ATTACHMENT ONE

TECHNICAL SPECIFICATION CHANGES
(MARKED-UP)

4.2.2.2 (Continued)

e. With measurements indicating

$$\underset{\text{over } z}{\text{maximum}} \left(\frac{F_Q^M(z)}{K(z)} \right)$$

has increased since the previous determination of $F_Q^M(z)$, either of the following actions shall be taken:

1. $F_Q^M(z)$ shall be increased ~~by 2%~~ over that specified in Specification 4.2.2.2c., or by an appropriate factor specified in the COLR
2. $F_Q^M(z)$ shall be measured at least once per 7 Effective Full Power Days until two successive maps indicate that

$$\underset{\text{over } z}{\text{maximum}} \left(\frac{F_Q^M(z)}{K(z)} \right)$$ is not increasing.

f. With the relationships specified in Specification 4.2.2.2c. above not being satisfied:

1. Calculate the percent $F_Q(z)$ exceeds its limit by the following expression:

$$\left[\left(\text{max. over z of} \left(\frac{F_Q^M(z) \times W(z)\ NO}{\frac{F_Q^{RTP}}{P} \times K(z)} \right) \right) - 1 \right] \times 100 \text{ for } P \geq 0.5$$

$$\left[\left(\text{max. over z of} \left(\frac{F_Q^M(z) \times W(z)\ NO}{\frac{F_Q^{RTP}}{0.5} \times K(z)} \right) \right) - 1 \right] \times 100 \text{ for } P < 0.5$$

2. Either one of the following actions shall be taken:

(a) Within 15 minutes, control the AFD to within new AFD limits which are determined by tightening both the negative and positive AFD limits of Specification 3.2.1 by 1% AFD for each percent $F_Q(z)$ exceeds its limits as determined in Specification 4.2.2.2.f.1. Within 8 hours reset the AFD alarm setpoints to these modified limits, or

(b) Comply with the requirements of Specification 3.2.2 for $F_Q(z)$ exceeding its limit by the percent calculated above, or

(c) Verify that the requirements of Specification 4.2.2.3 for RESTRICTED AFD OPERATION are satisfied and enter RESTRICTED AFD OPERATION.

4.2.2.4 (Continued)

b. Increasing the measured $F_Q(Z)$ 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. Verify that the requirements of Specification 3.2.2 are satisfied.

c. Satisfying the following relationship:

$$F_Q^M(Z) \leq \frac{F_Q^{RTP} \times K(Z)}{P \times W(Z)_{RAFDO}} \quad \text{for } P > APL^{ND}$$

where $F_Q^M(Z)$ is the measured $F_Q(Z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty. $K(Z)$ is the normalized $F_Q(Z)$ as a function of core height. The F_Q limit is F_Q^{RTP}. P is the relative THERMAL POWER. $W(Z)_{RAFDO}$ is the cycle dependent function that accounts for limited power distribution transients encountered during RAFDO. F_Q^{RTP}, $K(Z)$, and $W(Z)_{RAFDO}$ are specified in the Core Operating Limits Report as per Specification 6.9.1.9.

d. Measuring $F_Q^M(z)$ in conjunction with target flux difference determination according to the following schedule:

1. Prior to entering RAFDO after satisfying Section 4.2.2.3 unless a full core flux map has been taken in the previous 31 EFPD with the relative thermal power having been maintained above APL^{ND} for the 24 hours prior to mapping, and

2. At least once per 31 Effective Full Power Days.

e. With measurements indicating

$$\text{maximum over } z \left[\frac{F_Q^M(z)}{K(z)} \right]$$

has increased since the previous determination of $F_Q^M(z)$ either of the following actions shall be taken:

1. $F_Q^M(z)$ shall be increased ~~by 2 percent~~ over that specified in 4.2.2.4.c, or

by an appropriate factor specified in the COLR

b. WCAP-10216-P-A, REV. 1A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL AND FQ SURVEILLANCE TECHNICAL SPECIFICATION," ~~June 1983~~ February 1994 (W Proprietary).

(Methodology for Specification 3.2.1 - Axial Flux Difference (Relaxed Axial Offset Control) and 3.2.2 - Heat Flux Hot Channel Factor (W(Z) surveillance requirements of F_Q Methodology)

c. WCAP-10266-P-A, REV. 2, "THE 1981 VERSION OF WESTINGHOUSE EVALUATION MODEL USING BASH CODE," March 1987 (W Proprietary).

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

The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermalhydraulic 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 shall be provided, upon issuance for each reload cycle, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

SPECIAL REPORTS

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

6.10 RECORD RETENTION

In addition to the applicable record retention requirements of Title 10, Code of Federal Regulations, the following records shall be retained for at least the minimum period indicated.

6.10.1 The following records shall be retained for at least 5 years:

a. Records and logs of unit operation covering time interval at each power level;

ATTACHMENT TWO

TECHNICAL SPECIFICATION CHANGES
(RE-TYPED)

SURVEILLANCE REQUIREMENTS (Continued)

4.2.2.2 (Continued)

e. With measurements indicating

$$\text{maximum over z} \left(\frac{F_Q^M(z)}{K(z)} \right)$$

has increased since the previous determination of $F_Q^M(z)$, either of the following actions shall be taken:

1. $F_Q^M(z)$ shall be increased over that specified in Specification 4.2.2.2c, by an appropriate factor specified in the COLR, or

2. $F_Q^M(z)$ shall be measured at least once per 7 Effective Full Power Days until two successive maps indicate that

$$\text{maximum over z} \left(\frac{F_Q^M(z)}{K(z)} \right)$$ is not increasing.

f. With the relationships specified in Specification 4.2.2.2c. above not being satisfied:

1. Calculate the percent $F_Q(z)$ exceeds its limit by the following expression:

$$\left[\left(\text{max. over z of} \left(\frac{F_Q^M(z) \times W(z) \, NO}{\frac{F_Q^{RTP}}{P} \times K(z)} \right) \right) - 1 \right] \times 100 \text{ for } P \geq 0.5$$

$$\left[\left(\text{max. over z of} \left(\frac{F_Q^M(z) \times W(z) \, NO}{\frac{F_Q^{RTP}}{0.5} \times K(z)} \right) \right) - 1 \right] \times 100 \text{ for } P < 0.5$$

2. Either one of the following actions shall be taken:

(a) Within 15 minutes, control the AFD to within new AFD limits which are determined by tightening both the negative and positive AFD limits of Specification 3.2.1 by 1% AFD for each percent $F_Q(z)$ exceeds its limits as determined in Specification 4.2.2.2.f.1. Within 8 hours reset the AFD alarm setpoints to these modified limits, or

(b) Comply with the requirements of Specification 3.2.2 for $F_Q(z)$ exceeding its limit by the percent calculated above, or

(c) Verify that the requirements of Specification 4.2.2.3 for RESTRICTED AFD OPERATION are satisfied and enter RESTRICTED AFD OPERATION.

4.2.2.4 (Continued)

b. Increasing the measured $F_Q(z)$ 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. Verify that the requirements of Specification 3.2.2 are satisfied.

c. Satisfying the following relationship:

$$F_Q^M(z) \leq \frac{F_Q^{RTP} \times K(z)}{P \times W(z)_{RAFDO}} \quad \text{for } P > APL^{ND}$$

where $F_Q^M(z)$ is the measured $F_Q(z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty. K(z) is the normalized $F_Q(z)$ as a function of core height. The F_Q limit is F_Q^{RTP}. P is the relative THERMAL POWER. $W(z)_{RAFDO}$ is the cycle dependent function that accounts for limited power distribution transients encountered during RAFDO. F_Q^{RTP}, K(z), and $W(z)_{RAFDO}$ are specified in the Core Operating Limits Report as per Specification 6.9.1.9.

d. Measuring $F_Q^M(z)$ in conjunction with target flux difference determination according to the following schedule:

1. Prior to entering RAFDO after satisfying Section 4.2.2.3 unless a full core flux map has been taken in the previous 31 EFPD with the relative thermal power having been maintained above APL^{ND} for the 24 hours prior to mapping, and

2. At least once per 31 Effective Full Power Days.

e. With measurement indicating

$$\text{maximum over z} \quad \left(\frac{F_Q^M(z)}{K(z)} \right)$$

has increased since the previous determination of $F_Q^M(z)$ either of the following actions shall be taken:

1. $F_Q^M(z)$ shall be increased over that specified in 4.2.2.4.c by an appropriate factor specified in the COLR, or

b. WCAP-10216-P-A, REV. 1A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL AND FQ SURVEILLANCE TECHNICAL SPECIFICATION," February 1994 (W Proprietary).

(Methodology for Specification 3.2.1 - Axial Flux Difference (Relaxed Axial Offset Control) and 3.2.2 - Heat Flux Hot Channel Factor (W(Z) surveillance requirements of F_Q Methodology)

c. WCAP-10266-P-A, REV. 2, "THE 1981 VERSION OF WESTINGHOUSE EVALUATION MODEL USING BASH CODE," March 1987 (W Proprietary).

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

The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermalhydraulic 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 shall be provided, upon issuance for each reload cycle, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

SPECIAL REPORTS

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

6.10 RECORD RETENTION

In addition to the applicable record retention requirements of Title 10, Code of Federal Regulations, the following records shall be retained for at least the minimum period indicated.

6.10.1 The following records shall be retained for at least 5 years:

a. Records and logs of unit operation covering time interval at each power level;

ATTACHMENT THREE

SAFETY EVALUATION

SAFETY EVALUATION

This amendment application requests a revision to Technical Specification (TS) 4.2.2.2, 4.2.2.4, and 6.9.1.9. These specifications are revised to allow the incorporation of a larger penalty to account for F_Q increases greater than 2 percent between measurements.

BACKGROUND

By Letter dated November 26, 1993, the NRC approved the use of Revision 1A to WCAP-10216-P-A, "Relaxation of Constant Axial Offset Control - F_Q Surveillance Technical Specification." The revised WCAP incorporates minor methodology changes to account for F_Q increases of greater than 2 percent between monthly surveillances.

The heat flux hot channel factor, $F_Q(Z)$, is 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. $F_Q(Z)$ is shown to be within its limits by performing periodic measurements. Since $F_Q(Z)$ surveillance is only required when power has been increased by 10 percent of rated power from the previous surveillance, or at least every 31 effective full power days (EFPD), the technical specifications take into account the possibility that $F_Q(Z)$ may increase between surveillances. The TS require that when performing the surveillance, the resulting maximum $F_Q(Z)$ value must be compared to the maximum $F_Q(Z)$ determined from the previous measurement. If the maximum $F_Q(Z)$ has increased since the previous determination of $F_Q(Z)$, the TS allow two options: either the current $F_Q(Z)$ must be increased by an additional 2 percent to account for further increases in $F_Q(Z)$ before the next surveillance, or the surveillance period must be reduced to every seven EFPD.

The $F_Q(Z)$ penalty of 2 percent was based on the Westinghouse assumption that F_Q would change by no more than 2 percent between monthly flux maps. This assumption was based on calculations for previous (pre-1983) core designs which pre-date the low leakage loading patterns, high amounts of burnable poisons, and 18-month cycles typical of recent cores. Recently, some Westinghouse-designed cores have experienced increases in the measured $F_Q(Z)$ as high as 5 to 6 percent between monthly flux maps over certain burnup ranges. Core designs which combine low leakage loading patterns with high reactivity fuel loading patterns and large numbers of burnable absorbers are most likely to exhibit this behavior. The increase generally occurs early in the cycle and tapers off before the point of minimum F_Q margin is reached.

Preliminary design information for Callaway Cycle 8 indicates that the 2 percent limit will be exceeded, and it is expected that future Callaway cycles will experience predicted increases in F_Q exceeding the 2 percent per month assumption. Therefore, for those cores which are predicted to have larger increases in $F_Q(Z)$ over certain burnup ranges, a larger penalty will be provided on a cycle-specific basis. The penalties will be calculated using the NRC-approved methods discussed in WCAP-10216-P-A, Rev. 1A. The larger penalty will be included in the Core Operating Limit Report (COLR) as a replacement for the current 2 percent standard value.

The proposed changes are consistent with the requirements of 10CFR50.36 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 operating the plant. The proposed revision references the NRC-approved calculation methodology. The development of cycle-specific $F_Q(Z)$ values will continue to be performed by the referenced methodology which has been accepted by the NRC.

EVALUATION

The current Technical Specification method of controlling reactor physics parameters to assure conformance to 10CFR50.36 (which requires the lowest functional performance levels acceptable for continued safe operation) is to specify the values determined to be within the acceptance criteria using NRC-approved calculational methodology. As previously discussed, the methodology for calculating cycle specific $F_Q(Z)$ values has been reviewed and approved by NRC and is consistent with the applicable limits in the Final Safety Analysis Report.

The removal of the $F_Q(Z)$ penalty factor 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 the applicable FSAR limits will be maintained and the Technical Specifications will continue to require operation within the core operational limits calculated by an NRC-approval methodology, this proposed change is administrative in nature. Appropriate actions to be taken if limits are violated will also remain in the Technical Specification.

The proposed change to Technical Specifications does not involve an unreviewed safety question because operation of the Callaway Plant with this change would not:

1. Increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report. There is no increase in the probability of occurrence or the consequences of an accident. The removal of $F_Q(Z)$ penalty values from the Callaway Plant Technical Specifications and the creation of cycle-specific $F_Q(Z)$ penalty values in the COLR has no influence or impact on the probability or consequences of any accident previously evaluated. The cycle-specific $F_Q(Z)$ values, although not in Technical Specifications, will be followed in the operation of the Callaway Plant. The proposed amendment still requires exactly the same actions to be taken when or if $F_Q(Z)$ limits are exceeded as is required by current Technical Specifications.

2. Create a possibility for an accident or malfunction of a different type than any previously evaluated in the safety analysis report. There is no new type of accident or malfunction created and the method and manner of plant operations will not change. As stated earlier, the removal of the cycle-specific $F_Q(Z)$ value 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 $F_Q(Z)$ values are calculated using NRC approved methods. The Technical Specifications will continue to require operation within the required $F_Q(Z)$ limits and appropriate actions will be taken when or if limits are exceeded.

3. Reduce the margin of safety as defined in the basis for any technical specification. This is based on the fact that no plant design changes are involved and the method and manner of plant operation remains the same. The margin of safety is not affected by change and removal of $F_Q(Z)$ from the Technical Specifications. The current F_Q limits remain unchanged and the current safety analysis remains valid and unaffected by this change. The margin of safety presently provided by current Technical Specifications remains unchanged. The proposed amendment continues to require operation within the core limits as obtained from the NRC-approved design methodology and appropriate actions to be taken when or if $F_Q(Z)$ limits are violated remain unchanged.

Given the above discussions as well as those presented in the Significant Hazards Evaluation, the proposed change does not adversely affect or endanger the health or safety of the general public or involve a significant safety hazard.

ATTACHMENT FOUR

SIGNIFICANT HAZARDS EVALUATION

SIGNIFICANT HAZARDS EVALUATION

This amendment application requests a revision to Technical Specification (TS) 4.2.2.2, 4.2.2.4, and 6.9.1.9. These specifications are revised to allow the incorporation of a larger penalty to account for F_Q increases greater than 2 percent between measurements.

BACKGROUND

By Letter dated November 26, 1993, the NRC approved the use of Revision 1A to WCAP-10216-P-A, "Relaxation of Constant Axial Offset Control - F_Q Surveillance Technical Specification." The revised WCAP incorporates minor methodology changes to account for F_Q increases of greater than 2 percent between monthly surveillances.

The heat flux hot channel factor, $F_Q(Z)$, is 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. $F_Q(Z)$ is shown to be within its limits by performing periodic measurements. Since $F_Q(Z)$ surveillance is only required when power has been increased by 10 percent of rated power from the previous surveillance, or at least every 31 effective full power days (EFPD), the technical specifications take into account the possibility that $F_Q(Z)$ may increase between surveillances. The TS require that when performing the surveillance, the resulting maximum $F_Q(Z)$ value must be compared to the maximum $F_Q(Z)$ determined from the previous measurement. If the maximum $F_Q(Z)$ has increased since the previous determination of $F_Q(Z)$, the TS allow two options: either the current $F_Q(Z)$ must be increased by an additional 2 percent to account for further increases in $F_Q(Z)$ before the next surveillance, or the surveillance period must be reduced to every seven EFPD.

The $F_Q(Z)$ penalty of 2 percent was based on the Westinghouse assumption that F_Q would change by no more than 2 percent between monthly flux maps. This assumption was based on calculations for previous (pre-1983) core designs which pre-date the low leakage loading patterns, high amounts of burnable poisons, and 18-month cycles typical of recent cores. Recently, some Westinghouse-designed cores have experienced increases in the measured $F_Q(Z)$ as high as 5 to 6 percent between monthly flux maps over certain burnup ranges. Core designs which combine low leakage loading patterns with high reactivity fuel loading patterns and large numbers of burnable absorbers are most likely to exhibit this behavior. The increase generally occurs early in the cycle and tapers off before the point of minimum F_Q margin is reached.

Preliminary design information for Callaway Cycle 8 indicates that the 2 percent limit will be exceeded, and it is expected that future Callaway cycles will experience predicted increases in F_Q exceeding the 2 percent per month assumption. Therefore, for those cores which are predicted to have larger increases in $F_Q(Z)$ over certain burnup ranges, a larger penalty will be provided on a cycle-specific basis. The penalties will be calculated using the NRC-approved methods discussed in WCAP-10216-P-A, Rev. 1A. The larger penalty will be included in the Core Operating Limit Report (COLR) as a replacement for the current 2 percent standard value.

The current Technical Specification method of controlling reactor physics parameters to assure conformance to 10CFR50.36 (which requires the lowest functional performance levels acceptable for continued safe operation) is to specify the values determined to be within the acceptance criteria using NRC-approved calculational methodology. The methodology for calculating cycle specific $F_Q(Z)$ values has been reviewed and approved by NRC and is consistent with the applicable limits in the Final Safety Analysis Report.

EVALUATION

The removal of the $F_Q(Z)$ penalty factor 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 the applicable FSAR limits will be maintained and the Technical Specifications will continue to require operation within the core operational limits calculated by an NRC-approval methodology, this proposed change is administrative in nature. Appropriate actions to be taken if limits are violated will also remain in the Technical Specification.

The proposed change to Technical Specifications does not involve a significant hazards consideration because operation of the Callaway Plant with this change would not:

1. Involve a significant increase in the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report. There is no increase in the probability of occurrence or the consequences of an accident. The removal of $F_Q(Z)$ penalty values from the Callaway Plant Technical Specifications and the creation of cycle-specific $F_Q(Z)$ values in the COLR has no influence or impact on the probability or consequences of any accident previously evaluated. The cycle-specific $F_Q(Z)$ values, although not in Technical Specifications, will be followed in

the operation of the Callaway Plant. The proposed amendment still requires exactly the same actions to be taken when or if $F_Q(Z)$ limits are exceeded as is required by current Technical Specifications.

2. Create a possibility of a new or different kind of accident from any previously evaluated in the safety analysis report. There is no new type of accident or malfunction created and the method and manner of plant operation will not change. As stated earlier, the removal of the cycle-specific $F_Q(Z)$ value 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 $F_Q(Z)$ values are calculated using NRC approved methods. The Technical Specifications will continue to require operation within the required $F_Q(Z)$ limits and appropriate actions will be taken when or if limits are exceeded.

3. Involve a significant reduction in a margin of safety. This is based on the fact that no plant design changes are involved and the method and manner of plant operation remains the same. The margin of safety is not affected by change and removal of $F_Q(Z)$ penalty values from the Technical Specifications. The margin of safety presently provided by current Technical Specifications remains unchanged. The current F_Q limits remain unchanged and the current safety analysis limits remain valid an unaffected by this change. The proposed amendment continues to require operation within the core limits as obtained from the NRC-approved design methodology and appropriate actions to be taken when or if $F_Q(Z)$ limits are violated remain unchanged.

Given the above discussions as well as those presented in the Safety Evaluation, the proposed change does not adversely affect or endanger the health or safety of the general public or involve a significant safety hazard.

ATTACHMENT FIVE

ENVIRONMENTAL CONSIDERATION

ENVIRONMENTAL CONSIDERATION

This amendment application requests a revision to Technical Specification (TS) 4.2.2.2, 4.2.2.4, and 6.9.1.9. These specifications are revised to allow the incorporation of a larger penalty to account for F_Q increases greater than 2 percent between measurements.

The proposed amendment involves changes with respect to the use of facility components located within the restricted area as defined in 10CFR Part 20, and changes a surveillance requirement. Union Electric has determined that the proposed amendment does not involve:

1. A significant hazard consideration, as discussed in the Significant Hazards Evaluation of this amendment application;

2. A significant change in the types or significant increase in the amounts of any effluents that may be released offsite;

3. A significant increase in individual or cumulative occupational radiation exposure.

Accordingly the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9). Pursuant to 10CFR51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.