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January 29, 1 92

U.S. Nuclear Regulatory Commission
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ULNRC- 2551

Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT - CYCLE 5
CORE OPERATING LIMITS REPORT

References: 1) ULNRC-2323 dated November 14, 1990
2) ULNRC-2360 dated January 31, 1991
3) ULNRC-2379 dated March 19, 1991
4) ULNRC-2513 dated November 13, 1991
5) ULNRC-2532 dated December 12, 1991

Reference 1 transmitted the Callaway Plant Cycle 5 Core Operating Limits Report (COLR). Attached please find Revision 6 to Sections 2.4.1, 2.5 and Figure 7 of the COLR. Revision 6 modifies the Axial Flux Difference (AFD) target band and corresponding W(Z) values to +12%, -7% for Normal Operation. The revised AFD target bands are applicable through the end of Cycle 5.

Should you have any questions concerning this information, please contact us.

Very truly yours,

for Donald F. Schnell

WEK/dls

Attachment

A001
1/1

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1.4 Axial Flux Difference (Specification 3.2.1)

2.4.1 The Axial Flux Difference (AFD) target bands are,

a. ~~±8%~~ +12%, -7% for Normal Operation

b. ±3% for Restricted AFD Operation

2.4.2 The Acceptable Operation Limits are shown in Figure 3.

2.4.3 The minimum allowable power level for Restricted AFD Operation, APL^{ND}, is 90% of RATED THERMAL POWER.

2.5 Heat Flux Hot Channel Factor - $F_Q(Z)$
(Specification 3.2.2)

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \qquad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \qquad \text{for } P \leq 0.5$$

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

2.5.1 $F_Q^{RTP} = 2.50$

2.5.2 K(z) is provided in Figure 4.

2.5.3 The W(z) functions that are to be used in Technical Specifications 4.2.2.2, 4.2.2.3, and 4.2.2.4 for FQ surveillance are shown in Figures 5 through 8.

Because significant margin exists between the analytically determined maximum FQ(z)*Prel values and their limit, Restricted Axial Flux Difference (RAFDO) operation is not expected to be required for Cycle 5. For this reason, no $W(z)_{RAFDO}$ values are supplied for Cycle 5.

The Normal Operation W(z) values, $W(z)_{NO}$, were originally determined for three specific burnups in Cycle 5, assuming Cycle 5 operates with the CAOC strategy and uses a +3%, -12% delta-I band about the target flux difference. This permits determination of W(z) at any cycle burnup through the use of three point interpolation. The end of cycle W(z) value has been revised based on CAOC operation with a +12,-7% delta-I band about the target flux difference. Use of this W(z) value for Cycle 5 burnups from 16000 MWD/MTU until end of cycle is conservative. Interpolation with the +3%,-12% W(z) values from earlier burnups should not be performed. Also included is a $W(z)_{NO}$ function that bounds the $W(z)_{NO}$ curves based on a +3%,-12% delta-I band for all Cycle 5 burnups. This is not appropriate to use for delta-I bands other than +3%,-12% about the target flux difference.

Rev. 6

	INCORE Point	Height (Feet)	W(Z) 16000.	INCORE Point	Height (Feet)	W(Z) 16000.
Top	1.	0.00000	* 1.0000	37.	6.0000	1.1974
	2.	0.16700	* 1.0000	38.	6.1670	1.2033
	3.	0.33300	* 1.0000	39.	6.3330	1.2076
	4.	0.50000	* 1.0000	40.	6.5000	1.2104
	5.	0.66700	* 1.0000	41.	6.6670	1.2116
	6.	0.83300	* 1.0000	42.	6.8330	1.2112
	7.	1.0000	* 1.0000	43.	7.0000	1.2089
	8.	1.1670	* 1.0000	44.	7.1670	1.2056
	9.	1.3330	* 1.0000	45.	7.3330	1.2032
	10.	1.5000	* 1.0000	46.	7.5000	1.2030
	11.	1.6670	* 1.0000	47.	7.6670	1.2045
	12.	1.8330	1.1629	48.	7.8330	1.2057
	13.	2.0000	1.1585	49.	8.0000	1.2055
	14.	2.1670	1.1536	50.	8.1670	1.2047
	15.	2.3330	1.1483	51.	8.3330	1.2044
	16.	2.5000	1.1426	52.	8.5000	1.2037
	17.	2.6670	1.1365	53.	8.6670	1.2016
	18.	2.8330	1.1300	54.	8.8330	1.1982
	19.	3.0000	1.1228	55.	9.0000	1.1958
	20.	3.1670	1.1162	56.	9.1670	1.1953
	21.	3.3330	1.1125	57.	9.3330	1.1964
	22.	3.5000	1.1149	58.	9.5000	1.1977
	23.	3.6670	1.1205	59.	9.6670	1.1998
	24.	3.8330	1.1250	60.	9.8330	1.1995
	25.	4.0000	1.1300	61.	10.000	1.1998
	26.	4.1670	1.1360	62.	10.167	1.2007
	27.	4.3330	1.1421	63.	10.333	* 1.0000
	28.	4.5000	1.1476	64.	10.500	* 1.0000
	29.	4.6670	1.1523	65.	10.667	* 1.0000
	30.	4.8330	1.1562	66.	10.833	* 1.0000
	31.	5.0000	1.1597	67.	11.000	* 1.0000
	32.	5.1670	1.1622	68.	11.167	* 1.0000
	33.	5.3330	1.1646	69.	11.333	* 1.0000
	34.	5.5000	1.1715	70.	11.500	* 1.0000
	35.	5.6670	1.1813	71.	11.667	* 1.0000
	36.	5.8330	1.1900	72.	11.833	* 1.0000
				73.	12.000	* 1.0000

Figure 7

Callaway Unit 1 Cycle 5

W(z) at 16000 MWD/MTU
NO

Applicable for Delta-I bands of +12%,-7%
For burnups from 16000 MWD/MTU until end of cycle

* Top and Bottom 15% Excluded as per Tech Spec 4.2.2.2G

~~be gained by using the burnup dependent W(z)$_{NO}$ values.~~

The W(z) values are provided for 73 axial points assuming the core height boundaries of 0 and 12 feet and intervals of .167 feet between the core boundaries.

2.6 Nuclear Enthalpy Rise Hot Channel Factor - $F_{\Delta H}^{N}$ (Specification 3.2.3)

$$F_{\Delta H}^{N} \leq F_{\Delta H}^{RTP} [1 + PF_{\Delta H}(1-P)]$$

where:

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

2.6.1 $F_{\Delta H}^{RTP} = 1.59$

2.6.2 $PF_{\Delta H} = 0.3$

2.7 Refueling Boron Concentration (Specification 3.9.1)

2.7.1 The refueling boron concentration to maintain $k_{eff} \leq 0.95$ shall be ≥ 2000 ppm.