribution are preserved by the LHR and DNB parameter limits. The criteria for the loss of coolant accident (LOCA) are specified in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 76). The criteria for the loss of forced reactor coolant flow accident are specified in Reference 7. Operation within the LHR limit preserves the LOCA criteria; operation within the DNB parameter limits preserves the loss of flow criteria. 3 2

During PHYSICS TESTS, one or more of the LCOs that normally preserve the LHR and DNB parameter limits may be suspended. The results of the accident analysis are not adversely impacted, however, if LHR and DNB parameters are verified to be within their limits while the LCOs are suspended. Therefore, SRs are placed as necessary to ensure that LHR and DNB parameters remain within limits during PHYSICS TESTS. Performance of these Surveillances allows PHYSICS TESTS to be conducted without decreasing the margin of safety.

PHYSICS TESTS include measurement of core parameters or exercise of control components that affect process variables. Among the process variables involved are F^T_{XY}, F^T_r, T_q, and ASI, which represent initial condition input (power peaking) to the accident analysis. Also involved are the shutdown and regulating CEAs, which affect power peaking and are required for shutdown of the reactor. The limits for these variables are specified for each fuel cycle in the COLR. 3

As described in LCO 3.0.7, compliance with Special Test Exceptions LCOs is optional, and therefore no criteria of 10 CFR 50.36(c)(2)(ii) apply. Special Test Exception LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

BASES

LCO

This LCO permits individual CEAs to be positioned outside of their normal group heights and insertion limits during the performance of PHYSICS TESTS such as those required to:

a. Measure CEA worth,

b. Determine the reactor stability index and damping factor under xenon oscillation conditions,

c. Determine power distributions for nonnormal CEA configurations,

d. Measure rod shadowing factors, and

e. Measure temperature and power coefficients.

Additionally, it permits the center CEA to be misaligned during PHYSICS TESTS required to determine the isothermal temperature coefficient (ITC), MTC, and power coefficient.

The requirements of LCO 3.1.3, LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.2.2, [and] LCO 3.2.3~~, and LCO 3.2.4~~ may be suspended during the performance of PHYSICS TESTS, provided THERMAL POWER is restricted to test power plateau, which shall not exceed 85% RTP. (3)

APPLICABILITY

This LCO is applicable in MODES 1 and 2 because the reactor must be critical at various THERMAL POWER levels to perform the PHYSICS TESTS described in the LCO section. Limiting the test power plateau to < 85% RTP ensures that LHRs are maintained within acceptable limits.

ACTIONS

A.1

If THERMAL POWER exceeds the test power plateau, THERMAL POWER must be reduced to restore the additional thermal margin provided by the reduction. The 15 minute Completion Time ensures that prompt action shall be taken to reduce THERMAL POWER to within acceptable limits.

B.1~~ and B.2~~ (3)

If Required Action A.1 cannot be completed within the required Completion Time, PHYSICS TESTS must be suspended within 1 hour. Allowing 1 hour for suspending PHYSICS TESTS allows the operator sufficient time to change any abnormal CEA configuration back to within the limits of LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6.

BASES

ACTIONS (continued)

Suspension of PHYSICS TESTS exceptions requires restoration of each of the applicable LCOs to within specification.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

Verifying that THERMAL POWER is equal to or less than that allowed by the test power plateau, as specified in the PHYSICS TEST procedure and required by the safety analysis, ensures that adequate LHR and DNB parameter margins are maintained while LCOs are suspended. [The 1 hour Frequency is sufficient, based on the slow rate of power change and increased operational controls in place during PHYSICS TESTS. 4

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
--]

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
2. 10 CFR 50.59.
3. Regulatory Guide 1.68, Revision 21, August 1978. January 1977 2
4. ANSI/ANS-19.6.1-1985, December 13, 1985.
5. U FSAR, Chapter [14]. 4 2
6. FSAR, Section [15.3.2.1].
76. 10 CFR 50.46. 2
7. USFAR, Section 15.2.5

B 3.1 REACTIVITY CONTROL SYSTEMS ~~(Analog)~~

1

B 3.1.8 Special Test Exceptions (STE) - MODES 1 and 2 ~~(Analog)~~

BASES

BACKGROUND

The primary purpose of these MODES 1 and 2 Special Test Exceptions (STE) is to permit relaxation of existing LCOs to allow the performance of certain PHYSICS TESTS. These tests are conducted to determine specific reactor core characteristics.

Section XI of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants" (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. All functions necessary to ensure that specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. Testing is required as an integral part of the design, fabrication, construction, and operation of the power plant. Requirements for notification of the NRC, for the purpose of conducting tests and experiments, are specified in 10 CFR 50.59, "Changes, Tests, and Experiments" (Ref. 2).

The key objectives of a test program are to (Ref. 3):

a. Ensure that the facility has been adequately designed,

b. Validate the analytical models used in design and analysis,

c. Verify assumptions used for predicting plant response,

d. Ensure that installation of equipment in the facility has been accomplished in accordance with design, and

e. Verify that operating and emergency procedures are adequate.

To accomplish these objectives, testing is required prior to initial criticality, after each refueling shutdown, and during startup, low power operation, power ascension, and at power operation. The PHYSICS TESTS requirements for reload fuel cycles ensure that the operating characteristics of the core are consistent with the design predictions, and that the core can be operated as designed (Ref. 4).

BASES

BACKGROUND (continued)

PHYSICS TESTS procedures are written and approved in accordance with established formats. The procedures include all information necessary to permit a detailed execution of testing required to ensure that design intent is met. PHYSICS TESTS are performed in accordance with these procedures and test results are approved prior to continued power escalation and long term power operation.

Examples of PHYSICS TESTS include determination of critical boron concentration, control element assembly (CEA) group worths, reactivity coefficients, flux symmetry, and core power distribution.

APPLICABLE SAFETY ANALYSES

It is acceptable to suspend certain LCOs for PHYSICS TESTS because fuel damage criteria are not exceeded. Even if an accident occurs during a PHYSICS TEST with one or more LCOs suspended, fuel damage criteria are preserved because the limits on power distribution and shutdown capability are maintained during PHYSICS TESTS.

Reference 5 define~~s~~d the requirements for initial testing of the facility, including PHYSICS TESTS. Requirements for reload fuel cycle PHYSICS TESTS are defined in ANSI/ANS-19.6.1-1985 (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits of all LCOs, conditions may occur when one or more LCOs must be suspended to make completion of PHYSICS TESTS possible or practical. This is acceptable as long as the fuel design criteria are not violated. As long as the linear heat rate (LHR) remains within its limit, fuel design criteria are preserved. (2)

In this test, the following LCOs are suspended:

LCO 3.1.3, "Moderator Temperature Coefficient (MTC),"
LCO 3.1.4, "Control Element Assembly (CEA) Alignment,"
LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits,"
LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits,"
~~LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY}),"~~ (3)
LCO 3.2.~~3~~2, "Total Integrated Radial Peaking Factor (F^T_r)" and
LCO 3.2.~~4~~3, "AZIMUTHAL POWER TILT (T_q)."

The ~~safety analysis (Ref. 6) places~~ limits on allowable THERMAL POWER during PHYSICS TESTS ~~and requires~~ ensure the LHR and the departure from nucleate boiling (DNB) parameter ~~to be~~ are maintained within limits. (2) The power plateau of < 85% RTP and the associated trip setpoints are required to ensure ~~[explain]~~ adequate margin is provided to the LHR and DNB parameter limits so that fuel design limits are not violated during PHYSICS TESTS. (4)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The individual LCOs governing CEA group height, insertion and alignment, ASI, F^T_{XY}, $F^T{}_r$, and T_q preserve the LHR limits. Additionally, the LCOs governing Reactor Coolant System (RCS) flow, reactor inlet temperature (T_c), and pressurizer pressure contribute to maintaining DNB parameter limits. The initial condition criteria for accidents sensitive to core power distribution are preserved by the LHR and DNB parameter limits. The criteria for the loss of coolant accident (LOCA) are specified in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 76). The criteria for the loss of forced reactor coolant flow accident are specified in Reference 7. Operation within the LHR limit preserves the LOCA criteria; operation within the DNB parameter limits preserves the loss of flow criteria. 3 2

During PHYSICS TESTS, one or more of the LCOs that normally preserve the LHR and DNB parameter limits may be suspended. The results of the accident analysis are not adversely impacted, however, if LHR and DNB parameters are verified to be within their limits while the LCOs are suspended. Therefore, SRs are placed as necessary to ensure that LHR and DNB parameters remain within limits during PHYSICS TESTS. Performance of these Surveillances allows PHYSICS TESTS to be conducted without decreasing the margin of safety.

PHYSICS TESTS include measurement of core parameters or exercise of control components that affect process variables. Among the process variables involved are F^T_{XY}, $F^T{}_r$, T_q, and ASI, which represent initial condition input (power peaking) to the accident analysis. Also involved are the shutdown and regulating CEAs, which affect power peaking and are required for shutdown of the reactor. The limits for these variables are specified for each fuel cycle in the COLR. 3

As described in LCO 3.0.7, compliance with Special Test Exceptions LCOs is optional, and therefore no criteria of 10 CFR 50.36(c)(2)(ii) apply. Special Test Exception LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

BASES

LCO

This LCO permits individual CEAs to be positioned outside of their normal group heights and insertion limits during the performance of PHYSICS TESTS such as those required to:

a. Measure CEA worth,

b. Determine the reactor stability index and damping factor under xenon oscillation conditions,

c. Determine power distributions for nonnormal CEA configurations,

d. Measure rod shadowing factors, and

e. Measure temperature and power coefficients.

Additionally, it permits the center CEA to be misaligned during PHYSICS TESTS required to determine the isothermal temperature coefficient (ITC), MTC, and power coefficient.

The requirements of LCO 3.1.3, LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.2.2, and LCO 3.2.3, and LCO 3.2.4 may be suspended during the performance of PHYSICS TESTS, provided THERMAL POWER is restricted to test power plateau, which shall not exceed 85% RTP. 3

APPLICABILITY

This LCO is applicable in MODES 1 and 2 because the reactor must be critical at various THERMAL POWER levels to perform the PHYSICS TESTS described in the LCO section. Limiting the test power plateau to < 85% RTP ensures that LHRs are maintained within acceptable limits.

ACTIONS

A.1

If THERMAL POWER exceeds the test power plateau, THERMAL POWER must be reduced to restore the additional thermal margin provided by the reduction. The 15 minute Completion Time ensures that prompt action shall be taken to reduce THERMAL POWER to within acceptable limits.

B.1 and B.2 3

If Required Action A.1 cannot be completed within the required Completion Time, PHYSICS TESTS must be suspended within 1 hour. Allowing 1 hour for suspending PHYSICS TESTS allows the operator sufficient time to change any abnormal CEA configuration back to within the limits of LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6.

BASES

ACTIONS (continued)

Suspension of PHYSICS TESTS exceptions requires restoration of each of the applicable LCOs to within specification.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

Verifying that THERMAL POWER is equal to or less than that allowed by the test power plateau, as specified in the PHYSICS TEST procedure and required by the safety analysis, ensures that adequate LHR and DNB parameter margins are maintained while LCOs are suspended. [The 1 hour Frequency is sufficient, based on the slow rate of power change and increased operational controls in place during PHYSICS TESTS. 4

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
---]

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
2. 10 CFR 50.59.
3. Regulatory Guide 1.68, Revision 21, August 1978. January 1977 2
4. ANSI/ANS-19.6.1-1985, December 13, 1985.
5. U FSAR, Chapter [14]. 4 2
6. FSAR, Section [15.3.2.1]. 2
76. 10 CFR 50.46.
7. USFAR, Section 15.3

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.8 BASES, SPECIAL TEST EXCEPTIONS (STE) – MODES 1 and 2

1. The type of plant (Analog) is deleted since it is unnecessary. This information is provided in NUREG-1432, Rev. 5.0, to assist in identifying the appropriate Specification to be used as a model for the plant specific ITS conversion but serves no purpose in a plant specific implementation.

2. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.

3. Changes are made to be consistent with changes made to the Specification.

4. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

5. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.8, SPECIAL TEST EXCEPTIONS (STE) – MODES 1 and 2

There are no specific No Significant Hazards Considerations for this Specification.

CTS 3/4.1.1.3, Boron Dilution

Current Technical Specification (CTS) Markup
and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

BORON DILUTION

LIMITING CONDITION FOR OPERATION

3.1.1.3 The flow rate of reactor coolant to the reactor pressure vessel shall be ≥ 3000 gpm whenever a reduction in Reactor Coolant System boron concentration is being made.

APPLICABILITY: ALL MODES.

ACTION:

With the flow rate of reactor coolant to the reactor pressure vessel < 3000 gpm, immediately suspend all operations involving a reduction in boron concentration of the Reactor Coolant System.

R01

SURVEILLANCE REQUIREMENTS

4.1.1.3 The flow rate of reactor coolant to the reactor pressure vessel shall be determined to be ≥ 3000 gpm within one hour prior to the start of and in accordance with the Surveillance Frequency Control Program during a reduction in the Reactor Coolant System boron concentration by either:

a. Verifying at least one reactor coolant pump is in operation, or

b. Verifying that at least one low pressure safety injection pump is in operation and supplying ≥ 3000 gpm to the reactor pressure vessel.

REACTIVITY CONTROL SYSTEMS

BORON DILUTION

LIMITING CONDITION FOR OPERATION

3.1.1.3 The flow rate of reactor coolant to the reactor pressure vessel shall be ≥ 3000 gpm whenever a reduction in Reactor Coolant System boron concentration is being made.

APPLICABILITY: ALL MODES.

ACTION:

With the flow rate of reactor coolant to the reactor pressure vessel < 3000 gpm, immediately suspend all operations involving a reduction in boron concentration of the Reactor Coolant System.

R01

SURVEILLANCE REQUIREMENTS

4.1.1.3 The flow rate of reactor coolant to the reactor pressure vessel shall be determined to be ≥ 3000 gpm within 1 hour prior to the start of and in accordance with the Surveillance Frequency Control Program during a reduction in the Reactor Coolant System boron concentration by either:

a. Verifying at least one reactor coolant pump is in operation, or

b. Verifying that at least one low pressure safety injection pump is in operation and supplying ≥ 3000 gpm to the reactor pressure vessel.

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

R01 CTS 3/4.1.1.3 establishes a minimum flow rate to the reactor pressure vessel (RPV) of at least 3000 gpm whenever a reduction in Reactor Coolant System (RCS) boron concentration is being made. This minimum flowrate provides adequate mixing, prevents stratification, and ensures that reactivity changes will be gradual during boron concentration changes in the RCS.

A minimum boron dilution flow rate to the RPV is not assumed as an initial condition of a design basis accident (DBA) or transient analysis nor is it an assumed value to mitigate a DBA or transient (e.g., a boron dilution event). The ITS does not include this Specification. This changes the CTS by relocating this Specification to the Technical Requirements Manual (TRM).

This change is acceptable because the CTS 3/4.1.1.3.Specification does not meet the 10 CFR 50.36(c)(2)(ii) criteria for inclusion into the ITS.

10 CFR 50.36(c)(2)(ii) Criteria Evaluation:

1. The minimum boron dilution flow rate to the RPV is not an instrumentation system. Therefore, this Specification does not constitute an instrumentation system that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

2. The minimum boron dilution flow rate to the RPV is not a process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis that either assumes the failure of or challenge to the integrity of a fission product barrier. This Specification specifies a minimum flowrate value that provides adequate mixing, prevents stratification, and ensures that reactivity changes in the core are gradual during boron concentration changes in the RCS. These limits, however, do not reflect initial condition assumptions in a DBA or transient.

3. The minimum boron dilution flow rate to the RPV is a parameter and not a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. The minimum boron dilution flow rate to the RPV is a parameter requirement and is not a structure, system, or component which operating experience or

probabilistic risk assessment has shown to be significant to public health and safety.

Since 10 CFR 50.36(c)(2)(ii) criteria have not been satisfied, the Boron Dilution Specification may be relocated to a licensee controlled document outside the Technical Specifications. Control element assembly insertion limits during power operation, shutdown margin requirements during shutdown, and boration concentration requirements during refueling are retained in separate Technical Specifications and ensure adequate excess negative core reactivity is available in the event of an inadvertent boron dilution event. Additionally, RCS circulation requirements to provide mixing and prevent stratification are retained in separate Technical Specifications (i.e., shutdown cooling specifications).

Changes to the TRM will be controlled by the provisions of 10 CFR 50.59. This change is designated as relocation because the Specifications did not meet the criteria in 10 CFR 50.36(c)(2)(ii) and have been relocated to the TRM.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.1.1.3, BORON DILUTION

There are no specific No Significant Hazards Considerations for this Specification.

CTS 3/4.1.2, Boration Systems

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

3/4.1.2 BORATION SYSTEMS

FLOW PATHS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.1 As a minimum, one of the following boron injection flow paths shall be OPERABLE and capable of being powered from an OPERABLE emergency power source.

a. A flow path from the boric acid makeup tank via either a boric acid pump or a gravity feed connection and any charging pump to the Reactor Coolant System if only the boric acid makeup tank in Specification 3.1.2.7a is OPERABLE, or

b. The flow path from the refueling water tank via either a charging pump or a high pressure safety injection pump* to the Reactor Coolant System if only the refueling water tank in Specification 3.1.2.7b is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With none of the above flow paths OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes** until at least one injection path is restored to OPERABLE status.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.1 At least one of the above required flow paths shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

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* The flow path from the RWT to the RCS via a single HPSI pump shall only be established if: (a) the RCS pressure boundary does not exist, or (b) RCS pressure boundary integrity exists and no charging pumps are operable. In the latter case, all charging pumps shall be disabled.

** Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS

R01

b. At least once per 24 hours, when the Reactor Auxiliary Building air temperature is less than 55°F, by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F, when the flow path from the Boric Acid Makeup Tank is required to be OPERABLE.

A01

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A01

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REACTIVITY CONTROL SYSTEMS

FLOW PATHS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 At least two of the following three boron injection flow paths shall be OPERABLE:

a. One flow path from the boric acid makeup tank(s) with the tank meeting Specification 3.1.2.8 part a) or b), via a boric acid makeup pump through a charging pump to the Reactor Coolant System.

b. One flow path from the boric acid makeup tank(s) with the tank meeting Specification 3.1.2.8 part a) or b), via a gravity feed valve through a charging pump to the Reactor Coolant System.

c. The flow path from the refueling water storage tank via a charging pump to the Reactor Coolant System.

OR

At least two of the following three boron injection flow paths shall be OPERABLE:

d. One flow path from each boric acid makeup tank with the combined tank contents meeting Specification 3.1.2.8 c), via both boric acid makeup pumps through a charging pump to the Reactor Coolant System.

e. One flow path from each boric acid makeup tank with the combined tank contents meeting Specification 3.1.2.8 c), via both gravity feed valves through a charging pump to the Reactor Coolant System.

f. The flow path from the refueling water storage tank, via a charging pump to the Reactor Coolant System.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one of the above required boron injection flow paths to the Reactor Coolant System OPERABLE, restore at least two boron injection flow paths to the Reactor Coolant System to OPERABLE status within 72 hours or make the reactor subcritical within the next 2 hours and borate to a SHUTDOWN MARGIN equivalent to the requirements of Specification 3.1.1.2 at 200°F; restore at least two flow paths to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

R01

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS

R01

4.1.2.2 At least two of the above required flow paths shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. In accordance with the Surveillance Frequency Control Program during shutdown by verifying that each automatic valve in the flow path actuates to its correct position on a Safety Injection Actuation Signal.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is below 55°F by verifying that the solution temperature of the Boric Acid Makeup Tank(s) is above 55°F.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 At least one charging pump or high pressure safety injection pump* in the boron injection flow path required OPERABLE pursuant to Specification 3.1.2.1 shall be OPERABLE and capable of being powered from an OPERABLE emergency bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no charging pump or high pressure safety injection pump* OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes** until at least one of the required pumps is restored to OPERABLE status.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.3 At least one of the above required pumps shall be demonstrated OPERABLE by verifying the charging pump develops a flow rate of greater than or equal to 40 gpm or the high pressure safety injection pump develops a total head of greater than or equal to 2571 ft. when tested pursuant to the INSERVICE TESTING PROGRAM.

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* The flow path from the RWT to the RCS via a single HPSI pump shall be established only if: (a) the RCS pressure boundary does not exist, or (b) RCS pressure boundary integrity exists and no charging pumps are operable. In the latter case, all charging pumps shall be disabled.

** Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 72 hours or be in HOT STANDBY within the next 6 hours; restore at least two charging pumps to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.4 At least two charging pumps shall be demonstrated OPERABLE by verifying that each pump develops a flow rate or greater than or equal to 40 gpm when tested pursuant to the INSERVICE TESTING PROGRAM.

REACTIVITY CONTROL SYSTEMS

BORIC ACID PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 At least one boric acid pump shall be OPERABLE if only the flow path through the boric acid pump in Specification 3.1.2.1a above, is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no boric acid pump OPERABLE as required to complete the flow path of Specification 3.1.2.1a, suspend all operations involving CORE ALTERATIONS or positive reactivity changes* until at least one boric acid pump is restored to OPERABLE status.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required boric acid pump shall be demonstrated OPERABLE by verifying that the pump develops the specified discharge pressure when tested pursuant to the INSERVICE TESTING PROGRAM.

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* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

BORIC ACID PUMPS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 At least the boric acid pump(s) in the boron injection flow path(s) required OPERABLE pursuant to Specification 3.1.2.2a shall be OPERABLE if the flow path through the boric acid pump in Specification 3.1.2.2a is OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one boric acid pump required for boron injection flow path(s) pursuant to Specification 3.1.2.2a inoperable, restore the boric acid pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.6 The above required boric acid pump(s) shall be demonstrated OPERABLE by verifying that the pump(s) develop the specified discharge pressure when tested pursuant to the INSERVICE TESTING PROGRAM.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

a. One boric acid makeup tank with a minimum borated water volume of 3650 gallons of 3.0 to 3.5 weight percent boric acid (5245 to 6119 ppm boron).

b. The refueling water tank with:

1. A minimum contained volume of 125,000 gallons,

2. A minimum boron concentration of 1900 ppm, and

3. A minimum solution temperature of 40°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water sources OPERABLE, suspend all operations involving positive reactivity changes* until at least one borated water source is restored to OPERABLE status.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.7 The above required borated water source shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by:

1. Verifying the boron concentration of the water,

2. Verifying the water level of the tank, and.

b. At least once per 24 hours by verifying the RWT temperature when it is the source of borated water and the site ambient air temperature is < 40°F.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F when that Boric Acid Makeup Tank is required to be OPERABLE.

* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 At least two of the following four borated water sources shall be OPERABLE:

a. Boric Acid Makeup Tank 1A in accordance with Figure 3.1-1.

b. Boric Acid Makeup Tank 1B in accordance with Figure 3.1-1.

c. Boric Acid Makeup Tanks 1A and 1B with a minimum combined contained borated water volume in accordance with Figure 3.1-1.

d. The refueling water tank with:

1. A minimum contained volume of 477,360 gallons of water,

2. A minimum boron concentration of 1900 ppm,

3. A maximum solution temperature of 100°F,

4. A minimum solution temperature of 55°F when in MODES 1 and 2, and

5. A minimum solution temperature of 40°F when in MODES 3 and 4.

R01

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one borated water source OPERABLE, restore at least two borated water sources to OPERABLE status within 72 hours or make the reactor subcritical within the next 2 hours and borate to a SHUTDOWN MARGIN equivalent to the requirements of Specification 3.1.1.2 at 200°F; restore at least two borated water sources to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 At least two borated water sources shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by:

1. Verifying the boron concentration of the water source,

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

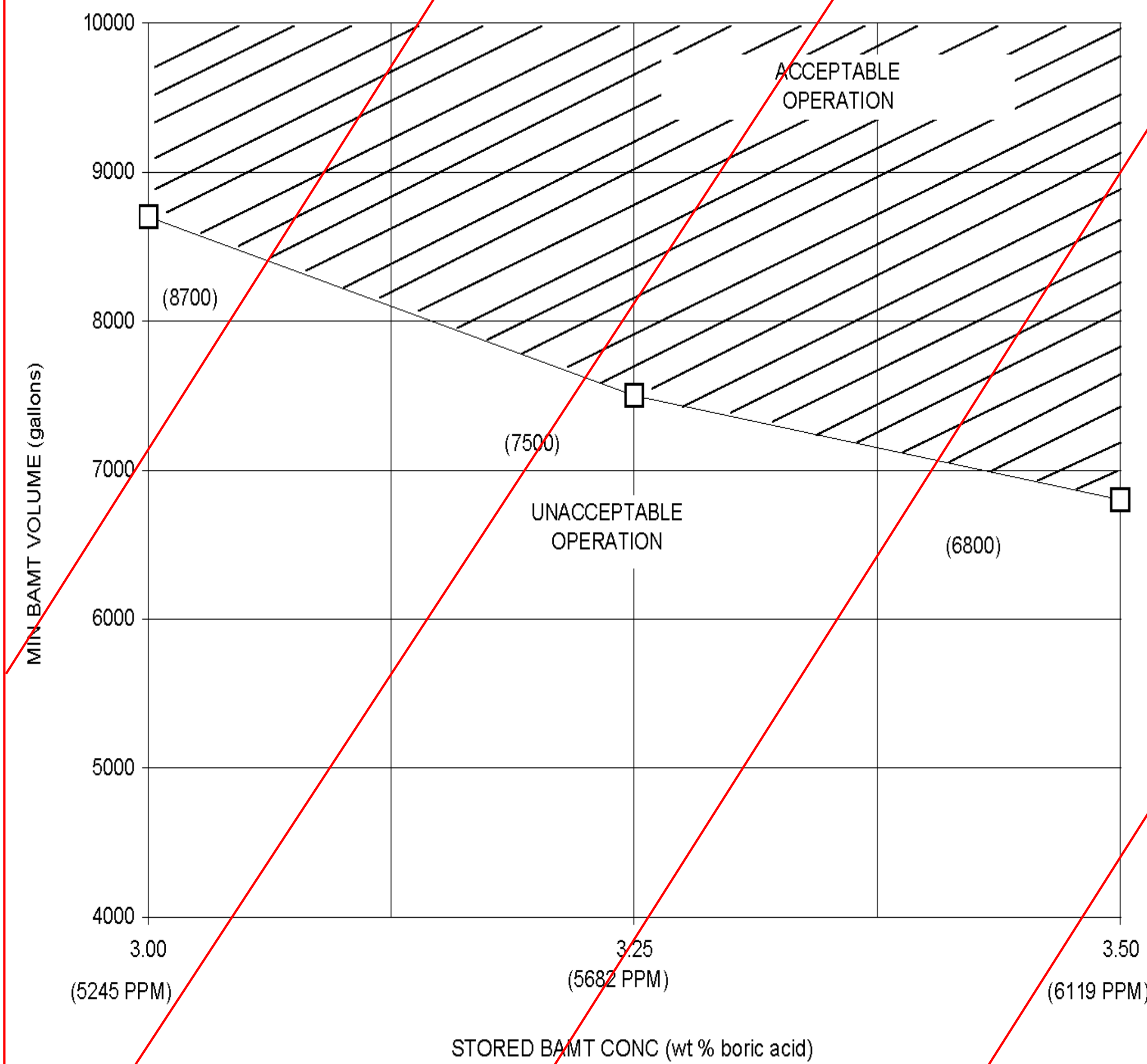
R01

2. Verifying the water level in each water source.

b. In accordance with the Surveillance Frequency Control Program by verifying the RWT temperature.

c. At least once per 24 hours by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F when the Reactor Auxiliary Building air temperature is below 55°F.

FIGURE 3.1-1 ST. LUCIE 1 MIN BAMT VOLUME VS STORED BAMT CONCENTRATION (MODES 1, 2, 3 and 4)



REACTIVITY CONTROL SYSTEMS

3/4.1.2 BORATION SYSTEMS

FLOW PATHS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.1 As a minimum, one of the following boron injection flow paths shall be OPERABLE and capable of being powered from an OPERABLE emergency power source:

a. A flow path from the boric acid makeup tank via either a boric acid makeup pump or a gravity feed connection and any charging pump to the Reactor Coolant System if only the boric acid makeup tank in Specification 3.1.2.7a. is OPERABLE, or

b. The flow path from the refueling water tank via either a charging pump or a high pressure safety injection pump to the Reactor Coolant System if only the refueling water tank in Specification 3.1.2.7b. is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With none of the above flow paths OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes*.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.1 At least one of the above required flow paths shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

b. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F by verifying that the Boric Acid Makeup Tank solution temperature is greater than 55°F (when the flow path from the Boric Acid Makeup Tank is used).

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* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

FLOW PATHS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 At least two of the following three boron injection flow paths shall be OPERABLE:

a. One flow path from the boric acid makeup tank(s) with the tank meeting Specification 3.1.2.8 part a) or b), via a boric acid makeup pump through a charging pump to the Reactor Coolant System.

b. One flow path from the boric acid makeup tank(s) with the tank meeting Specification 3.1.2.8 part a) or b), via a gravity feed valve through a charging pump to the Reactor Coolant System.

c. The flow path from the refueling water tank via a charging pump to the Reactor Coolant System.

OR

At least two of the following three boron injection flow paths shall be OPERABLE: R01

d. One flow path from each boric acid makeup tank with the combined tank contents meeting Specification 3.1.2.8 c), via both boric acid makeup pumps through a charging pump to the Reactor Coolant System.

e. One flow path from each boric acid makeup tank with the combined tank contents meeting Specification 3.1.2.8 c), via both gravity feed valves through a charging pump to the Reactor Coolant System.

f. The flow path from the refueling water tank, via a charging pump to the Reactor Coolant System.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one of the above required boron injection flow paths to the Reactor Coolant System OPERABLE, restore at least two boron injection flow paths to the Reactor Coolant System to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to its COLR limit at 200 °F within the next 6 hours; restore at least two flow paths to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

REACTIVITY CONTROL SYSTEMS

FLOW PATHS - OPERATING

SURVEILLANCE REQUIREMENTS

R01

4.1.2.2 At least two of the above required flow paths shall be demonstrated OPERABLE:

a. At least once per 24 hours, when the Reactor Auxiliary Building air temperature is below 55°F, by verifying that the solution temperature of the Boric Acid Makeup Tanks is above 55°F.

b. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. In accordance with the Surveillance Frequency Control Program during shutdown by verifying that each automatic valve in the flow path actuates to its correct position on an SIAS test signal.

d. In accordance with the Surveillance Frequency Control Program by verifying that the flow path required by Specification 3.1.2.2a and 3.1.2.2b delivers at least 40 gpm to the Reactor Coolant System.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 At least one charging pump or high pressure safety injection pump in the boron injection flow path required OPERABLE pursuant to Specification 3.1.2.1 shall be OPERABLE and capable of being powered from an OPERABLE emergency power source.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no charging pump or high pressure safety injection pump OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes*.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.3 At least the above required pumps shall be demonstrated OPERABLE by verifying the charging pump develops a flow rate of greater than or equal to 40 gpm or the high pressure safety injection pump develops a total head of greater than or equal to 2854 ft. when tested pursuant to the INSERVICE TESTING PROGRAM.

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* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to its COLR limit at 200°F within the next 6 hours; restore at least two charging pumps to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.4.1 At least two charging pumps shall be demonstrated OPERABLE by verifying that each pump develops a flow rate of greater than or equal to 40 gpm when tested pursuant to the INSERVICE TESTING PROGRAM.

4.1.2.4.2 In accordance with the Surveillance Frequency Control Program verify that each charging pump starts automatically on an SIAS test signal.

REACTIVITY CONTROL SYSTEMS

BORIC ACID MAKEUP PUMPS – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 At least one boric acid makeup pump shall be OPERABLE and capable of being powered from an OPERABLE emergency bus if only the flow path through the boric acid pump in Specification 3.1.2.1a is OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no boric acid pump OPERABLE as required to complete the flow path of Specification 3.1.2.1a, suspend all operations involving CORE ALTERATIONS or positive reactivity changes*.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required boric acid makeup pump shall be demonstrated OPERABLE by verifying that the pump develops the specified discharge pressure when tested pursuant to the INSERVICE TESTING PROGRAM.

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* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

BORIC ACID MAKEUP PUMPS – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 At least the boric acid makeup pump(s) in the boron injection flow path(s) required OPERABLE pursuant to Specification 3.1.2.2 shall be OPERABLE and capable of being powered from an OPERABLE emergency bus if the flow path through the boric acid pump(s) in Specification 3.1.2.2 is OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With no boric acid makeup pump required for the boron injection flow path(s) pursuant to Specification 3.1.2.2 operable, restore the boric acid makeup pump to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to its COLR limit at 200°F; restore the above required boric acid makeup pump(s) to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

R01

SURVEILLANCE REQUIREMENTS

4.1.2.6 The above required boric acid makeup pump(s) shall be demonstrated OPERABLE by verifying that the pump(s) develop the specified discharge pressure when tested pursuant to the INSERVICE TESTING PROGRAM.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES – SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.7 As a minimum, one of the following borated water sources shall be OPERABLE:

a. One boric acid makeup tank with a minimum borated water volume of 3550 gallons of 3.1 to 3.5 weight percent boric acid (5420 to 6119 ppm boron).

b. The refueling water tank with:

1. A minimum contained borated water volume of 125,000 gallons,

2. A minimum boron concentration of 1900 ppm, and

3. A solution temperature between 40°F and 120°F.

R01

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water sources OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes*.

SURVEILLANCE REQUIREMENTS

4.1.2.7 The above required borated water source shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by:

1. Verifying the boron concentration of the water,

2. Verifying the contained borated water volume of the tank, and

b. At least once per 24 hours by verifying the RWT temperature when it is the source of borated water and the outside air temperature is outside the range of 40°F and 120°F.

.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F, by verifying that the boric acid makeup tank solution temperature is greater than 55°F when that boric acid makeup tank is required to be OPERABLE.

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* Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SHUTDOWN MARGIN.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES – OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 At least two of the following four borated water sources shall be OPERABLE:

a. Boric Acid Makeup Tank 2A in accordance with Figure 3.1-1.

b. Boric Acid Makeup Tank 2B in accordance with Figure 3.1-1.

c. Boric Acid Makeup Tanks 2A and 2B with a minimum combined contained borated water volume in accordance with Figure 3.1-1.

d. The refueling water tank with:

1. A minimum contained borated water volume of 477,360 gallons,

2. A boron concentration of between 1900 and 2200 ppm of boron, and R01

3. A solution temperature of between 55°F and 100°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the above required boric acid makeup tank(s) inoperable, restore the tank(s) to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to its COLR limit at 200°F; restore the above required boric acid makeup tank(s) to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 At least two required borated water sources shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by:

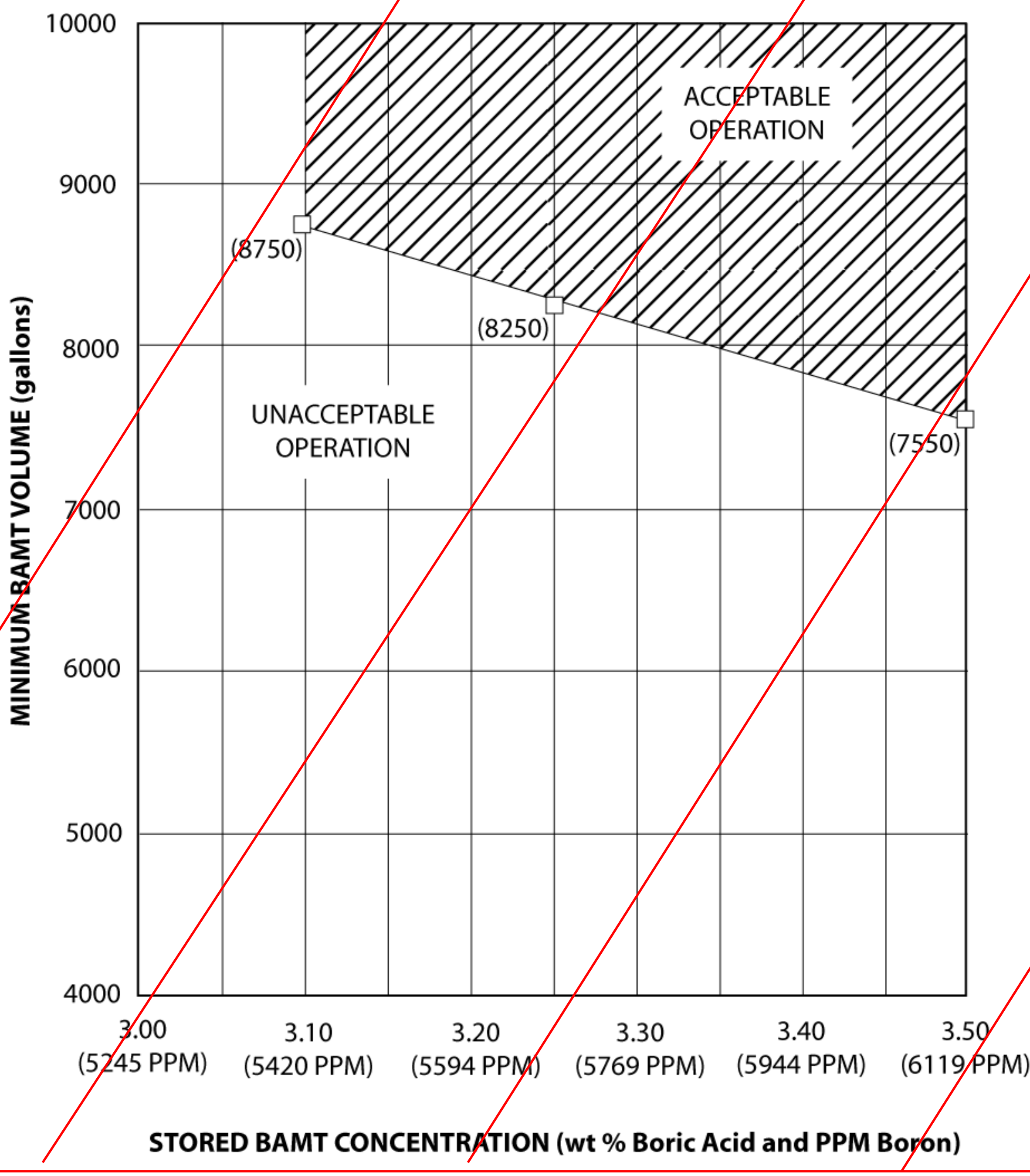
1. Verifying the boron concentration in the water and

2. Verifying the contained borated water volume of the water source.

b. At least once per 24 hours by verifying the RWT temperature when the outside air temperature is outside the range of 55°F and 100°F.

c. At least once per 24 hours when the Reactor Auxiliary Building air temperature is less than 55°F, by verifying that the boric acid makeup tank solution is greater than 55°F.

FIGURE 3.1-1
MINIMUM BAMT VOLUME vs STORED BORIC ACID CONCENTRATION



A01

~~Page 3/4 1-17 (Amendment No. 8) has been deleted from the Technical Specifications.~~
~~The next page is 3/4 1-18.~~

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2 Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1432, Rev. 5.0, "Standard Technical Specifications - Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

R01 CTS 3/4.1.2.1, 3/4.1.2.2, 3/4.1.2.3, 3/4.1.2.4, 3/4.1.2.5, 3/4.1.2.6, 3/4.1.2.7, and 3/4.1.2.8 provide boration system requirements and require a source of borated water, one or more flow paths to inject borated water into the RCS, and either a charging pump or high pressure safety injection pump to provide the necessary charging head.

The purpose of the boration system Technical Specifications is provide the means to control the chemical neutron absorber (boron) concentration in the Reactor Coolant System (RCS) and to help maintain the shutdown margin during normal operations. The RCS boration management system functions to control boron concentration and maintain shutdown margin are not assumed to be OPERABLE to mitigate the consequences of a DBA or transient. In the case of a malfunction of a component in the boration systems which causes a boron dilution event, the automatic response, or that required by the operator, is to close the appropriate valves in the reactor makeup system. The plant response to a boron dilution event also includes control rod assembly movement and reactor trip features to ensure shutdown margin is maintained. The boration capabilities of the boration systems are not assumed to mitigate the boron dilution event. The ITS does not include these Specifications. This changes the CTS by relocating these Specifications to the Technical Requirements Manual (TRM).

This change is acceptable because the CTS 3/4.1.2.boration system Specifications do not meet the 10 CFR 50.36(c)(2)(ii) criteria for inclusion into the ITS.

10 CFR 50.36(c)(2)(ii) Criteria Evaluation:

1. The boration systems do not constitute instrumentation systems that are used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

2. The boration systems are not process variables, design features, or operating restrictions that represent an initial condition of a DBA or transient analysis that either assumes the failure of or challenge to the integrity of a fission product barrier.

3. The RCS boration management system functions to control boron concentration and maintain shutdown margin do not represent a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. The St. Lucie Plant (PSL) at-power PRA has shown that the RCS boration management system functions are not significant risk contributors to core damage frequency and offsite releases. PSL does not have shutdown PRA model. However, operational experience has shown that the boration management system is not a constraint of prime importance in the mitigation of any accident or transient that results in challenging public health and safety. Therefore, the RCS boration management system functions to control boron concentration and maintain shutdown margin do not represent structures, systems, or components which operating experience or probabilistic risk assessment has shown to be significant to public health and safety

Since 10 CFR 50.36(c)(2)(ii) criteria have not been satisfied for the RCS boration management system functions to control boron concentration and maintain shutdown margin, the Boration System Specifications may be relocated to a licensee controlled document outside the Technical Specifications. RCS boration structures, systems, or components credited as the primary success path which function or actuate to mitigate a DBA or transient are retained in separate Technical Specifications (e.g., Emergency Core Cooling System). Additionally, shutdown margin requirements during shutdown, and boration concentration requirements during refueling are retained in separate Technical Specifications to ensure adequate excess negative core reactivity is available in the event of an inadvertent boron dilution event.

Changes to the TRM will be controlled by the provisions of 10 CFR 50.59. This change is designated as relocation because the Specifications did not meet the criteria in 10 CFR 50.36(c)(2)(ii) and have been relocated to the TRM.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.1.2, BORATION SYSTEMS

There are no specific No Significant Hazards Considerations for this Specification.

CTS 3/4.1.3.3, Position Indicator Channels – Shutdown
Unit 2 only

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

POSITION INDICATOR CHANNELS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.3.3 At least one CEA position indicator channel shall be OPERABLE for each shutdown or regulating CEA not fully inserted.

APPLICABILITY: MODES 3*, 4*, and 5*.

ACTION:

With less than the above required position indicator channel(s) OPERABLE, immediately open the reactor trip breakers.

R01

SURVEILLANCE REQUIREMENTS

4.1.3.3 Each of the above required CEA position indicator channel(s) shall be determined to be OPERABLE by performance of a CHANNEL FUNCTIONAL TEST in accordance with the Surveillance Frequency Control Program.

* With the reactor trip breakers in the closed position.

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

R01 Unit 2 Current Technical Specifications (CTS) 3/4.1.3.3 provide control element assembly (CEA) position indication requirements when the reactor is shutdown and requires one CEA position indication channel for each withdrawn CEA to be OPERABLE when the reactor trip breakers are closed and one or more CEAs are withdrawn.

The purpose of this requirement is to provide the control room operator with indication of the position of a CEA when the CEA is not fully inserted and perform any related operations that are required. The CEA position indication channels do not provide any automatic function and no operator action assumed in accident or transient analyses (e.g., uncontrolled CEA withdrawal event) is initiated based on CEA position. Shutdown margin requirements ensure adequate excess negative reactivity is available to maintain the reactor subcritical when a CEA with the highest reactivity worth is withdrawn while the reactor is shutdown. The ITS does not include this Specification. This changes the CTS by relocating this Specification to the Technical Requirements Manual (TRM).

This change is acceptable because the Unit 2 CTS 3/4.1.3.3.Specification does not meet the 10 CFR 50.36(c)(2)(ii) criteria for inclusion into the ITS.

10 CFR 50.36(c)(2)(ii) Criteria Evaluation:

1. The CEA position monitoring system when the reactor is shutdown is not an instrumentation system that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

2. The CEA position monitoring system when the reactor is shutdown is not a process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis that either assumes the failure of or challenge to the integrity of a fission product barrier.

3. The CEA position monitoring system when the reactor is shutdown is not a structure, system, or component that is part of the primary success path or which functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. The CEA position monitoring system when the reactor is shutdown and the reactor trip breakers are closed is not addressed in the St. Lucie Plant Unit 2 PRA and does not represent a system which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Since 10 CFR 50.36(c)(2)(ii) criteria have not been satisfied for the CEA position monitoring system when the reactor trip breakers are closed and one or more CEAs are withdrawn, the requirements of the CEA Position Indication – Shutdown Specification may be relocated to a licensee controlled document outside the Unit 2 Technical Specifications. Shutdown Margin requirements during shutdown are retained in separate Technical Specifications and ensure adequate excess negative core reactivity is available in the event of a CEA system malfunction during shutdown (e.g., uncontrolled CEA withdrawal event from a subcritical condition).

Changes to the TRM will be controlled by the provisions of 10 CFR 50.59. This change is designated as relocation because the Specifications did not meet the criteria in 10 CFR 50.36(c)(2)(ii) and have been relocated to the TRM.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.1.3.3, POSITION INDICATOR CHANNELS – SHUTDOWN
UNIT 2 ONLY

There are no specific No Significant Hazards Considerations for this Specification.

CTS 3/4.10.1, SHUTDOWN MARGIN

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

3/4.10 SPECIAL TEST EXCEPTIONS

M01

SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 may be suspended for measurement of CEA worth and shutdown margin provided reactivity equivalent to at least the highest estimated CEA worth is available for trip insertion from OPERABLE CEA(s).

APPLICABILITY: MODE 2.

ACTION:

a. With any full length CEA not fully inserted and with less than the above reactivity equivalent available for trip insertion, immediately initiate and continue boration at ≥ 40 gpm of 1900 ppm boric acid solution or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

b. With all full length CEAs inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at ≥ 40 gpm of 1900 ppm boric acid solution or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each full length CEA required either partially or fully withdrawn shall be determined in accordance with the Surveillance Frequency Control Program.

4.10.1.2 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 3.1.1.1.

M01

3/4.10 SPECIAL TEST EXCEPTIONS

3/4.10.1 SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 may be suspended for measurement of CEA worth, MTC, and SHUTDOWN MARGIN provided reactivity equivalent to at least the highest estimated CEA worth is available for trip insertion from OPERABLE CEA(s).

APPLICABILITY: MODES 2 and 3*.

ACTION:

a. With any full-length CEA not fully inserted and with less than the above reactivity equivalent available for trip insertion, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

b. With all full-length CEAs inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each full-length CEA required either partially or fully withdrawn shall be determined in accordance with the Surveillance Frequency Control Program.

4.10.1.2 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 3.1.1.1.

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* Operation in MODE 3 shall be limited to 6 consecutive hours.

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 Unit 1 CTS 3.10.1 provides an exception to the SHUTDOWN MARGIN (SDM) requirements of CTS 3.1.1.1 in MODE 2 and Unit 2 CTS 3.10.1 provides an exception to the SHUTDOWN MARGIN requirements of CTS 3.1.1.1 in MODES 2 and 3 for the purpose of measurement of control element assembly (CEA) worth and shutdown margin, and moderator temperature coefficient (MTC) for Unit 2, provided the reactivity equivalent to at least the highest estimated CEA worth is available for trip insertion from OPERABLE CEAs. According to the Bases, this special test exception provides that a minimum amount of CEA worth is immediately available for reactivity control when tests are performed for CEA 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. This changes the CTS by eliminating a special test exception.

This change is acceptable because SDM is maintained in MODE 2 by CEA alignment and insertion limits (CTS 3.1.3.1, 3.1.3.5, and 3.1.3.6), which are not suspended by CTS 3.10.1. In addition, verification of the actual versus predicted core reactivity condition is not required to be performed in MODE 3. ITS SR 3.1.2.1, Note 2 states that this Surveillance is not required to be performed prior to entry into MODE 2. As a result, the CTS 3.10.1 special test exception is not needed. Future PHYSICS TESTS, including CEA worth, SDM, and MTC measurements, may be performed under ITS 3.1.8, "Special Test Exceptions (STE) - MODES 1 and 2," or in accordance with the requirements of LCO 3.1.4, “Control Element Assembly (CEA) Alignment,” LCO 3.1.5, "Shutdown Control Element Assembly (CEA) Insertion Limits," and LCO 3.1.6, “Regulating Control Element Assembly (CEA) Insertion Limits.” This change is designated as more restrictive because a special test exception allowance is being deleted.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.10.1, SHUTDOWN MARGIN

There are no specific No Significant Hazards Considerations for this Specification.

UNIT 1 CTS 3/4.10.5, Center CEA Misalignment
UNIT 2 CTS 3/4.10.4, Center CEA Misalignment

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

~~SPECIAL TEST EXCEPTIONS~~

M01

~~CENTER CEA MISALIGNMENT~~

~~LIMITING CONDITION FOR OPERATION~~

~~3.10.5 The requirements of Specifications 3.1.3.1 and 3.1.3.6 may be suspended during the performance of PHYSICS TESTS to determine the isothermal temperature coefficient and power coefficient provided:~~

~~a. Only the center CEA (CEA #1) is misaligned, and~~

~~b. The limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.5.2 below.~~

~~APPLICABILITY: MODES 1 and 2.~~

~~ACTION:~~

~~With any of the limits of Specification 3.2.1 being exceeded while the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended, either:~~

~~a. Reduce THERMAL POWER sufficiently to satisfy the requirements of Specification 3.2.1, or~~

~~b. Be in HOT STANDBY within 6 hours.~~

~~SURVEILLANCE REQUIREMENTS~~

~~4.10.5.1 The THERMAL POWER shall be determined in accordance with the Surveillance Frequency Control Program during PHYSICS TESTS in which the requirements of Specifications 3.1.3.1 and/or 3.1.3.6 are suspended and shall be verified to be within the test power plateau.~~

~~4.10.5.2 The linear heat rate shall be determined to be within the limits of Specification 3.2.1 by monitoring it continuously with the Incore Detector Monitoring System pursuant to the requirements of Specification 4.2.1.4 during PHYSICS TESTS above 5% of RATED THERMAL POWER in which the requirements of Specifications 3.1.3.1 and/or 3.1.3.6 are suspended.~~

SPECIAL TEST EXCEPTIONS

M01

3/4.10.4 CENTER CEA MISALIGNMENT

LIMITING CONDITION FOR OPERATION

3.10.4 The requirements of Specifications 3.1.3.1 and 3.1.3.6 may be suspended during the performance of PHYSICS TESTS to determine the isothermal temperature coefficient, moderator temperature coefficient and power coefficient provided:

a. Only the center CEA (CEA #1) is misaligned, and

b. The limits of Specification 3.2.1 are maintained and determined as specified in Specification 4.10.4.2 below.

APPLICABILITY: MODES 1 and 2.

ACTION:

With any of the limits of Specification 3.2.1 being exceeded while the requirements of Specifications 3.1.3.1 and 3.1.3.6 are suspended, either:

a. Reduce THERMAL POWER sufficiently to satisfy the requirements of Specification 3.2.1, or

b. Be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.10.4.1 The THERMAL POWER shall be determined at least once per hour during PHYSICS TESTS in which the requirements of Specifications 3.1.3.1 and/or 3.1.3.6 are suspended and shall be verified to be within the test power plateau.

4.10.4.2 The linear heat rate shall be determined to be within the limits of Specification 3.2.1 by monitoring it continuously with the Incore Detector Monitoring System pursuant to the requirements of Specification 4.2.1.4 during PHYSICS TESTS above 5% of RATED THERMAL POWER in which the requirements of Specifications 3.1.3.1 and/or 3.1.3.6 are suspended.

DISCUSSION OF CHANGES
UNIT 1 CTS 3/4.10.5, CENTER CEA MISALIGNMENT
UNIT 2 CTS 3/4.10.4, CENTER CEA MISALIGNMENT

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 Unit 1 Current Technical Specifications (CTS) 3/4.10.5 and Unit 2 CTS 3/4.10.5 provide an exception to CTS 3.1.3.3 and CTS 3.1.3.6 Specifications. This special test exception permits the center CEA to be misaligned during PHYSICS TESTS required to determine the isothermal temperature coefficient and power coefficient. The Improved Technical Specifications (ITS) do not contain this special test exception. This changes the CTS by eliminating a special test exception.

This change is acceptable because this type of PHYSICS TEST is no longer performed. Future PHYSICS TESTS will be performed under ITS 3.1.8, "Special Test Exceptions (STE) - MODES 1 and 2," or in accordance with the requirements of LCO 3.1.4, “Control Element Assembly (CEA) Alignment,” and LCO 3.1.6, “Regulating Control Element Assembly (CEA) Insertion Limits.” As a result, this CTS Special test exception is not needed. This change is designated as more restrictive because an exception to the CTS is being deleted.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
UNIT 1 CTS 3/4.10.5, CENTER CEA MISALIGNMENT
UNIT 2 CTS 3/4.10.4, CENTER CEA MISALIGNMENT

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 10

ISTS Not Adopted

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

1

3.1 REACTIVITY CONTROL SYSTEMS (Analog)

3.1.7 Special Test Exceptions (STE) - SHUTDOWN MARGIN (SDM) (Analog)

LCO 3.1.7 During performance of PHYSICS TESTS, the requirements of:

LCO 3.1.1, "SHUTDOWN MARGIN,"
LCO 3.1.5, "Shutdown Control Element Assembly Insertion Limits," and
LCO 3.1.6, "Regulating Control Element Assembly Insertion Limits,"

may be suspended for measurement of Control Element Assembly (CEA) worth, provided shutdown reactivity equivalent to at least the highest estimated CEA worth (of those CEAs actually withdrawn) is available for trip insertion.

APPLICABILITY: MODES 2 and 3 during PHYSICS TESTS.

--NOTE--
Operation in MODE 3 shall be limited to 6 consecutive hours.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Any CEA not fully inserted and less than the above shutdown reactivity equivalent available for trip insertion. OR All CEAs inserted and the reactor subcritical by less than the above shutdown reactivity equivalent.	A.1 Initiate boration to restore required shutdown reactivity.	15 minutes

1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify that the position of each CEA not fully inserted is within the acceptance criteria for available negative reactivity addition.	[2 hours OR In accordance with the Surveillance Frequency Control Program]
SR 3.1.7.2	-----------------------------NOTE----------------------------- Not required to be performed during initial power escalation following a refueling outage if SR 3.1.4.6 has been met. --- Verify that each CEA not fully inserted is capable of full insertion when tripped from at least the 50% withdrawn position.	Once within [7 days] prior to reducing SDM to less than the limits of LCO 3.1.1

JUSTIFICATION FOR DEVIATIONS
ISTS 3.1.7, SPECIAL TEST EXCEPTIONS (STE) - SHUTDOWN MARGIN (SDM) (ANALOG)

1. ISTS 3.1.7, "Special Test Exceptions (STE) - SHUTDOWN MARGIN (SDM) (Analog)," is not included in the St. Lucie Plant Unit 1 and Unit 2 ITS because the exception is not needed to perform any required startup or PHYSICS TESTS.

Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

1

B 3.1 REACTIVITY CONTROL SYSTEMS (Analog)

B 3.1.7 Special Test Exception (STE) - SHUTDOWN MARGIN (SDM) (Analog)

BASES

BACKGROUND

The primary purpose of the SHUTDOWN MARGIN (SDM) Special Test Exception (STE) is to permit relaxation of existing LCOs to allow the performance of certain PHYSICS TESTS. These tests are constructed to determine the control element assembly (CEA) worth.

Section XI of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants" (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. All functions necessary to ensure that specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. Testing is required as an integral part of the design, fabrication, construction, and operation of the power plant. Requirements for notification of the NRC, for the purpose of conducting tests and experiments, are specified in 10 CFR 50.59, "Changes, Tests, and Experiments" (Ref. 2).

The key objectives of a test program are to (Ref. 3):

a. Ensure that the facility has been adequately designed,

b. Validate the analytical models used in design and analysis,

c. Verify assumptions used for predicting plant response,

d. Ensure that installation of equipment in the facility has been accomplished in accordance with the design, and

e. Verify that operating and emergency procedures are adequate.

To accomplish these objectives, testing is required prior to initial criticality, after each refueling shutdown, and during startup, low power operation, power ascension, and at power operation. The PHYSICS TESTS requirements for reload fuel cycles ensure that the operating characteristics of the core are consistent with the design predictions, and that the core can be operated as designed (Ref. 4).

1

BASES

BACKGROUND (continued)

PHYSICS TESTS procedures are written and approved in accordance with established formats. The procedures include all information necessary to permit a detailed execution of testing required to ensure that the design intent is met. PHYSICS TESTS are performed in accordance with these procedures, and test results are approved prior to continued power escalation and long term power operation. Examples of PHYSICS TESTS include determination of critical boron concentration, CEA group worths, reactivity coefficients, flux symmetry, and core power distribution.

APPLICABLE SAFETY ANALYSES

It is acceptable to suspend certain LCOs for PHYSICS TESTS because fuel damage criteria are not exceeded. Even if an accident occurs during PHYSICS TESTS with one or more LCOs suspended, fuel damage criteria are preserved because adequate limits on power distribution and shutdown capability are maintained during PHYSICS TESTS.

Reference 5 defines the requirements for initial testing of the facility, including PHYSICS TESTS. Requirements for reload fuel cycle PHYSICS TESTS are defined in ANSI/ANS-19.6.1-1985 (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits of all LCOs, conditions may occur when one or more LCOs must be suspended to make completion of PHYSICS TESTS possible or practical. This is acceptable as long as the fuel design criteria are not violated. As long as the linear heat rate (LHR) remains within its limit, fuel design criteria are preserved.

In this test, the following LCOs are suspended:

a. LCO 3.1.1, "SHUTDOWN MARGIN (SDM)",

b. LCO 3.1.5, “Shutdown Control Element Assembly (CEA) Insertion Limits,” and

c. LCO 3.1.6, "Regulating Control Element Assembly (CEA) Insertion Limits."

Therefore, this LCO places limits on the minimum amount of CEA worth required to be available for reactivity control when CEA worth measurements are performed.

The individual LCOs cited above govern SDM CEA group height, insertion, and alignment. Additionally, the LCOs governing Reactor Coolant System (RCS) flow, reactor inlet temperature, and pressurizer pressure contribute to maintaining departure from nucleate boiling (DNB) parameter limits. The initial condition criteria for accidents sensitive to

APPLICABLE SAFETY ANALYSES (continued)

core power distribution are preserved by the LHR and DNB parameter limits. The criteria for the loss of coolant accident (LOCA) are specified in 10 CFR 50.46, "Acceptance Criteria for Emergency core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 6). The criteria for the loss of forced reactor coolant flow accident are specified in Reference 7. Operation within the LHR limit preserves the LOCA criteria; operation within the DNB parameter limits preserves the loss of flow criteria.

SRs are conducted as necessary to ensure that LHR and DNB parameters remain within limits during PHYSICS TESTS. Performance of these SRs allows PHYSICS TESTS to be conducted without decreasing the margin of safety.

Requiring that shutdown reactivity equivalent to at least the highest estimated CEA worth (of those CEAs actually withdrawn) be available for trip insertion from the OPERABLE CEA provides a high degree of assurance that shutdown capability is maintained for the most challenging postulated accident, a stuck CEA. Since LCO 3.1.1 is suspended, however, there is not the same degree of assurance during this test that the reactor would always be shut down if the highest worth CEA was stuck out and calculational uncertainties or the estimated highest CEA worth was not as expected (the single failure criterion is not met). This situation is judged acceptable, however, because specified acceptable fuel damage limits are still met. The risk of experiencing a stuck CEA and subsequent criticality is reduced during this PHYSICS TEST exception by the requirements to determine CEA positions every 2 hours; by the trip of each CEA to be withdrawn 24 hours prior to suspending the SDM; and by ensuring that shutdown reactivity is available, equivalent to the reactivity worth of the estimated highest worth withdrawn CEA (Ref. 5).

PHYSICS TESTS include measurement of core parameters or exercise of control components that affect process variables. Among the process variables involved are total planar radial peaking factor, total integrated radial peaking factor, T_q and ASI, which represent initial condition input (power peaking) to the accident analysis. Also involved are the shutdown and regulating CEAs, which affect power peaking and are required for shutdown of the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

As described in LCO 3.0.7, compliance with Special Test Exception LCOs is optional, and therefore no criteria of 10 CFR 50.36(c)(2)(ii) apply. Special Test Exception LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

1

BASES

LCO

This LCO provides that a minimum amount of CEA worth is immediately available for reactivity control when CEA worth measurement tests are performed. The STE is required to permit the periodic verification of the actual versus predicted worth of the regulating and shutdown CEAs. The SDM requirements of LCO 3.1.1, the shutdown CEA insertion limits of LCO 3.1.5, and the regulating CEA insertion limits of LCO 3.1.6 may be suspended.

APPLICABILITY

This LCO is applicable in MODES 2 and 3. Although CEA worth testing is conducted in MODE 2, sufficient negative reactivity is inserted during the performance of these tests to result in temporary entry into MODE 3. Because the intent is to immediately return to MODE 2 to continue CEA worth measurements, the STE allows limited operation to 6 consecutive hours in MODE 3, as indicated by the Note, without having to borate to meet the SDM requirements of LCO 3.1.1.

ACTIONS

A.1

With any CEA not fully inserted and less than the minimum required reactivity equivalent available for insertion, or with all CEAs inserted and the reactor subcritical by less than the reactivity equivalent of the highest worth CEA, restoration of the minimum SDM requirements must be accomplished by increasing the RCS boron concentration. The required Completion Time of 15 minutes for initiating boration allows the operator sufficient time to align the valves and start the boric acid pumps and is consistent with the Completion Time of LCO 3.1.1.

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1

Verification of the position of each partially or fully withdrawn full length or part length CEA is necessary to ensure that the minimum negative reactivity requirements for insertion on a trip are preserved. [A 2 hour Frequency is sufficient for the operator to verify that each CEA position is within the acceptance criteria.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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1

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.7.2

Prior demonstration that each CEA to be withdrawn from the core during PHYSICS TESTS is capable of full insertion, when tripped from at least a 50% withdrawn position, ensures that the CEA will insert on a trip signal. The Frequency ensures that the CEAs are OPERABLE prior to reducing SDM to less than the limits of LCO 3.1.1.

The SR is modified by a Note which allows the SR to not be performed during initial power escalation following a refueling outage if SR 3.1.4.6 has been met during that refueling outage. This allows the CEA drop time test, which also proves the CEAs are trippable, to be credited for this SR.

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
2. 10 CFR 50.59.
3. Regulatory Guide 1.68, Revision 2, August 1978.
4. ANSI/ANS-19.6.1-1985, December 13, 1985.
5. FSAR, Chapter [14].
6. 10 CFR 50.46.
7. FSAR, Chapter [15].

JUSTIFICATION FOR DEVIATIONS
ISTS 3.1.7 BASES, SPECIAL TEST EXCEPTIONS (STE) - SHUTDOWN MARGIN (SDM) (ANALOG)

1. ISTS 3.1.7, "Special Test Exceptions (STE) - SHUTDOWN MARGIN (SDM) (Analog)," is not included in the St. Lucie Plant (PSL) Unit 1 and Unit 2 ITS because the exception is not needed to perform any required startup or PHYSICS TESTS. Therefore, the Bases associated with ISTS 3.1.7 is not included in the PSL Unit 1 and Unit 2 ITS Bases.