POWER DISTRIBUTION LIMITS

ALLOWABLE POWER LEVEL - APL

LIMITING CONDITION FOR OPERATION

3.2.6 THERMAL POWER shall be less than or equal to ALLOWABLE POWER LEVEL (APL), given by the following relationship:

APL = min over Z of $\frac{CFQ \times K(Z)}{F_Q(Z) \times V(Z) \times F_p}$ x 100%, or 100%, whichever is less

- CFQ is the F_Q limit at RATED THERMAL POWER specified in the COLR for Westinghouse or Exxon fuel.
- $F_Q(Z)$ is the measured hot channel factor including a 3% manufacturing tolerance uncertainty and a 5% measurement uncertainty.
- V(Z) is the function specified in the COLR.
- F_p = 1.00 except when successive steady-state power distribution maps indicate an increase in max over Z of $\frac{F_Q(Z)}{K(Z)}$ with exposure.

  Then either of the penalties, F_p, shall be taken:

  F_p = ~~1.02 or~~, burnup dependent penalty specified in the COLR, or

  F_p = 1.00 provided that Surveillance Requirement 4.2.6.2 is satisfied once per 7 Effective Full Power Days until two successive maps indicate that the max over Z of $\frac{F_Q(Z)}{K(Z)}$ is not increasing.
- The above limit is not applicable in the following core regions.

  1) Lower core region 0% to 10% inclusive.
  2) Upper core region 90% to 100% inclusive.

APPLICABILITY: MODE 1

MONTHLY REACTOR OPERATING REPORT

6.9.1.8 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 U.S. Nuclear Regulatory Commission (Attn: Document Control Desk), Washington, D.C. 20555, with a copy to the Regional Office no later than the 15th of each month following the calendar month covered by the report.

CORE OPERATING LIMITS REPORT

6.9.1.9.1 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 for the following:

a. Moderator Temperature Coefficient Limits for Specification 3/4.1.1.4,

b. Rod Drop Time Limits for Specification 3/4.1.3.3,

c. Shutdown Rod Insertion Limits for Specification 3/4.1.3.4,

d. Control Rod Insertion Limits for Specification 3/4.1.3.5,

e. Axial Flux Difference for Specification 3/4.2.1,

f. Heat Flux Hot Channel Factor for Specification 3/4.2.2,

g. Nuclear Enthalpy Rise Hot Channel Factor for Specification 3/4.2.3, and

h. Allowable Power Level for Specification 3/4.2.6.

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

a. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985 (Westinghouse Proprietary),

b. WCAP-8385, "Power Distribution Control and Load Following Procedures - Topical Report," September 1974 (Westinghouse Proprietary),

c. WCAP-10216-P-A, ~~Part B~~, Revision 1A, "Relaxation of Constant Axial Offset Control/F_Q Surveillance Technical Specification," ~~June 1983~~ February 1994 (Westinghouse Proprietary),

d. WCAP-10266-P-A Rev. 2, "The 1981 Version of Westinghouse Evaluation Mode Using BASH Code," March 1987 (Westinghouse Proprietary).

POWER DISTRIBUTION LIMITS

ALLOWABLE POWER LEVEL - APL

LIMITING CONDITION FOR OPERATION

3.2.6 THERMAL POWER shall be less than or equal to ALLOWABLE POWER LEVEL (APL), given by the following relationships:

$$APL = \text{min over Z of } \frac{CFQ \times K(Z)}{F_Q(Z) \times V(Z) \times F_p} \times 100\%, \text{ or } 100\%, \text{ whichever is less}$$

- CFQ is the F_Q limit at RATED THERMAL POWER specified in the COLR for Westinghouse or Exxon fuel.
- $F_Q(Z)$ is the measured hot channel factor, including a 3% manufacturing tolerance uncertainty and a 5% measurement uncertainty.
- V(Z) is the function specified in the COLR.
- $F_p = 1.00$ except when successive steady-state power distribution maps indicate an increase in max over Z of $\frac{F_Q(Z)}{K(Z)}$ with exposure.

  Then either of the following penalties, F_p, shall be taken:

  F_p = ~~1.02 or~~ burnup dependent penalty specified in the COLR, or

  $F_p = 1.00$ provided that Surveillance Requirement 4.2.6.2 is satisfied once per 7 Effective Full Power Days until 2 successive maps indicate that the max over Z of $\frac{F_Q(Z)}{K(Z)}$ is not increasing.
- The above limit is not applicable in the following core regions.

  1) Lower core region 0% to 10% inclusive.
  2) Upper core region 90% to 100% inclusive.

APPLICABILITY: MODE 1

MONTHLY REACTOR OPERATING REPORT

6.9.1.8 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 U.S. Nuclear Regulatory Commission (Attn: Document Control Desk), Washington, D.C. 20555, with a copy to the Regional Office no later than the 15th of each month following the calendar month covered by the report.

CORE OPERATING LIMITS REPORT

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b. Rod Drop Time Limits for Specification 3/4.1.3.4,

c. Shutdown Rod Insertion Limits for Specification 3/4.1.3.5,

d. Control Rod Insertion Limits for Specification 3/4.1.3.6,

e. Axial Flux Difference for Specification 3/4.2.1,

f. Heat Flux Hot Channel Factor for Specification 3/4.2.2,

g. Nuclear Enthalpy Rise Hot Channel Factor for Specification 3/4.2.3, and

h. Allowable Power Level for Specification 3/4.2.6.

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

a. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985 (Westinghouse Proprietary),

b. WCAP-8385, "Power Distribution Control and Load Following Procedures - Topical Report," September 1974 (Westinghouse Proprietary),

c. WCAP-10216-P-A, ~~Part B~~ Revision 1A, "Relaxation of Constant Axial Offset Control/F_Q Surveillance Technical Specification," ~~June 1983~~ February 1994 (Westinghouse Proprietary),

d. WCAP-10266-P-A Rev. 2, "The 1981 Version of Westinghouse Evaluation Mode Using BASH Code," March 1987 (Westinghouse Proprietary).

ATTACHMENT 3 TO AEP:NRC:1071T

PROPOSED REVISED
TECHNICAL SPECIFICATION PAGES

ALLOWABLE POWER LEVEL - APL

LIMITING CONDITION FOR OPERATION

3.2.6 THERMAL POWER shall be less than or equal to ALLOWABLE POWER LEVEL (APL), given by the following relationships:

APL = min over Z of $\frac{CFQ \times K(Z)}{F_Q(Z) \times V(Z) \times F_P} \times 100\%$, or 100%, whichever is less.

- CFQ is the F_Q limit at RATED THERMAL POWER specified in the COLR for Westinghouse or Exxon fuel.
- $F_Q(Z)$ is the measured hot channel factor including a 3% manufacturing tolerance uncertainty and a 5% measurement uncertainty.
- V(Z) is the function specified in the COLR.
- F_P = 1.00 except when successive steady-state power distribution maps indicate an increase in max over Z of $\frac{F_Q(Z)}{K(Z)}$ with exposure.

  Then either of the penalties, F_P, shall be taken:

  F_P = burnup dependent penalty specified in the COLR, or

  F_P = 1.00 provided that Surveillance Requirement 4.2.6.2 is satisfied once per 7 Effective Full Power Days until two successive maps indicate that the max over Z of $\frac{F_Q(Z)}{K(Z)}$ is not increasing.
- The above limit is not applicable in the following core regions.

  1) Lower core region 0% to 10% inclusive.
  2) Upper core region 90% to 100% inclusive.

APPLICABILITY: MODE 1

MONTHLY REACTOR OPERATING REPORT

6.9.1.8 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 U.S. Nuclear Regulatory Commission (Attn: Document Control Desk), Washington, D.C. 20555, with a copy to the Regional Office no later than the 15th of each month following the calendar month covered by the report.

CORE OPERATING LIMITS REPORT

6.9.1.9.1 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 for the following:

a. Moderator Temperature Coefficient Limits for Specification 3/4.1.1.4,

b. Rod Drop Time Limits for Specification 3/4.1.3.3,

c. Shutdown Rod Insertion Limits for Specification 3/4.1.3.4,

d. Control Rod Insertion Limits for Specification 3/4.1.3.5,

e. Axial Flux Difference for Specification 3/4.2.1,

f. Heat Flux Hot Channel Factor for Specification 3/4.2.2,

g. Nuclear Enthalpy Rise Hot Channel Factor for Specification 3/4.2.3, and

h. Allowable Power Level for Specification 3/4.2.6.

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

a. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985 (Westinghouse Proprietary),

b. WCAP-8385, "Power Distribution Control and Load Following Procedures - Topical Report," September 1974 (Westinghouse Proprietary),

c. WCAP-10216-P-A, Revision 1A, "Relaxation of Constant Axial Offset Control / F_Q Surveillance Technical Specification," February 1994 (Westinghouse Proprietary),

d. WCAP-10266-P-A Rev. 2, "The 1981 Version of Westinghouse Evaluation Mode Using BASH Code," March 1987 (Westinghouse Proprietary).

ALLOWABLE POWER LEVEL - APL

LIMITING CONDITION FOR OPERATION

3.2.6 THERMAL POWER shall be less than or equal to ALLOWABLE POWER LEVEL (APL), given by the following relationships:

APL = min over Z of $\frac{CFQ \times K(Z)}{F_Q(Z) \times V(Z) \times F_P} \times 100\%$, or 100%, whichever is less.

- CFQ is the F_Q limit at RATED THERMAL POWER specified in the COLR for Westinghouse or Exxon fuel.
- $F_Q(Z)$ is the measured hot channel factor including a 3% manufacturing tolerance uncertainty and a 5% measurement uncertainty.
- V(Z) is the function specified in the COLR.
- F_P = 1.00 except when successive steady-state power distribution maps indicate an increase in max over Z of $\frac{F_Q(Z)}{K(Z)}$ with exposure.

  Then either of the penalties, F_P, shall be taken:

  F_P = burnup dependent penalty specified in the COLR, or

  F_P = 1.00 provided that Surveillance Requirement 4.2.6.2 is satisfied once per 7 Effective Full Power Days until two successive maps indicate that the max over Z of $\frac{F_Q(Z)}{K(Z)}$ is not increasing.
- The above limit is not applicable in the following core regions.

  1) Lower core region 0% to 10% inclusive.
  2) Upper core region 90% to 100% inclusive.

APPLICABILITY: MODE 1

MONTHLY REACTOR OPERATING REPORT

6.9.1.8 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 U.S. Nuclear Regulatory Commission (Attn: Document Control Desk), Washington, D.C. 20555, with a copy to the Regional Office no later than the 15th of each month following the calendar month covered by the report.

CORE OPERATING LIMITS REPORT

6.9.1.9.1 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 for the following:

a. Moderator Temperature Coefficient Limits for Specification 3/4.1.1.4,

b. Rod Drop Time Limits for Specification 3/4.1.3.4,

c. Shutdown Rod Insertion Limits for Specification 3/4.1.3.5,

d. Control Rod Insertion Limits for Specification 3/4.1.3.6,

e. Axial Flux Difference for Specification 3/4.2.1,

f. Heat Flux Hot Channel Factor for Specification 3/4.2.2,

g. Nuclear Enthalpy Rise Hot Channel Factor for Specification 3/4.2.3, and

h. Allowable Power Level for Specification 3/4.2.6.

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

a. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985 (Westinghouse Proprietary),

b. WCAP-8385, "Power Distribution Control and Load Following Procedures - Topical Report," September 1974 (Westinghouse Proprietary),

c. WCAP-10216-P-A, Revision 1A, "Relaxation of Constant Axial Offset Control / F_Q Surveillance Technical Specification," February 1994 (Westinghouse Proprietary),

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ATTACHMENT 4 TO AEP:NRC:1071T

EXAMPLE OF PROPOSED CHANGE
TO THE CORE OPERATING LIMITS REPORT

EXAMPLE COLR PAGE FOR BURNUP DEPENDENT FQ PENALTY, F_p

COLR for Donald C. Cook Nuclear Plant Unit ~~1~~ X Cycle ~~13~~ YY

2.8 Allowable Power Level - APL (Specification 3.2.6)

$$\text{APL-min over Z for } \frac{CFQ * K(Z)}{F_Q(Z) * V(Z) * F_p}$$

2.8.1 V(Z) is provided in Table 1 for ± 5% AFD target band

2.8.2 CFQ and K(Z) are provided in COLR Sections 2.6.1 and 2.6.2, respectively

2.8.3 ~~F_p is provided in Technical Specification 3.2.6~~

F_p is burnup dependent as follows:

- $F_p = 1.027$ when burnup is less than or equal to 1250 $\frac{MWD}{MTU}$
- $F_p = 1.02$ when burnup is greater than 1250 $\frac{MWD}{MTU}$