Attachment 1

Technical Specifications Affected and Description of Change

TECHNICAL SPECIFICATIONS AFFECTED BY PROPOSED AMENDMENT AND BRIEF DESCRIPTION OF CHANGE

PAGE	TECHNICAL SPECIFICATION	CHANGE DESCRIPTION
3/4 1-6	3.1.1.1 Moderator Temperature Coefficient	Relocates MTC Limits to the COLR and corrects references
3/4 1-7	4.1.1.3 MTC Surveillance Requirement	Relocates MTC Limits to the COLR and corrects references
3/4 1-7a	New Figure 3.1-2a, Maximum MTC Limit Curve, MCT vs Power Level. Page added to Tech Specs to accommodate it.	Retains upper MTC Limit. Required for positive MTC Spec (future possibility). Figure is also in COLR for T. S. 3.1.1.3
B3/4 1-2	3/4.1.1.3 Moderator Temperature Coefficient Bases	Administrative Change. MTC Limits have been relocated to the the COLR.
3/4 1-16	3.1.3.1.b.2 Movable Control Assemblies-Group Height	Administrative change. Removes reference to Figure 3.1-3, removed to the COLR in a previous amendment
3/4 1-17	3.1.3.1.c.1 Movable Control Assemblies-Group Height	Administrative change. Removes reference to figure 3.1-3, removed to the COLR in a previous amendment.
3/4 1-22	3.1.3.5 Shutdown Rod Insertion Limit	Administrative change. Clarifies that the fully withdrawn position for shutdown banks is specified in the COLR.
3/4 2-1	3.2.1.b Axial Flux Difference	Replaces references to Figure 3.2-1, which is moved to the COLR
3/4 2-2	3.2.1.C Axial Flux Difference	Deletes the word "above" twice in reference to Figure 3.2-1,
3/4 2-4	Figure 3.2-1 BLANK	Figure moved to the COLR
B3/4 2-1	3/4.2.1 Axial Flux Difference Bases	Administrative change. The F_Q Limit is removed to the COLR
B3/4 2-2	3/4.2.1 Axial Flux Difference Bases	Removes reference to Figure 3.2-1, Figure 3.2-1 removed to the COLR

TECHNICAL SPECIFICATIONS AFFECTED BY PROPOSED AMENDMENT AND BRIEF DESCRIPTION OF CHANGE

PAGE	TECHNICAL SPECIFICATION	CHANGE DESCRIPTION
3/4 2-5	3.2.2 Heat Flux Hot Channel Factor	Relocates the F_Q and K(Z) to the COLR. The numerical F_Q limit is replaced with a function F_Q^{RTP}, which is to be specified in the COLR
3/4 2-6	Figure 3.2-2 BLANK	Figure moved to the COLR
3/4 2-7	4.2.2.2.C.2 Heat Flux Hot Channel Factor Surveillance Requirements	Replaces the numerical part power multiplier for F_{XY} with a function PF_{XY}, which will be specified in the COLR
3/4 2-8	4.2.2.2.e Heat Flux Hot Channel Factor Surveillance Requirements	Administrative Change The Radial Peaking Factor Limits Report was replaced by the COLR in a previous amendment
B3/4 2-5	3/4.2.2 and 3/4.2.3 Heat Flux Hot Channel Factor and Nuclear Enthalpy Rise Hot Channel Factor Bases	Administrative change. The Radial Peaking Factor Limits Report was replaced by the COLR in a previous amendment
3/4 2-9	3.2.3 Nuclear Enthalpy Rise Hot Channel Factor	Relocates the F_{DH} to the COLR. The numerical values for the F_{DH} limit and the part power multiplier are replaced with parameters F_{DH}^{RTP}, and PF_{DH}, which are to be defined in the COLR
6-20	6.9.1.6 Core Operating Limits Report	Administrative change. Expand the description of the COLR and its control. Spillover and T.S. 6.9.2 go onto new page 6-20a

Attachment 2

No Significant Hazards Evaluation

NO SIGNIFICANT HAZARDS EVALUATION FOR CHANGES TO TECHNICAL SPECIFICATIONS DELETING CERTAIN CYCLE-SPECIFIC PARAMETERS

Background

Generic Letter 88-16, dated October 4, 1989,, was issued to encourage licensees to prepare changes to Technical Specifications related to cycle-specific parameters. These Technical Specification changes will relocate cycle-specific parameter limits from Technical Specifications to the Core Operating Limits Report (COLR). These parameter limits in the South Texas Project Electrical Generating Station Technical Specifications are currently calculated using NRC-approved methodologies. These limits are evaluated for every reload cycle, and may be revised periodically to reflect changes to cycle-specific variables. This represents an administrative burden to both the NRC, and Houston Lighting & Power.

The generic letter provided guidance to allow relocation of certain cycle-dependent core operating limits from the STP Technical Specifications. This would allow changes to the values of core operating limits without prior approval (i.e., license amendment) by the NRC, provided that an approved methodology was used for the parameter limit. Thus, cycle-specific changes to these limits will require a safety review in accordance with 10 CFR 50.59 instead of a prior submittal to the NRC.

Toward this end, a previous license amendment created a COLR for the South Texas Project. The initial creation of this document relocated limits for control rod insertion, F_{xy}, and axial flux difference. The proposed amendment expands on the document previously created, moving Moderator Temperature Coefficient, Heat Flux Hot Channel Factor, and Nuclear Enthalpy Rise Hot Channel Factor to the COLR. The COLR limits will continue to be calculated with NRC-approved methodologies, and the COLR itself will continue to be controlled as a unit-specific document.

Proposed Change

The proposed technical specification changes concern the relocation of several cycle-specific core operating limits for the South Texas Project from the Technical Specifications to the COLR. The impacted Technical Specifications will be amended to note that the limit has been relocated to the COLR, and the COLR paragraph in the Administrative Controls Section will be expanded to provide more information than is currently present. The COLR will still be required to be submitted to the NRC to allow for continued trending of the cycle-specific parameters.

The proposed changes will reference the COLR for specific parameters, and will ensure that cycle-specific parameters are maintained within the limits of the COLR. The cycle-specific parameter limits proposed for relocation to the COLR as part of this license amendment include:

(a)	3.1.1.3	Moderator Temperature Coefficient
(b)	3.1.3.5	Shutdown Rod Insertion Limits
(c)	3.2.1	Axial Flux Difference
(d)	3.2.2	Heat Flux Hot Channel Factor
(e)	3.2.3	Nuclear Enthalpy Rise Hot Channel Factor

The proposed changes are consistent with the requirements of 10 CFR 50.36 and the staff's proposed policy for improving Technical Specifications, delineated in SECY-86-10, "Recommendations for Improving TS". The policy allows process variables such as core operational limits to be controlled by specifying them numerically in the Technical Specifications, or by specifying the method of calculating their numerical values if the staff finds that the correct limits will be followed in operation of the plant. The proposed revision references the NRC-approved methodologies.

The proposed changes to the Technical Specifications are also considered to be improvements, and are consistent with the NRC stated policy for improving Technical Specifications (52 FR 3788, February, 1987).

Safety Evaluation

The current Technical Specification method of controlling the above reactor physics parameters to assure conformance to 10 CFR 50.36 (which requires the lowest functional levels acceptable for continued safe operation) is to specify the values determined to be within the acceptance criteria using an NRC-approved calculation methodology. As previously discussed, the methodologies for calculating these parameters have been approved by the NRC, and are consistent with the applicable limits in the Final Safety Analysis Report (FSAR).

The removal of cycle-dependent variables from the Technical Specifications has no impact upon plant operation or safety. No safety related equipment, safety function, or plant operations will be altered as a result of this proposed change. Since applicable FSAR limits will be maintained, and the Technical Specifications will continue to require operation within the core operating limits calculated by the approved methodologies, this proposed change is administrative in nature, and does not affect the purpose of the Technical Specification involved. Appropriate actions to be taken if the limits are violated will remain in the Technical Specifications.

This proposed change will control the cycle-specific parameters within the acceptance criteria and assure conformance to 10 CFR 50.36 by using the approved methodology instead of specifying Technical Specification values.

The COLR will document the specific parameter limits resulting from NRC approved calculations, including mid-cycle or other revisions to parameter values. Therefore, the proposed change is in conformance with the requirements of 10 CFR 50.36.

Any changes to the COLR will be made in accordance with the requirements of 10 CFR 50.59, with a copy of the revised COLR sent to the NRC as required in Section 6.9.1.6 of the Technical Specifications. From cycle to cycle, the COLR will be revised such that the appropriate core operating limits for the applicable unit and cycle will apply. The Technical Specifications will not be changed.

Determination of Significant Hazards

Pursuant to 10 CFR 50.91, Houston Lighting & Power has determined that operation of the facility in accordance with the proposed license amendment request does not involve any significant hazards considerations as defined by NRC regulations in 10 CFR 50.92. The following discussion describes how the proposed amendment satisfies each of the three requirements of 10 CFR 50.92(c).

1) The proposed change does not involve a significant increase in the probability or consequence of an accident previously evaluated.

   The removal of cycle-specific core operating limits from the South Texas Project Technical Specifications has no influence or impact on the probability or consequences of any accident previously evaluated. The core operation limits, although not in the Technical Specifications, will be followed in the operation of the South Texas Project Electric Generating Station. The proposed amendment requires exactly the same actions to be taken if a core operating limit is exceeded that the current Technical Specifications do. The cycle-specific limits in the COLR will continue to be controlled by the South Texas Project programs and procedures. Each accident analysis addressed in the South Texas Project FSAR will be examined with respect to changes in the cycle-dependent parameters, which are obtained from the use of NRC approved reload design methodologies, to ensure that the transient evaluation of new reloads are bounded by previously accepted analyses. This examination, which will be conducted per the requirements of 10 CFR 50.59, will ensure that future reloads will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2) The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   As stated earlier, the removal of the cycle specific variables has no influence or impact, nor does it contribute in any way to the probability or consequences of an accident. No safety-related equipment, safety function, or plant operation will be altered as a result of this proposed

change. The cycle specific variables are calculated using the NRC approved methods and submitted to the NRC to allow the staff to continue to trend the values of these limits. The Technical Specifications will continue to require operation within the core operating limits, and appropriate actions will be required if these limits are exceeded.

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

3) The proposed amendment does not result in a significant reduction in the margin of safety.

The margin of safety is not affected by the removal of cycle specific core operating limits from the Technical Specifications. The margin of safety presently provided by current Technical Specifications remains unchanged. Appropriate measures exist to control the values of these cycle specific limits. The proposed amendment continues to require operation within the core limits as obtained from the NRC-approved reload design methodologies, and the actions to be taken if a limit is exceeded remains unchanged.

The development of the limits for future reloads will continue to conform to those methods described in NRC-approved documentation. In addition, each future reload will involve a 10 CFR 50.59 safety review to assure that operation of the unit within the cycle specific limits will not involve a significant reduction in the margin of safety. Therefore, the proposed changes are administrative in nature, and do not impact the operation of the South Texas Project in a manner that involves a reduction in the margin of safety.

Conclusion

The Commission has provided guidance concerning the application of the standards for determining whether a significant hazards consideration exists. This guidance (51 FR 7750) includes examples of the type of amendments that are considered not likely to involve significant hazards considerations. The change proposed is similar to the examples of administrative changes in 51 FR 7750. Additionally, the proposed change is consistent with the NRC policy for improving Technical Specifications (52 FR 3788), and the proposed change is consistent with 10 CFR 50.36 and 10 CFR 50.59.

In view of the preceding, the Houston Lighting & Power Company has determined that the proposed license amendment for the South Texas Project does not involve any significant hazards considerations.

Attachment 3

Marked-Up Technical Specification Pages

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.3 The moderator temperature coefficient (MTC) shall be within the limits specified in the Core Operating Limit Report (COLR). The maximum upper limit shall be less than or equal to that shown in Figure 3.1-2a

~~a. less positive than 0 Δk/k/°F for the all rods withdrawn, beginning of cycle life (BOL), hot zero THERMAL POWER condition; and~~

~~b. less negative than -4.0×10^{-4} Δk/k/°F for the all rods withdrawn, end of cycle life (EOL), RATED THERMAL POWER condition.~~

APPLICABILITY: Beginning of Life (BOL) limit
~~Specification 3.1.1.3a.~~ - MODES 1 and 2* only**.
~~Specification 3.1.1.3b.~~ - MODES 1, 2, and 3 only**.
End of Life (EOL) limit

ACTION:

a. With the MTC more positive than the BOL limit specified in the COLR, ~~of Specification 3.1.1.3a. above,~~ operation in MODES 1 and 2 may proceed provided:

1. Control rod withdrawal limits are established and maintained sufficient to restore the MTC to less positive than ~~0 Δk/k/°F~~ The BOL limit specified in the COLR within 24 hours or be in HOT STANDBY within the next 6 hours. These withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6;

2. The control rods are maintained within the withdrawal limits established above until a subsequent calculation verifies that the MTC has been restored to within its limit for the all rods withdrawn condition; and

3. A Special Report is prepared and submitted to the Commission, pursuant to Specification 6.9.2, within 10 days, describing the value of the measured MTC, the interim control rod withdrawal limits, and the predicted average core burnup necessary for restoring the positive MTC to within its limit for the all rods withdrawn condition.

b. With the MTC more negative than the EOL limit specified in the COLR, ~~of Specification 3.1.1.3b. above,~~ be in HOT SHUTDOWN within 12 hours.

*With K_{eff} greater than or equal to 1.

**See Special Test Exceptions Specification 3.10.3.

SURVEILLANCE REQUIREMENTS

4.1.1.3 The MTC shall be determined to be within its limits during each fuel cycle as follows:

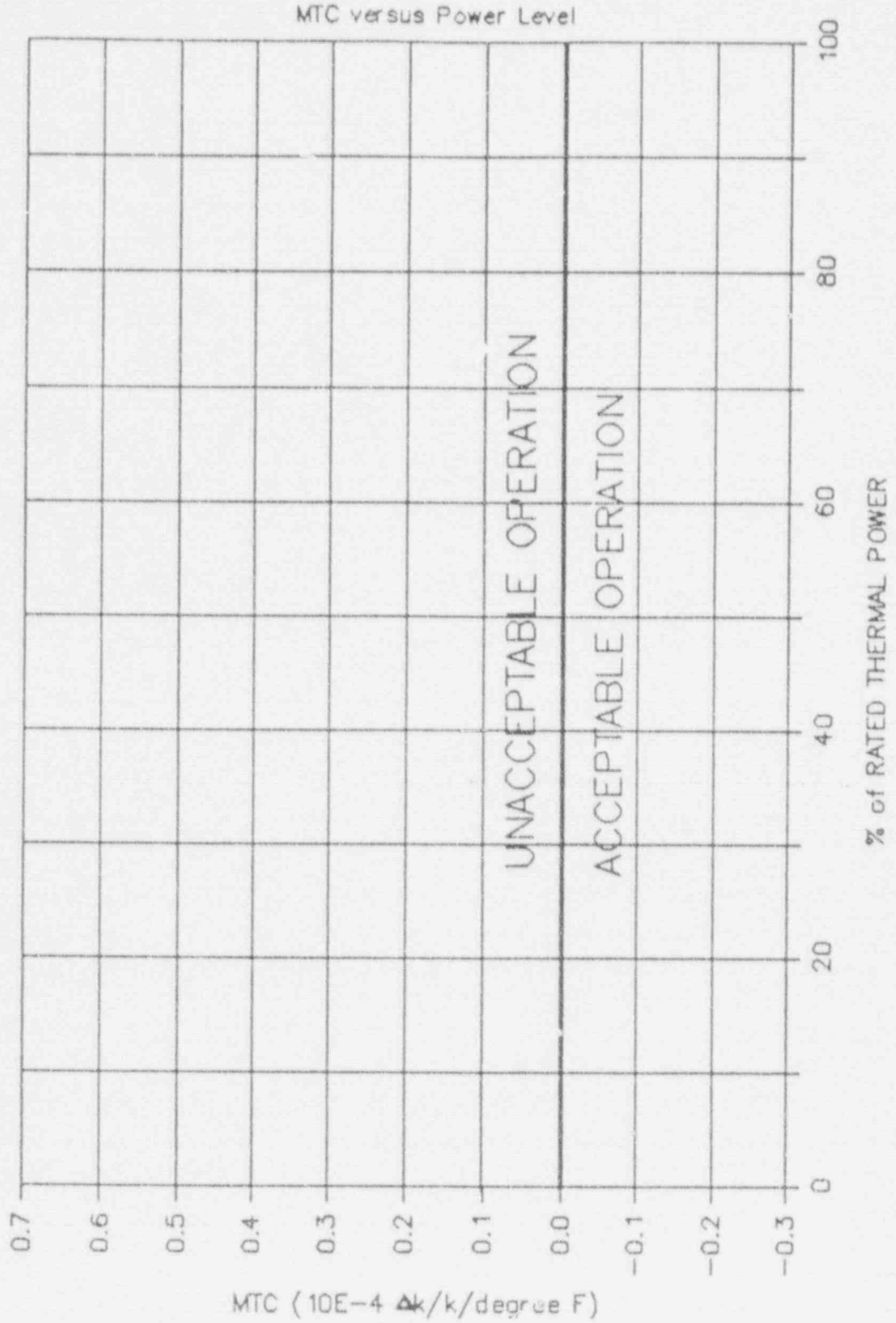
a. The MTC shall be measured and compared to the BOL limit ~~of Specification 3.1.1.3a., above~~ specified in the COLR, prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading; and

b. The MTC shall be measured at any THERMAL POWER and compared to ~~-3.1 x 10^{-4} $\Delta k/k/^{\circ}F$~~ (all rods withdrawn, RATED THERMAL POWER condition) within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm. In the event this comparison indicates the MTC is more negative than ~~-3.1 x 10^{-4} $\Delta k/k/^{\circ}F$~~, the MTC shall be remeasured, and compared to the EOL MTC limit ~~of Specification 3.1.1.3b.~~, at least once per 14 EFPD during the remainder of the fuel cycle.

Specified in the COLR

the 300 ppm surveillance limit specified in the COLR

Figure 3.1-2a



3/4 1-7a

REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All full-length shutdown and control rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more full-length rod 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 within 6 hours.

b. With one full-length rod trippable but inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within 1 hour:

1. The rod is restored to OPERABLE status within the above alignment requirements, or

2. The rod is declared inoperable and the remainder of the rods in the group with the inoperable rod are aligned to within ± 12 steps of the inoperable rod while maintaining the rod sequence and insertion limits ~~of figure 3.1-3~~ as specified in the Core Operating Limits Report (COLR). The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or

3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions;

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

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

c) A power distribution map is obtained from the movable incore detectors and $F_Q(Z)$ and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours; and

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the High Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.

c. With more than one rod trippable but inoperable due to causes other than addressed by ACTION a. above, POWER OPERATION may continue provided that:

1. Within 1 hour, the remainder of the rods in the bank(s) with the inoperable rods are aligned to within ± 12 steps of the inoperable rods while maintaining the rod sequence and insertion limits as specified in the COLR ~~of Figure 3.1-3~~. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, and

2. The inoperable rods are restored to OPERABLE status within 72 hours.

d. With more than one rod misaligned from its group step counter demand height by more than ± 12 steps (indicated position), be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each full-length rod shall be determined to be within the group demand limit by verifying the individual rod positions at least once per 12 hours except during time intervals when the rod position deviation monitor is inoperable, then verify the group positions at least once per 4 hours.

4.1.3.1.2 Each full-length rod not fully inserted in the core shall be determined to be OPERABLE by movement of at least 10 steps in any one direction at least once per 31 days.

REACTIVITY CONTROL SYSTEMS

SHUTDOWN ROD INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

3.1.3.5 All shutdown rods shall be fully withdrawn, as specified in the Core Operating Limits Report (COLR).

APPLICABILITY: MODES 1* and 2* **.

ACTION:

With a maximum of one shutdown rod not fully withdrawn, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 hour either:

a. Fully withdraw the rod, or

b. Declare the rod to be inoperable and apply Specification 3.1.3.1.

SURVEILLANCE REQUIREMENTS

4.1.3.5 Each shutdown rod shall be determined to be fully withdrawn:

a. Within 15 minutes prior to withdrawal of any rods in Control Bank A, B, C, or D during an approach to reactor criticality, and

b. At least once per 12 hours thereafter.

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

**With K_{eff} greater than or equal to 1.

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AXIAL FLUX DIFFERENCE

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within the target band (flux difference units) about the target flux difference as specified in the CORE OPERATING LIMITS REPORT, (COLR).

The indicated AFD may deviate outside the above required target band at greater than or equal to 50% but less than 90% of RATED THERMAL POWER provided the indicated AFD is within the Acceptable Operation Limits ~~of Figure 3.2-1~~ specified in the COLR and the cumulative penalty deviation time does not exceed 1 hour during the previous 24 hours.

The indicated AFD may deviate outside the above required target band at greater than 15% but less than 50% of RATED THERMAL POWER provided the cumulative penalty deviation time does not exceed 1 hour during the previous 24 hours.

APPLICABILITY: MODE 1, above 15% of RATED THERMAL POWER.*

ACTION:

a. With the indicated AFD outside of the ~~above~~ required target band and with THERMAL POWER greater than or equal to 90% of RATED THERMAL POWER, within 15 minutes either:

1. Restore the indicated AFD to within the target band limits, or

2. Reduce THERMAL POWER to less than 90% of RATED THERMAL POWER.

b. With the indicated AFD outside of the above required target band for more than 1 hour of cumulative penalty deviation time during the previous 24 hours or outside the Acceptable Operation Limits ~~of Figure 3.2-1~~ specified in the COLR and with THERMAL POWER less than 90% but equal to or greater than 50% of RATED THERMAL POWER, reduce:

1. THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes, and

2. The Power Range Neutron Flux* ** - High Setpoint to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.

---

*See Special Test Exceptions Specification 3.10.2.

**Surveillance testing of the Power Range Neutron Flux Channel may be performed pursuant to Specification 4.3.1.1 provided the indicated AFD is maintained within the Acceptable Operation Limits ~~of Figure 3.2-1~~ specified in the COLR. A total of 16 hours operation may be accumulated with the AFD outside of the above required target band during testing without penalty deviation.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

c. With the indicated AFD outside of the ~~above~~ required target band for more than 1 hour of cumulative penalty deviation time during the previous 24 hours and with THERMAL POWER less than 50% but greater than 15% of RATED THERMAL POWER, the THERMAL POWER shall not be increased equal to or greater than 50% of RATED THERMAL POWER until the indicated AFD is within the ~~above~~ required target band.

SURVEILLANCE REQUIREMENTS

4.2.1.1 The indicated AFD shall be determined to be within its limits during POWER OPERATION above 15% of RATED THERMAL POWER by:

a. Monitoring the indicated AFD for each OPERABLE excore channel:

1) At least once per 7 days when the AFD Monitor Alarm is OPERABLE, and

2) At least once per hour for the first 24 hours after restoring the AFD Monitor Alarm to OPERABLE status.

b. Monitoring and logging the indicated AFD for each OPERABLE excore channel at least once per hour for the first 24 hours and at least once per 30 minutes thereafter, when the AFD Monitor Alarm is inoperable. The logged values of the indicated AFD shall be assumed to exist during the interval preceding each logging.

4.2.1.2 The indicated AFD shall be considered outside of its target band when two or more OPERABLE excore channels are indicating the AFD to be outside the target band. Penalty deviation outside of the above required target band shall be accumulated on a time basis of:

a. One minute penalty deviation for each 1 minute of POWER OPERATION outside of the target band at THERMAL POWER levels equal to or above 50% of RATED THERMAL POWER, and

b. One-half minute penalty deviation for each 1 minute of POWER OPERATION outside of the target band at THERMAL POWER levels between 15% and 50% of RATED THERMAL POWER.

4.2.1.3 The target flux difference of each OPERABLE excore channel shall be determined by measurement at least once per 92 Effective Full Power Days. The provisions of Specification 4.0.4 are not applicable.

4.2.1.4 The target flux difference shall be updated at least once per 31 Effective Full Power Days by either determining the target flux difference

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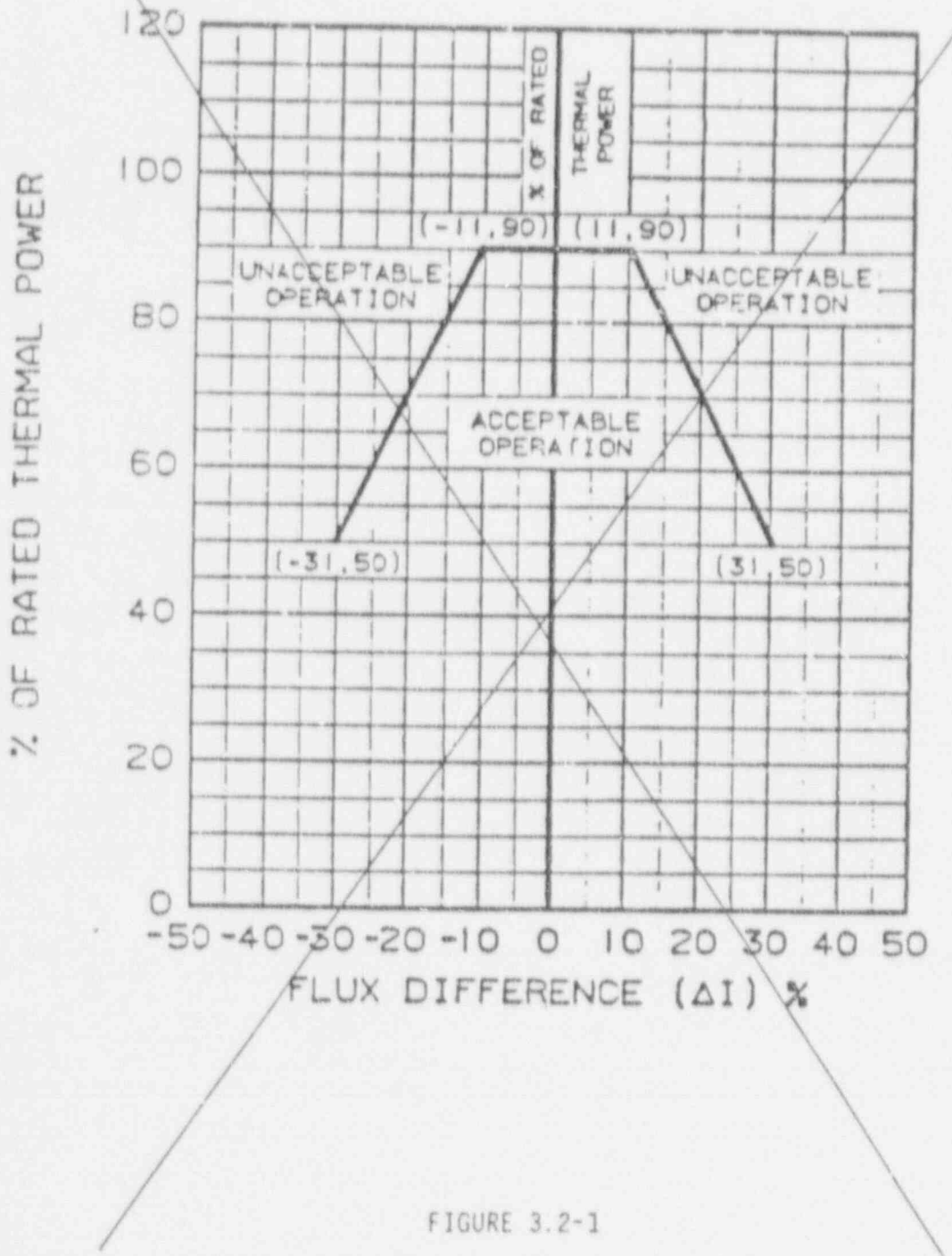

FIGURE 3.2-1

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF RATED THERMAL POWER

POWER DISTRIBUTION LIMITS

3/4.2.2 HEAT FLUX HOT CHANNEL FACTOR - $F_Q(Z)$

LIMITING CONDITION FOR OPERATION

3.2.2 $F_Q(Z)$ shall be limited by the following relationships:

$F_Q(Z) \leq \frac{2.50}{P} [K(Z)]$ for $P > 0.5$ $\quad \frac{F_Q^{RTP}}{P} * K(Z)$

$F_Q(Z) \leq 5.0 [K(Z)]$ for $P \leq 0.5$ $\quad \frac{F_Q^{RTP}}{0.5} * K(Z)$

F_Q^{RTP} = the F_Q limit at RATED THERMAL POWER (RTP) specified in the Core Operating Limits Report (COLR).

Where: $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$, and

$K(Z)$ = the ~~function obtained from Figure 3.2-2 for a given~~ normalized $F_Q(Z)$ as a function of core height ~~location~~ specified in the [illegible] 2.

APPLICABILITY: MODE 1.

ACTION:

With $F_Q(Z)$ exceeding its limit:

a. Reduce THERMAL POWER at least 1% for each 1% $F_Q(Z)$ exceeds the limit within 15 minutes and similarly reduce the Power Range Neutron Flux-High Trip Setpoint within the next 4 hours; POWER OPERATION may proceed for up to a total of 72 hours; subsequent POWER OPERATION may proceed provided the Overpower ΔT Trip Setpoint has been reduced at least 1% for each 1% $F_Q(Z)$ exceeds the limit.

b. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER above the reduced limit required by ACTION a., above; THERMAL POWER may then be increased provided $F_Q(Z)$ is demonstrated through incore mapping to be within its limit.

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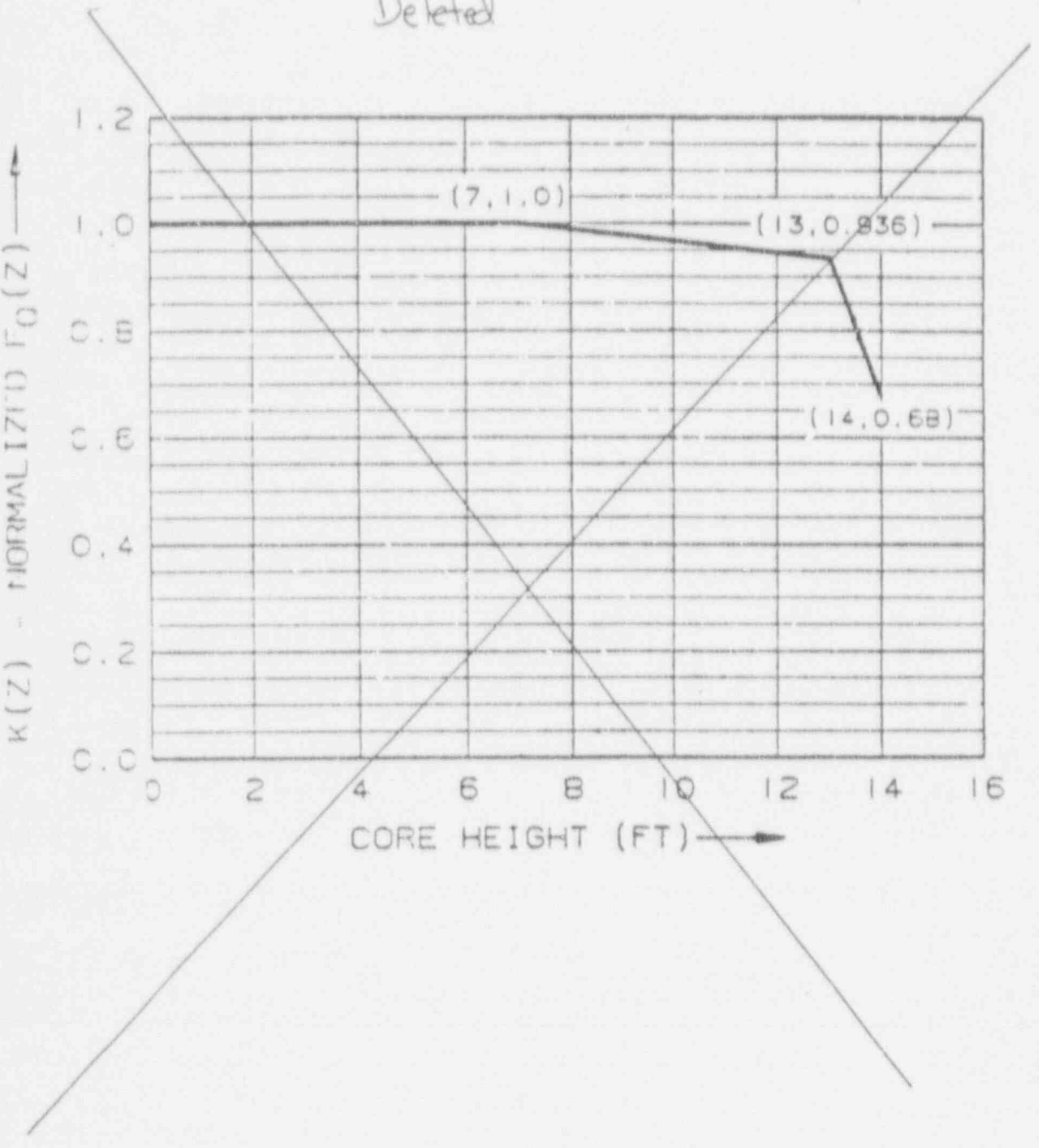

FIGURE 3.2-2

K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 F_{xy} shall be evaluated to determine if $F_Q(Z)$ is within its limit by:

a. Using the movable incore detectors to obtain a power distribution map at any THERMAL POWER greater than 5% of RATED THERMAL POWER,

b. Increasing the measured F_{xy} component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% to account for measurement uncertainties,

c. Comparing the F_{xy} computed (F_{xy}^C) obtained in Specification 4.2.2.2b., above to:

1) The F_{xy} limits for RATED THERMAL POWER (F_{xy}^{RTP}) for the appropriate measured core planes given in Specification 4.2.2.2e. and f., below, and

2) The relationship:

$$F_{xy}^L = F_{xy}^{RTP}\,[1+PF_{xy}(1-P)],$$

Where F_{xy}^L is the limit for fractional THERMAL POWER operation expressed as a function of F_{xy}^{RTP} and P is the fraction of RATED THERMAL POWER at which F_{xy} was measured. PF_{xy} is the power factor multiplier for F_{xy} specified in the COLR.

d. Remeasuring F_{xy} according to the following schedule:

1) When F_{xy}^C is greater than the F_{xy}^{RTP} limit for the appropriate measured core plane but less than the F_{xy}^L relationship, additional power distribution maps shall be taken and F_{xy}^C compared to F_{xy}^{RTP} and F_{xy}^L either:

a) Within 24 hours after exceeding by 20% of RATED THERMAL POWER or greater, the THERMAL POWER at which F_{xy}^C was last determined, or

b) At least once per 31 Effective Full Power Days (EFPD), whichever occurs first.

SURVEILLANCE REQUIREMENTS (Continued)

2) When the F_{xy}^{C} is less than or equal to the F_{xy}^{RTP} limit for the appropriate measured core plane, additional power distribution maps shall be taken and F_{xy}^{C} compared to F_{xy}^{RTP} and F_{xy}^{L} at least once per 31 EFPD.

e. The F_{xy} limits used in the Constant Axial Offset Control analysis for RATED THERMAL POWER (F_{xy}^{RTP}) shall be provided for all core planes containing Bank "D" control rods and all unrodded core planes ~~in a Radial Peaking Factor Limit Report~~ per Specification 6.9.1.6; as specified in the COLR

f. The F_{xy} limits of Specification 4.2.2.2e., above, are not applicable in the following core planes regions as measured in percent of core height from the bottom of the fuel:

1) Lower core region from 0 to 15%, inclusive,

2) Upper core region from 85 to 100%, inclusive,

3) Grid plane regions at 22.4 ± 2%, 34.2 ± 2%, 46.0 ± 2%, 57.8 ± 2%, 69.5 ± 2% and 81.3 ± 2%, inclusive, and

4) Core plane regions within ± 2% of core height (± 3.36 inches) about the bank demand position of the Bank "D" control rods.

g. With F_{xy}^{C} exceeding F_{xy}^{L}, the effects of F_{xy} on $F_{Q}(Z)$ shall be evaluated to determine if $F_{Q}(Z)$ is within its limits.

4.2.2.3 When $F_{Q}(Z)$ is measured for other than F_{xy} determinations, an overall measured $F_{Q}(Z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and further increased by 5% to account for measurement uncertainty.

3/4.2.3 NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

LIMITING CONDITION FOR OPERATION

3.2.3 $F^N_{\Delta H}$ shall be less than ~~$\frac{1.46}{F^{RTP}_{\Delta H}}$~~ $[1.0 + ~~0.3~~ (1-P)]$ $PF_{\Delta H}$

Where: $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

$F^{RTP}_{\Delta H}$ = the $F^N_{\Delta H}$ Limit at RATED THERMAL POWER (RTP) specified in the Core Operating Limits Report (COLR)

$PF_{\Delta H}$ = the Power Factor Multiplier for $F^N_{\Delta H}$ specified in the COLR.

APPLICABILITY: MODE 1.

ACTION:

With $F^N_{\Delta H}$ exceeding its limit:

a. Within 2 hours reduce the THERMAL POWER to the level where the LIMITING CONDITION FOR OPERATION is satisfied.

b. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER above the limit required by ACTION a., above; THERMAL POWER may then be increased, provided $F^N_{\Delta H}$ is demonstrated through incore mapping to be within its limit.

SURVEILLANCE REQUIREMENTS

4.2.3.1 The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 $F^N_{\Delta H}$ shall be demonstrated to be within its limit prior to operation above 75% RATED THERMAL POWER after each fuel loading and at least once per 31 EFPD thereafter by:

a. Using the movable incore detectors to obtain a power distribution map at any THERMAL POWER greater than 5% RATED THERMAL POWER.

b. Using the measured value of $F^N_{\Delta H}$ which does not include an allowance for measurement uncertainty.

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SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (Continued)

The Semiannual Radioactive Effluent Release Reports shall also include the following: an explanation as to why the inoperability of liquid or gaseous effluent monitoring instrumentation was not corrected within the time specified in Specification 3.3.3.10 or 3.3.3.11, respectively; and description of the events leading to liquid holdup tanks or gas storage tanks exceeding the limits of Specification 3.11.1.4 or 3.11.2.6, respectively.

MONTHLY OPERATING REPORTS

6.9.1.5 Routine reports of operating statistics and shutdown experience, including documentation of all challenges to the PORVs or safety valves, shall be submitted on a monthly basis to the Director, Office of Resource Management, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, with a copy to the Regional Administrator of the Regional Office of the NRC, no later than the 15th of each month following the calendar month covered by the report.

CORE OPERATING LIMITS REPORT

6.9.1.6 Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT before each reload cycle or any remaining part of a reload cycle. The CORE OPERATING LIMITS REPORT shall be maintained available in the Control Room. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by NRC in WCAP-8403, "Power Distribution and Load Following Procedures," 1974 and in WCAP-9273-A, "Westinghouse Reload Safety Evaluation Methodology," 1985 (for Control Bank Insertion Limits). The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met. The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements thereto, shall be provided within 30 days of their implementation, for each reload cycle, to the NRC in accordance with 10 CFR 50.4.

insert (see following pages)

SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the Regional Administrator of the Regional Office of the NRC within the time period specified for each report.

INSERT

CORE OPERATING LIMITS REPORT

6.9.1.6.a Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT before each reload cycle, or any part of a reload cycle for the following:

1. Moderator Temperature Coefficient BOL and EOL limits, and 300 ppm surveillance limit for Specification 3/4.1.1.3,

2. Shutdown Bank Insertion Limit for Specification 3/4.1.3.5,

3. Control Bank Insertion Limits for Specification 3/4.1.3.6,

4. Axial Flux Difference limits and target band for Specification 3/4.2.1,

5. Heat Flux Hot Channel Factor, K(Z), Power Factor Multiplier, and F_{xy}^{RTP}, for Specification 3/4.2.2, and

6. Nuclear Enthalpy Rise Hot Channel Factor, and Power Factor Multiplier for Specification 3/4.2.3

The CORE OPERATING LIMITS REPORT shall be maintained available in the Control Room.

6.9.1.6.b The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC in:

1. WCAP 9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY", July, 1985 (W Proprietary).

(Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Rod Insertion Limit, 3.1.3.6 - Control Bank Insertion Limits, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, and 3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor.)

2. WCAP 8385, "POWER DISTRIBUTION AND LOAD FOLLOWING PROCEDURES TOPICAL REPORT", September, 1974 (W Proprietary).

(Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control))

3. Westinghouse letter NS-TMA-2198, T. M. Anderson (Westinghouse) to K. Kniel (Chief of Core Performance Branch, NRC) January 31, 1980 - Attachment: Operation and Safety Analysis Aspects of an Improved Load Follow Package.

   (Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control).Approved by NRC Supplement No. 4 to NUREG 0422 January, 1981 docket Nos. 50-369 and 50-370)

4. NUREG-0800, Standard Review Plan, U. S. Nuclear Regulatory Commission, Section 4.3, Nuclear Design, July 1981. Branch Technical Position CPB 4.3-1, Westinghouse Constant Axial Offset Control (CAOC), Rev.2, July 1981.

   (Methodology for Specification 3.2.1 - Axial Flux Difference (Constant Axial Offset Control).)

5. WCAP 9220-P-A, Rev.1, "WESTINGHOUSE ECCS EVALUATION MODEL-1981 VERSION", February 1982 (W Proprietary).

   (Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor.)

6. WCAP 9561-P-A, ADD. 3, Rev.1, "BART A-1: A COMPUTER CODE FOR THE BEST ESTIMATE ANALYSIS OF REFLOOD TRANSIENTS - SPECIAL REPORT: THIMBLE MODELING W ECCS EVALUATION MODEL", July, 1986, (W Proprietary).

   (Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor.)

6.9.1.6.c The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits,nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met.

6.9.1.6.d The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements thereto, shall be provided upon issuance, for each reload cycle, to the NRC Document Control Desk, with copies to the Regional Administrator and Resident Inspector.

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BASES

MODERATOR TEMPERATURE COEFFICIENT (Continued)

The most negative MTC, value equivalent to the most positive moderator density coefficient (MDC), was obtained by incrementally correcting the MDC used in the FSAR analyses to nominal operating conditions. These corrections involved subtracting the incremental change in the MDC associated with a core condition of all rods inserted (most positive MDC) to an all rods withdrawn condition and, a conversion for the rate of change of moderator density with temperature at RATED THERMAL POWER conditions. This value of the MDC was then transformed into the limiting MTC value ~~-4.0 x 10^{-4} $\Delta k/k/^{\circ}F$~~. The MTC value ~~of -3.1 x 10^{-4} $\Delta k/k/^{\circ}F$~~ represents a conservative value (with corrections for burnup and soluble boron) at a core condition of 300 ppm equilibrium boron concentration and is obtained by making these corrections to the limiting MTC value ~~of -4.0 x 10^{-4} $\Delta k/k/^{\circ}F$~~.

EOL

specified in the Core Operating Limits Report (COLR).

EOL

300 ppm surveillance

The Surveillance Requirements for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup.

3/4.1.1.4 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 561°F. This limitation is required to ensure: (1) the moderator temperature coefficient is within its analyzed temperature range, (2) the trip instrumentation is within its normal operating range, (3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, and (4) the reactor vessel is above its minimum RT_{NDT} temperature.

3/4.1.2 BORATION SYSTEMS

The Boron Injection System ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include: (1) borated water sources, (2) charging pumps, (3) separate flow paths, (4) boric acid transfer pumps, and (5) an emergency power supply from OPERABLE diesel generators.

With the RCS average temperature above 350°F, a minimum of two boron injection flow paths are required to ensure single functional capability in the event an assumed failure renders one of the flow paths inoperable. The boration capability of either flow path is sufficient to provide a SHUTDOWN MARGIN from expected operating conditions of 1.75% $\Delta k/k$ after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs at EOL from full power equilibrium xenon conditions and requires 27,000 gallons of 7000 ppm borated water from the boric acid storage system or 458,000 gallons of 2500 ppm borated water from the refueling water storage tank (RWST). The RWST volume is an ECCS requirement and is more than adequate for the required boration capability.

BASES

The specifications of this section provide assurance of fuel integrity during Condition I (Normal Operation) and II (Incidents of Moderate Frequency) events by: (1) maintaining the minimum DNBR in the core greater than or equal to 1.30 during normal operation and in short-term transients, and (2) limiting the fission gas release, fuel pellet temperature, and cladding mechanical properties to within assumed design criteria. In addition, limiting the peak linear power density during Condition I events provides assurance that the initial conditions assumed for the LOCA analyses are met and the ECCS acceptance criteria limit of 2200°F is not exceeded.

The definitions of certain hot channel and peaking factors as used in these specifications are as follows:

$F_Q(Z)$ Heat Flux Hot Channel Factor, is defined as the maximum local heat flux on the surface of a fuel rod at core elevation Z divided by the average fuel rod heat flux, allowing for manufacturing tolerances on fuel pellets and rods;

$F^N_{\Delta H}$ Nuclear Enthalpy Rise Hot Channel Factor, is defined as the ratio of the integral of linear power along the rod with the highest integrated power to the average rod power; and

$F_{xy}(Z)$ Radial Peaking Factor, is defined as the ratio of peak power density to average power density in the horizontal plane at core elevation Z.

3/4.2.1 AXIAL FLUX DIFFERENCE

The limits on AXIAL FLUX DIFFERENCE (AFD) assure that the $F_Q(Z)$ upper bound envelope of ~~2.50~~ times the normalized axial peaking factor is not exceeded during either normal operation or in the event of xenon redistribution following power changes.

F_Q limit specified in Core operating limits Report (COLR)

Target flux difference is determined at equilibrium xenon conditions. The full-length rods may be positioned within the core in accordance with their respective insertion limits and should be inserted near their normal position for steady-state operation at high power levels. The value of the target flux difference obtained under these conditions divided by the fraction of RATED THERMAL POWER is the target flux difference at RATED THERMAL POWER for the associated core burnup conditions. Target flux differences for other THERMAL POWER levels are obtained by multiplying the RATED THERMAL POWER value by the appropriate fractional THERMAL POWER level. The periodic updating of the target flux difference value is necessary to reflect core burnup considerations.

BASES

AXIAL FLUX DIFFERENCE (Continued)

Although it is intended that the plant will be operated with the AFD within the target band required by Specification 3.2.1 about the target flux difference, during rapid plant THERMAL POWER reductions, control rod motion will cause the AFD to deviate outside of the target band at reduced THERMAL POWER levels. This deviation will not affect the xenon redistribution sufficiently to change the envelope of peaking factors which may be reached on a subsequent return to RATED THERMAL POWER (with the AFD within the target band) provided the time duration of the deviation is limited. Accordingly, a 1-hour penalty deviation limit cumulative during the previous 24 hours is provided for operation outside of the target band but within the limits ~~of Figure 3.2-1~~ while at THERMAL POWER levels between 50% and 90% of RATED THERMAL POWER. For THERMAL POWER levels between 15% and 50% of RATED THERMAL POWER, deviations of the AFD outside of the target band are less significant. The penalty of 2 hours actual time reflects this reduced significance. specified in the COLR

Provisions for monitoring the AFD on an automatic basis are derived from the plant process computer through the AFD Monitor Alarm. The computer determines the 1-minute average of each of the OPERABLE excore detector outputs and provides an alarm message immediately if the AFD for two or more OPERABLE excore channels are outside the target band and the THERMAL POWER is greater than 90% of RATED THERMAL POWER. During operation at THERMAL POWER levels between 50% and 90% and between 15% and 50% RATED THERMAL POWER, the computer outputs an alarm message when the penalty deviation accumulates beyond the limits of 1 hour and 2 hours, respectively.

Figure B 3/4 2-1 shows a typical monthly target band.

3/4.2.2 and 3/4.2.3 HEAT FLUX HOT CHANNEL FACTOR and NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR

The limits on heat flux hot channel factor and nuclear enthalpy rise hot channel factor ensure that: (1) the design limits on peak local power density and minimum DNBR are not exceeded and (2) in the event of a LOCA the peak fuel clad temperature will not exceed the 2200°F ECCS acceptance criteria limit.

Each of these is measurable but will normally only be determined periodically as specified in Specifications 4.2.2 and 4.2.3. This periodic surveillance is sufficient to ensure that the limits are maintained provided:

a. Control rods in a single group move together with no individual rod insertion differing by more than ± 12 steps, indicated, from the group demand position;

b. Control rod groups are sequenced with overlapping groups as described in Specification 3.1.3.6;

BASES

HEAT FLUX HOT CHANNEL FACTOR and NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Continued)

When an F_Q measurement is taken, an allowance for both experimental error and manufacturing tolerance must be made. An allowance of 5% is appropriate for a full-core map taken with the Incore Detector Flux Mapping System, and a 3% allowance is appropriate for manufacturing tolerance.

The Radial Peaking Factor, $F_{xy}(Z)$, is measured periodically to provide assurance that the Hot Channel Factor, $F_Q(Z)$, remains within its limit. The F_{xy} limit for RATED THERMAL POWER (F_{xy}^{RTP}) as provided in the ~~Radial Peaking Factor Limit Report~~ Core Operating Limits Report (COLR) per Specification 6.9.1.6 was determined from expected power control manuevers over the full range of burnup conditions in the core.

3/4.2.4 QUADRANT POWER TILT RATIO

The QUADRANT POWER TILT RATIO limit assures that the radial power distribution satisfies the design values used in the power capability analysis. Radial power distribution measurements are made during STARTUP testing and periodically during power operation.

The limit of 1.02, at which corrective action is required, provides DNB and linear heat generation rate protection with x-y plane power tilts. A limit of 1.02 was selected to provide an allowance for the uncertainty associated with the indicated power tilt.

The 2-hour time allowance for operation with a tilt condition greater than 1.02 is provided to allow identification and correction of a dropped or misaligned control rod. In the event such action does not correct the tilt, the margin for uncertainty on F_Q is reinstated by reducing the maximum allowed power by 3% for each percent of tilt in excess of 1.

For purposes of monitoring QUADRANT POWER TILT RATIO when one excore detector is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the QUADRANT POWER TILT RATIO. The incore detector monitoring is done with a full incore flux map or two sets of four symmetric thimbles. The two sets of four symmetric thimbles is a unique set of eight detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, N-8.

3/4.2.5 DNB PARAMETERS

The limits on the DNB-related parameters assure that each of the parameters are maintained within the normal steady-state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the

Attachment 4

Sample Core Operating Limits Reports

South Texas Unit 1 Cycle 3

1 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report for STPEGS Unit 1 Cycle 3 has been prepared in accordance with the requirements of Technical Specification 6.9.1.6. The core operating limits have been developed using the NRC approved methodologies specified in Technical Specification 6.9.1.6.

The Technical Specifications affected by this report are:

1)	3/4.1.1.3	Moderator Temperature Coefficient Limits
2)	3/4.1.3.5	Shutdown Rod Insertion Limit
3)	3/4.1.3.6	Control Rod Insertion Limits
4)	3/4.2.1	AFD Limits
5)	3/4.2.2	Heat Flux Hot Channel Factor
6)	3/4.2.3	Nuclear Enthalpy Rise Hot Channel Factor

2 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented below.

2.1 MODERATOR TEMPERATURE COEFFICIENT (Specification 3.1.1.3)

2.1.1 The BOL, ARO, MTC shall be less positive than the limits shown in Figure 1.

2.1.2 The EOL, ARO, HFP, MTC shall be less negative than -4.0×10^{-4} $\Delta k/k/°F$.

2.1.3 The 300 ppm, ARO, HFP, MTC shall be less negative than $-3.1 \times 10^{-4} \Delta k/k/°F$ (300 ppm Surveillance Limit).

Where: BOL stands for Beginning of Cycle Life
EOL stands for End of Cycle Life
ARO stands for All Rods Out
HFP stands for Hot Full Power (100% RATED THERMAL POWER)

2.2 ROD INSERTION LIMITS (Specification 3.1.3.5 and 3.1.3.6)

2.2.1 The Control Rod Insertion limits are provided in Figure 2.

2.2.2 Fully withdrawn for all Control and Shutdown Banks shall be 256 steps and above, but not exceeding 259 steps withdrawn.

2.2.3 All banks shall have the same fully withdrawn position.

2.3 AXIAL FLUX DIFFERENCE (Specification 3.2.1)

2.3.1 AFD limits as required by Technical Specification 3.2.1 are determined by CAOC Operations with a Delta-I allowable operating band of +3, -12%.

2.3.2 The AFD shall be maintained within the ACCEPTABLE OPERATION portion of Figure 3, as required by Technical Specifications.

2.4 HEAT FLUX HOT CHANNEL FACTOR (Specification 3.2.2)

2.4.1 $F_Q^{RTP} = 2.50$.

2.4.2 K(Z) is provided in Figure 4.

2.4.3 The F_{xy} limits for RATED THERMAL POWER within specific core planes shall be:

2.4.3.1 F_{XY}^{RTP} less than or equal to 1.94 for all core planes containing Control Bank D rods, and

2.4.3.2 F_{XY}^{RTP} less than or equal to 1.64 for all unrodded core planes.

2.4.3.3 $PF_{xy} = 0.2$.

These F_{xy} limits were used to confirm that the heat flux hot channel factor $F_Q(z)$ will be limited by Technical Specification 3.2.2 assuming the most limiting axial power distributions expected to result for the insertion and removal of Control Bank C and D during operation, including the accompanying variations in the axial xenon and power distributions, as described in reference 3.2. Therefore, these F_{xy} limits provide assurance that the initial conditions assumed in the LOCA analysis are met, along with the ECCS acceptance criteria of 10CFR50.46.

2.5 ENTHALPY RISE HOT CHANNEL FACTOR (Specification 3.2.3)

2.5.1 $F_{\Delta H}^{RTP} = 1.46$.

2.5.2 $PF_{\Delta H} = 0.3$.

3 REFERENCES

3.1 "Westinghouse Reload Safety Evaluation Methodology," WCAP-9272-P-A, July, 1985

3.2 "Power Distribution and Load Following Procedures," WCAP-8385, September, 1974

3.3 NUREG-1346, Technical Specifications, South Texas Project Unit Nos. 1 and 2

FIGURE 1

MTC versus Power Level

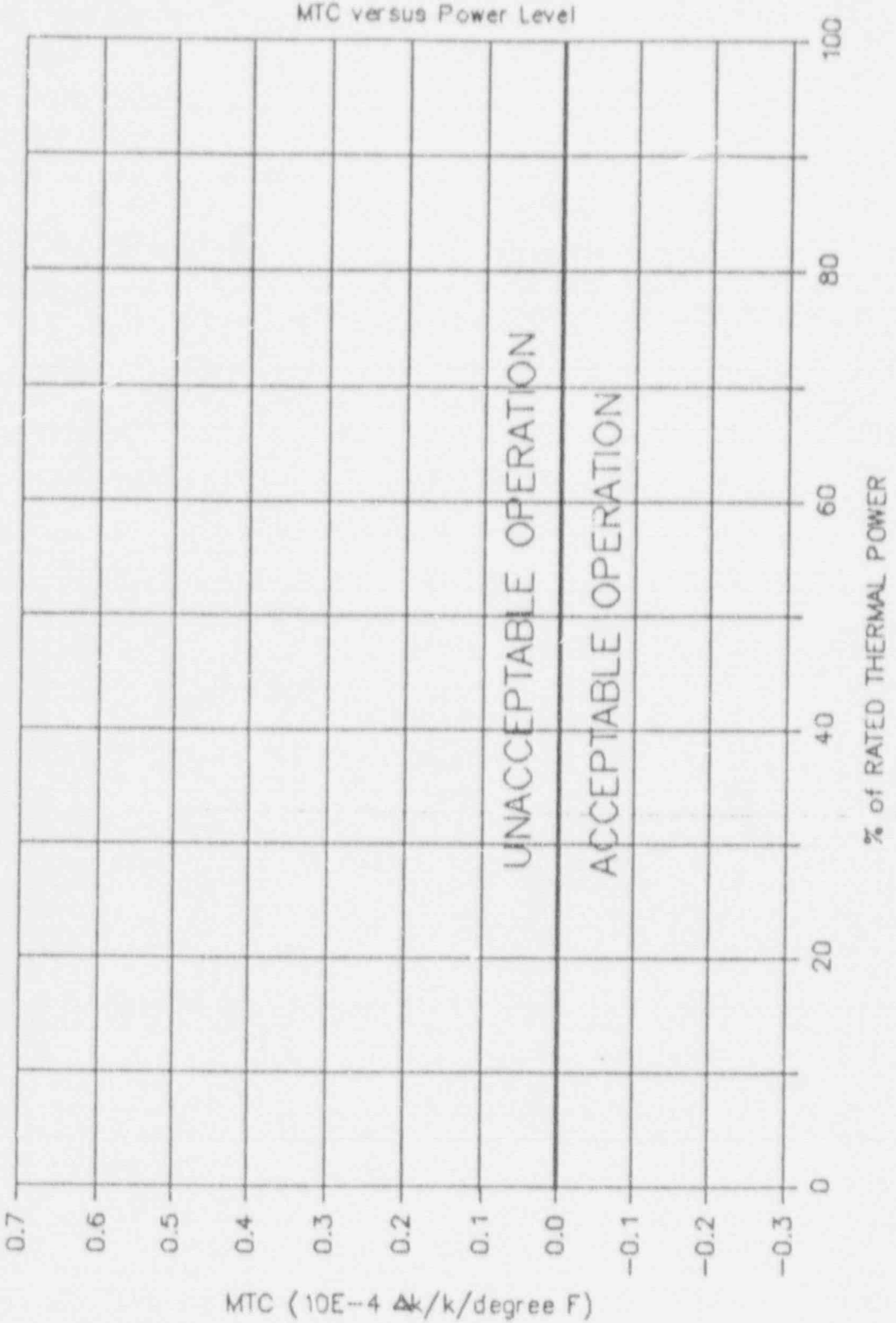

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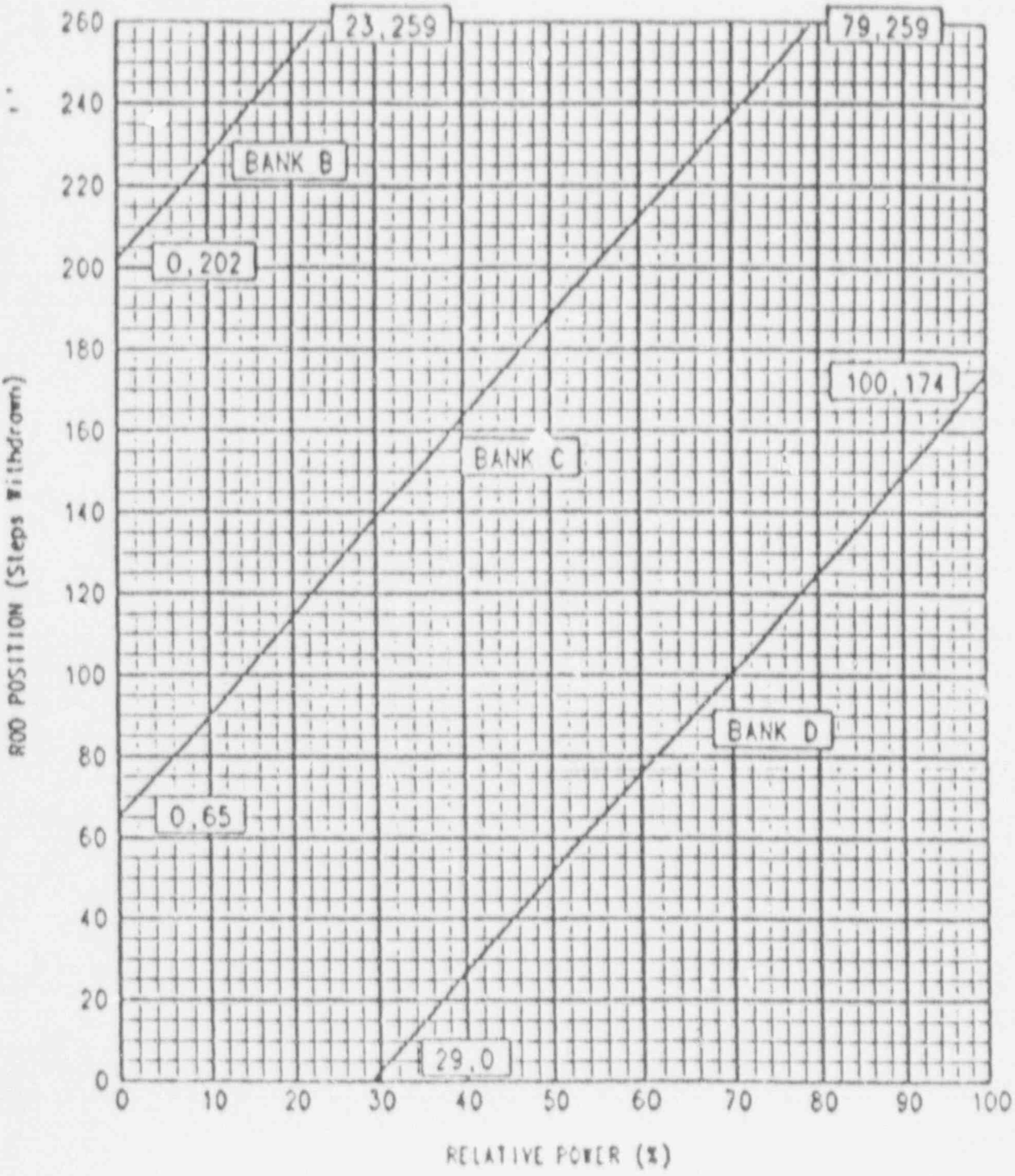
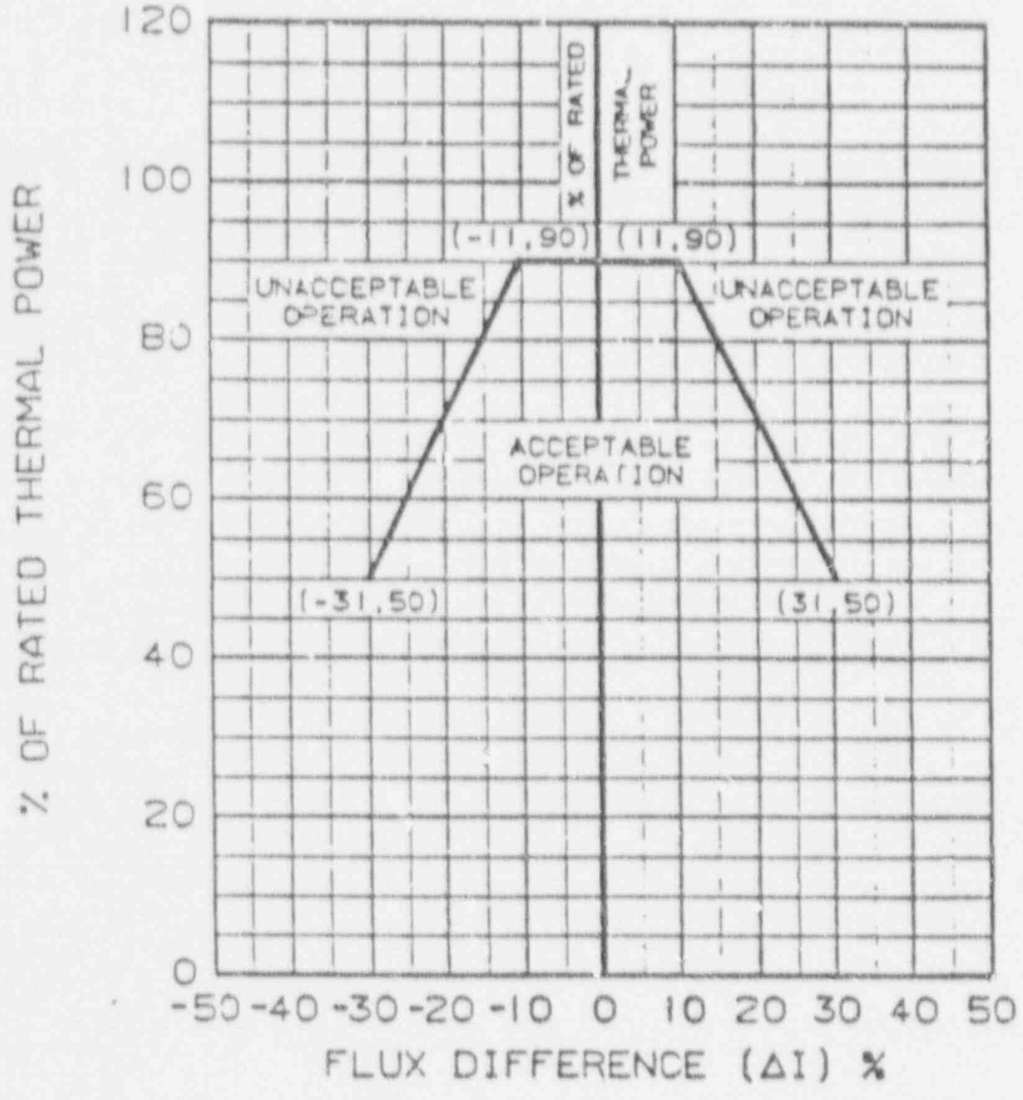
FIGURE 2

CONTROL ROD INSERTION LIMITS VERSUS POWER LEVEL



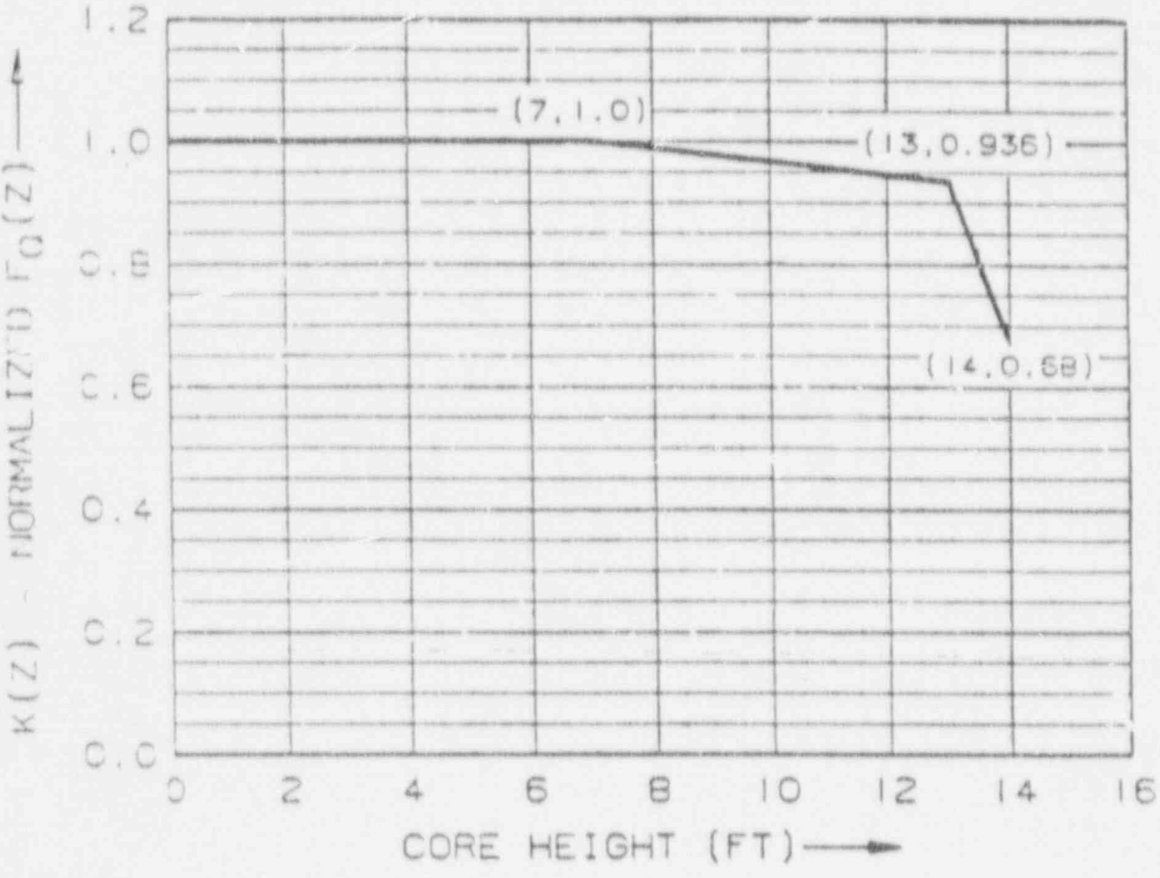
NOTE: CONTROL BANK A IS ALREADY WITHDRAWN TO THE FULL OUT POSITION.

FIGURE 3



AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF
RATED THERMAL POWER

FIGURE 4



K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

1 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report for STPEGS Unit 2 Cycle 1 has been prepared in accordance with the requirements of Technical Specification 6.9.1.6. The core operating limits have been developed using the NRC approved methodologies specified in Technical Specification 6.9.1.6.

The Technical Specifications affected by this report are:

1) 3/4.1.1.3 Moderator Temperature Coefficient Limits
2) 3/4.1.3.5 Shutdown Rod Insertion Limit
3) 3/4.1.3.6 Control Rod Insertion Limits
4) 3/4.2.1 AFD Limits
5) 3/4.2.2 Heat Flux Hot Channel Factor
6) 3/4.2.3 Nuclear Enthalpy Rise Hot Channel Factor

2 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented below.

2.1 MODERATOR TEMPERATURE COEFFICIENT (Specification 3.1.1.3)

2.1.1 The BOL, ARO, MTC shall be less positive than the limits shown in Figure 1.

2.1.2 The EOL, ARO, HFP, MTC shall be less negative than -4.0×10^{-4} $\Delta k/k/°F$.

2.1.3 The 300 ppm, ARO, HFP, MTC shall be less negative than $-3.1 \times 10^{-4} \Delta k/k/°F$ (300 ppm Surveillance Limit).

Where: BOL stands for Beginning of Cycle Life
EOL stands for End of Cycle Life
ARO stands for All Rods Out
HFP stands for Hot Full Power (100% RATED THERMAL POWER)

2.2 ROD INSERTION LIMITS (Specifications 3.1.3.5 and 3.1.3.6)

2.2.1 The Control Rod Insertion limits are provided in Figure 2.

2.2.2 Fully withdrawn for all Control and Shutdown Banks shall be 256 steps and above, but not exceeding 259 steps withdrawn

2.2.3 All banks shall have the same fully withdrawn position.

2.3 AXIAL FLUX DIFFERENCE (Specification 3.2.1)

2.3.1 AFD limits as required by Technical Specification 3.2.1 are determined by CAOC Operations with a Delta-I allowable operating band of +3, -12%.

2.3.2 The AFD shall be maintained within the ACCEPTABLE OPERATION portion of Figure 3, as required by Technical Specifications.

2.4 HEAT FLUX HOT CHANNEL FACTOR (Specification 3.2.2)

2.4.1 $F_Q^{RTP} = 2.50$.

2.4.2 K(Z) is provided in Figure 4.

2.4.3 The F_{xy} limits for RATED THERMAL POWER within specific core planes shall be:

2.4.3.1 F_{XY}^{RTP} less than or equal to 1.78 for all core planes containing Control Bank D rods, and

2.4.3.2 F_{XY}^{RTP} less than or equal to 1.55 for all unrodded core planes.

2.4.3.3 $PF_{xy} = 0.2$.

These F_{xy} limits were used to confirm that the heat flux hot channel factor $F_Q(z)$ will be limited by Technical Specification 3.2.2 assuming the most limiting axial power distributions expected to result for the insertion and removal of Control Bank C and D during operation, including the accompanying variations in the axial xenon and power distributions, as described in reference 3.2. Therefore, these F_{xy} limits provide assurance that the initial conditions assumed in the LOCA analysis are met, along with the ECCS acceptance criteria of 10CFR50.46.

2.5 ENTHALPY RISE HOT CHANNEL FACTOR (Specification 3.2.3)

2.5.1 $F_{\Delta H}^{RTP} = 1.46$.

2.5.2 $PF_{\Delta H} = 0.3$.

3 REFERENCES

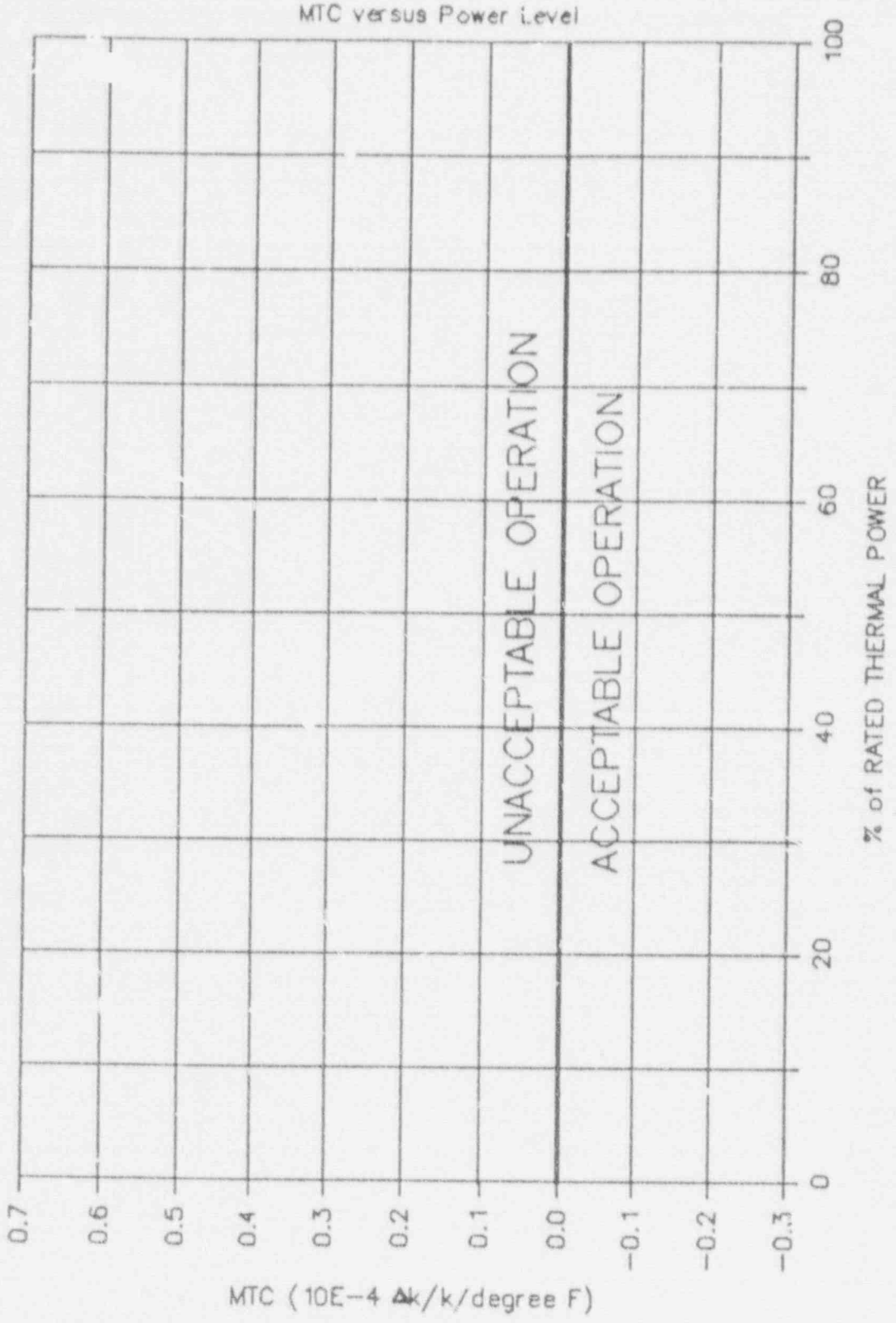
3.1 "Westinghouse Reload Safety Evaluation Methodology," WCAP-9272-P-A, July, 1985

3.2 "Power Distribution and Load Following Procedures," WCAP-8385, September, 1974

3.3 "Houston Lighting & Power Company South Texas Project Units 1 and 2 Radial Peaking Factor Limit Report for South Texas Unit 2 Cycle 1," letter from M. A. Sinwell (Westinghouse) to J. R. Worden dated December 21, 1988.

3.4 NUREG-1346, Technical Specifications, South Texas Project Unit Nos. 1 and 2

FIGURE 1


MTC versus Power Level
UNACCEPTABLE OPERATION
ACCEPTABLE OPERATION
% of RATED THERMAL POWER
0
20
40
60
80
100
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
MTC (10E-4 Δk/k/degree F)

SOUTH TEXAS UNIT 2 CYCLE 1

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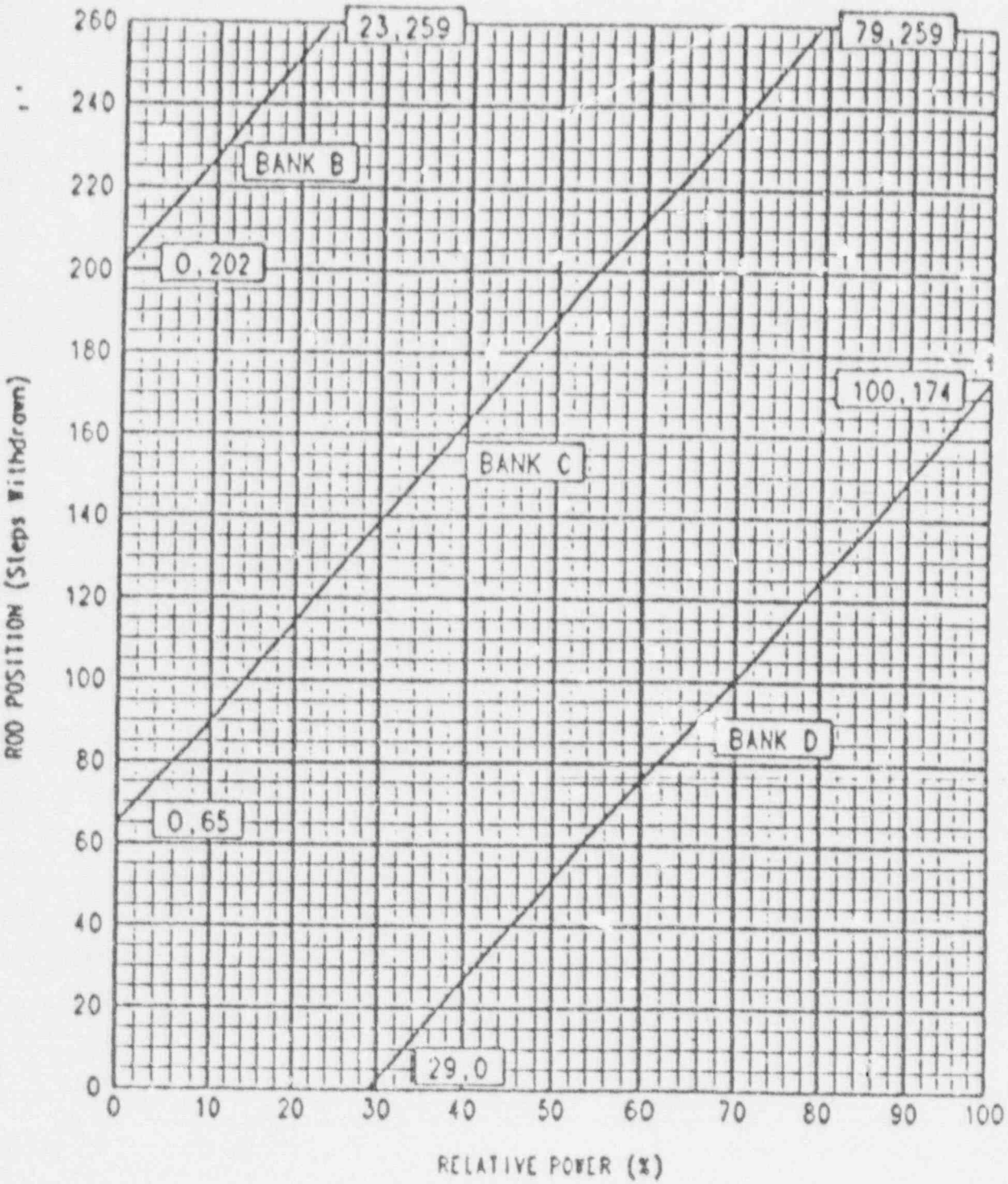
FIGURE 2

CONTROL ROD INSERTION LIMITS VERSUS POWER LEVEL



NOTE: CONTROL BANK A IS ALREADY WITHDRAWN TO THE FULL OUT POSITION.

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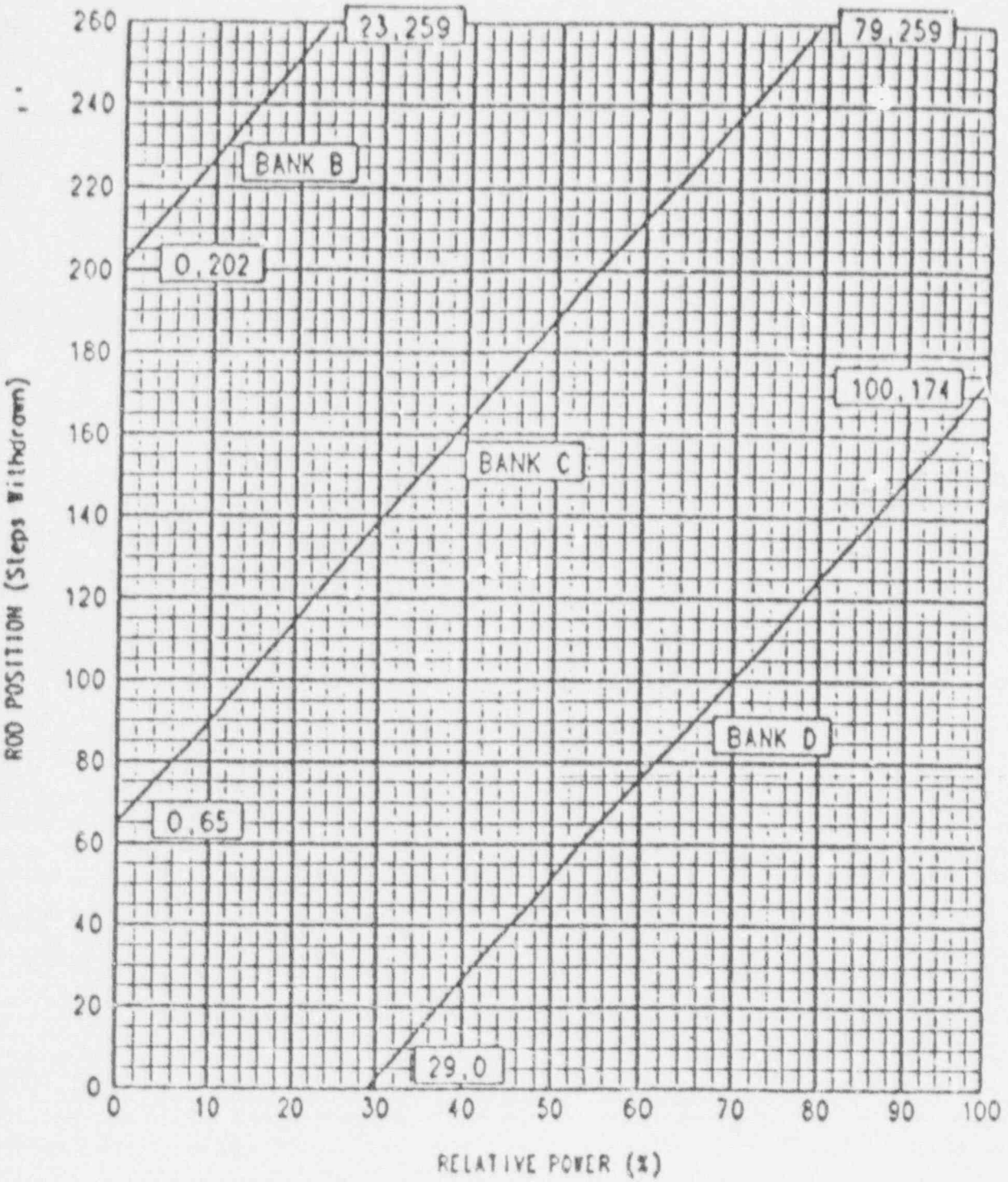
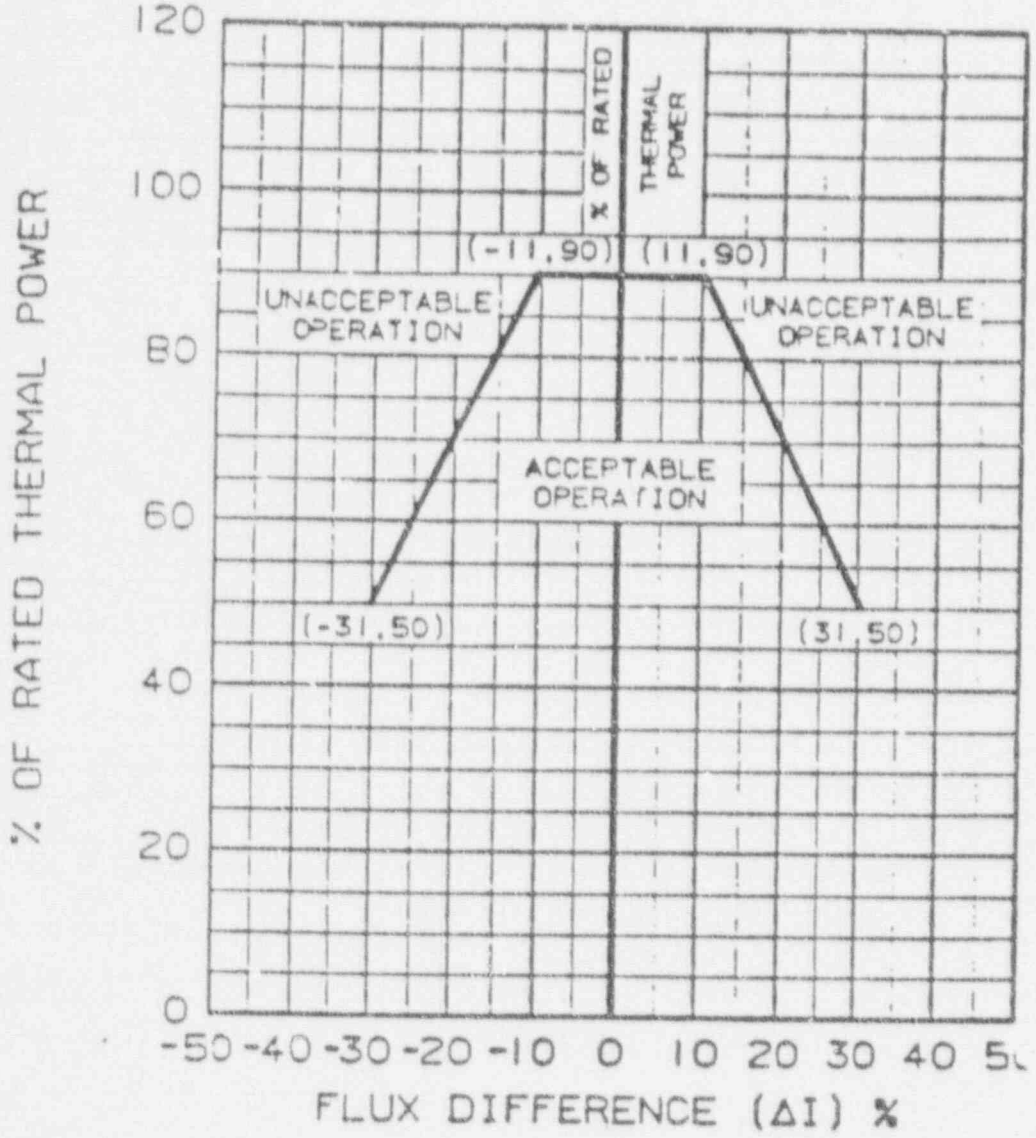
FIGURE 2

CONTROL ROD INSERTION LIMITS VERSUS POWER LEVEL



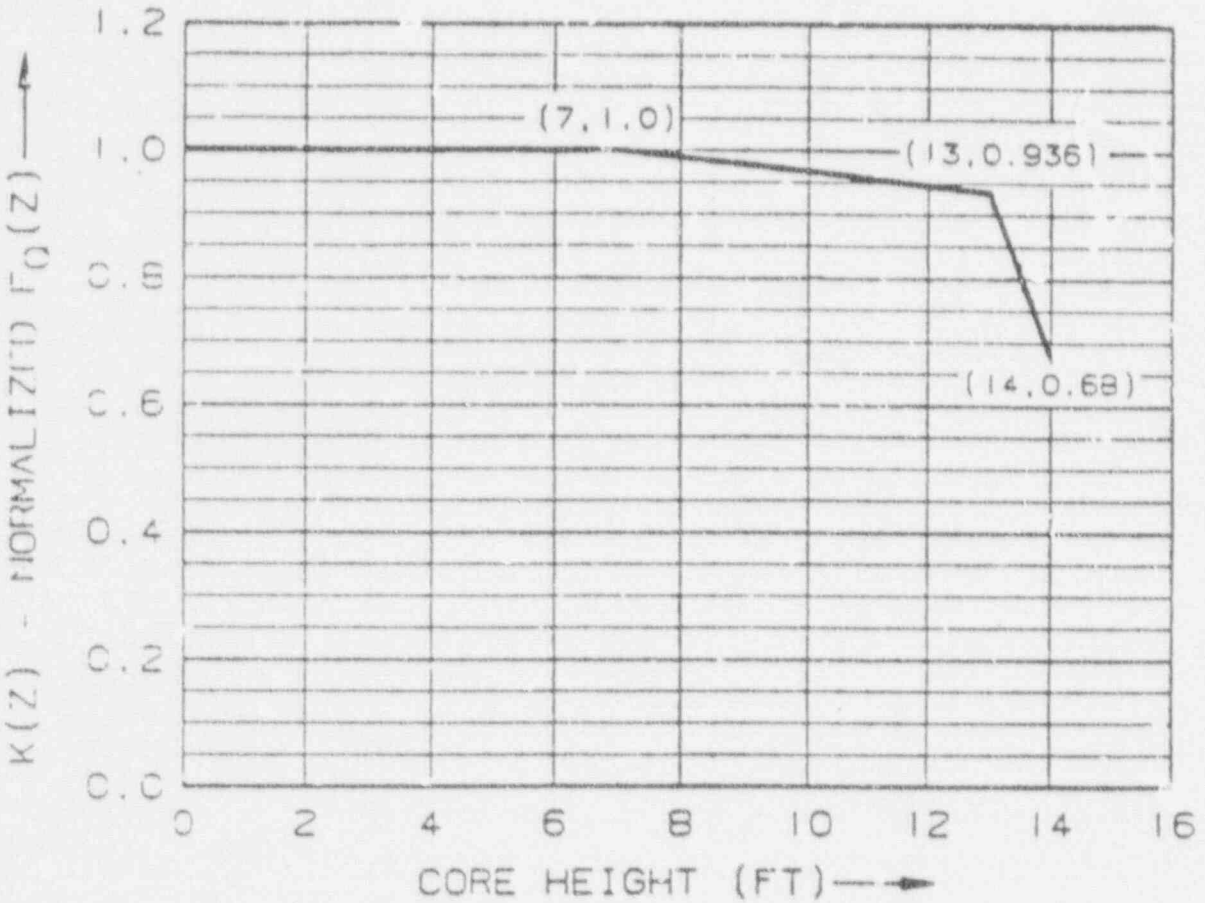
NOTE: CONTROL BANK A IS ALREADY WITHDRAWN TO THE FULL OUT POSITION.

FIGURE 3



AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF
RATED THERMAL POWER

FIGURE 4



K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT