

CORE OPERATING LIMITS REPORT
SEABROOK STATION UNIT 1
CYCLE 2

9204070003 920331
PDR ADDCK 05000443
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1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report for Seabrook Station Unit 1, Cycle 2 has been prepared in accordance with the requirements of Technical Specification 6.8.1.6.

The Technical Specifications affected by this report are:

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|----|---------|--|
| 1) | 3.1.1.1 | SHUTDOWN MARGIN limit for MODES 1, 2, 3, 4 |
| 2) | 3.1.1.2 | SHUTDOWN MARGIN limit for MODE 5 |
| 3) | 3.1.1.3 | Moderator Temperature Coefficient |
| 4) | 3.1.3.5 | Shutdown Rod Insertion Limit |
| 5) | 3.1.3.6 | Control Rod Insertion Limits |
| 6) | 3.2.1 | AXIAL FLUX DIFFERENCE |
| 7) | 3.2.2 | Heat Flux Hot Channel Factor |
| 8) | 3.2.3 | Nuclear Enthalpy Rise Hot Channel Factor |

2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in section 1.0 are presented in the following subsections. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 6.8.1.6.

2.1 SHUTDOWN MARGIN LIMIT FOR MODES 1, 2, 3, AND 4 (Specification 3.1.1.1)

The SHUTDOWN MARGIN shall be greater than or equal to 1.3% delta k/k.

2.2 SHUTDOWN MARGIN LIMIT FOR MODE 5 (Specification 3.1.1.2)

The SHUTDOWN MARGIN shall be greater than or equal to 1.2% delta k/k.

2.3 MODERATOR TEMPERATURE COEFFICIENT (Specification 3.1.1.3)

2.3.1 The Moderator Temperature Coefficient (MTC) shall be less positive than 0 delta k/k/°F for Beginning of Cycle Life (BOL), All Rods Out (ARO), Hot Zero Thermal Power conditions.

2.3.2 MTC shall be less negative than -4.2×10^{-4} delta k/k/°F for End of Cycle Life (EOL), ARO, Rated Thermal Power conditions.

2.3.3 The 300 ppm ARO, Rated Thermal Power MTC shall be less negative than -3.3×10^{-4} delta k/k/°F (300 ppm Surveillance Limit)

2.4 SHUTDOWN ROD INSERTION LIMIT (Specification 3.1.3.5)

2.4.1 The shutdown rods shall be fully withdrawn. The fully withdrawn position is defined as the interval within 225 to the mechanical fully withdrawn position inclusive.

2.5 CONTROL ROD INSERTION LIMITS (Specification 3.1.3.6)

2.5.1 The control rod banks shall be limited in physical insertion as specified in Figure 1.

2.6 AXIAL FLUX DIFFERENCE (Specification 3.2.1)

2.6.1 The AXIAL FLUX DIFFERENCE (AFD) Target Band is +3%, -12%.

2.6.2 The AFD shall be maintained within the Acceptable Operation Limits as specified in Figure 2.

2.7 HEAT FLUX HOT CHANNEL FACTOR (Specification 3.2.2)

2.7.1 $F_Q^{RTP} = 2.32$

2.7.2 $K(Z)$ is specified in Figure 3.

2.7.3 $PF_{xy} = 0.2$

2.7.4 The F_{xy} limits for Rated Thermal Power within specific core planes shall be:

2.7.4.1 F_{xy} (RTP) less than or equal to 1.784 for all planes containing banks D+C control rods for cycle burnups from 0-3000 MWD/MTU;

2.7.4.2 F_{xy} (RTP) less than or equal to 1.838 for all planes containing banks D+C control rods from cycle burnup 3000 MWD/MTU onward;

2.7.4.3 F_{xy} (RTP) less than or equal to 1.784 for all planes containing bank D control rods; and

2.7.4.4 F_{xy} (RTP) less than or equal to 1.622 for all unrodded planes.

2.7.4.5 See Figure 4 for a plot of $FQ(Z)*P(REL)$ versus axial core height.

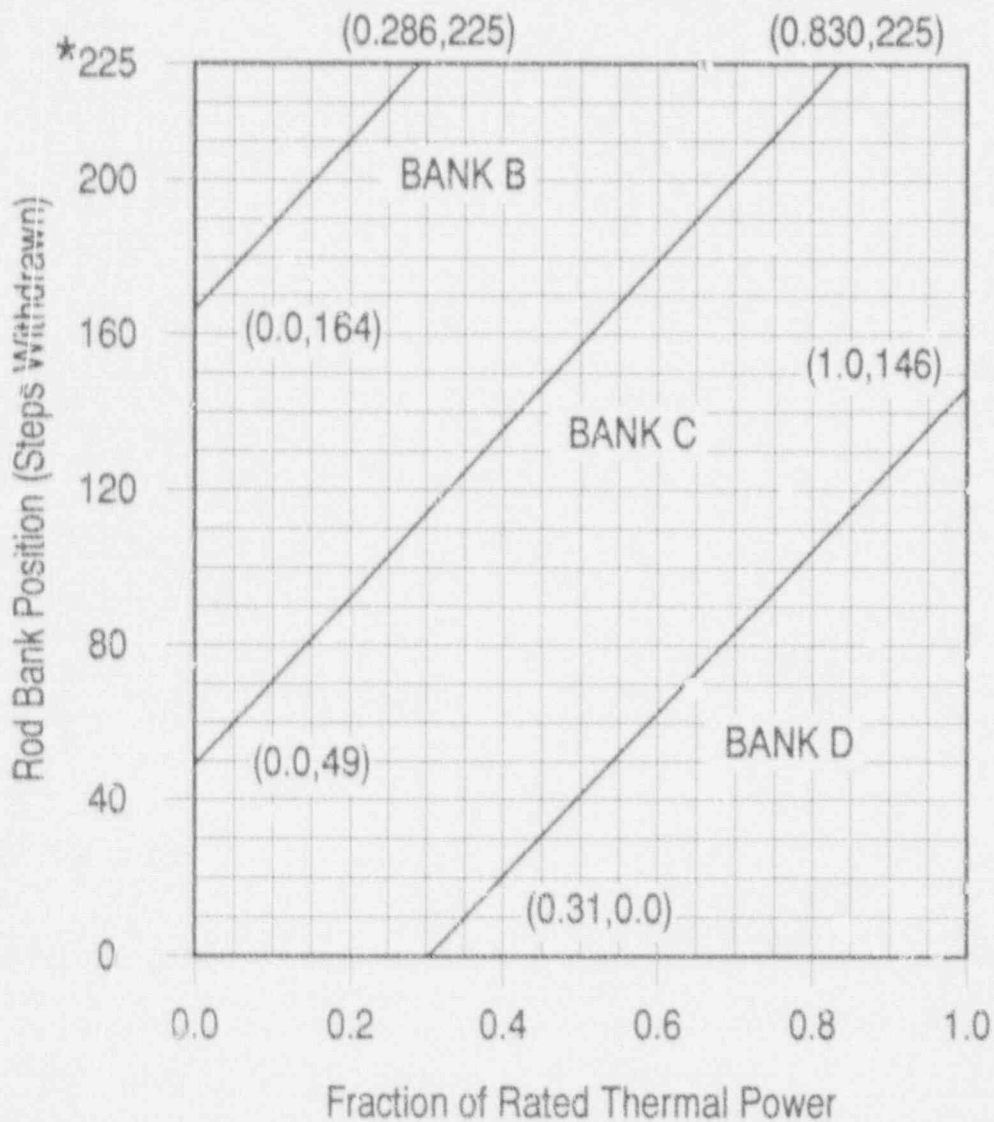
2.8 NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Specification 3.2.3)

2.8.1 $F_{\Delta H}^{RTP} = 1.49$

2.8.2 $PF_{\Delta H} = 0.2$

CYCLE 2 COLR FIGURE 1

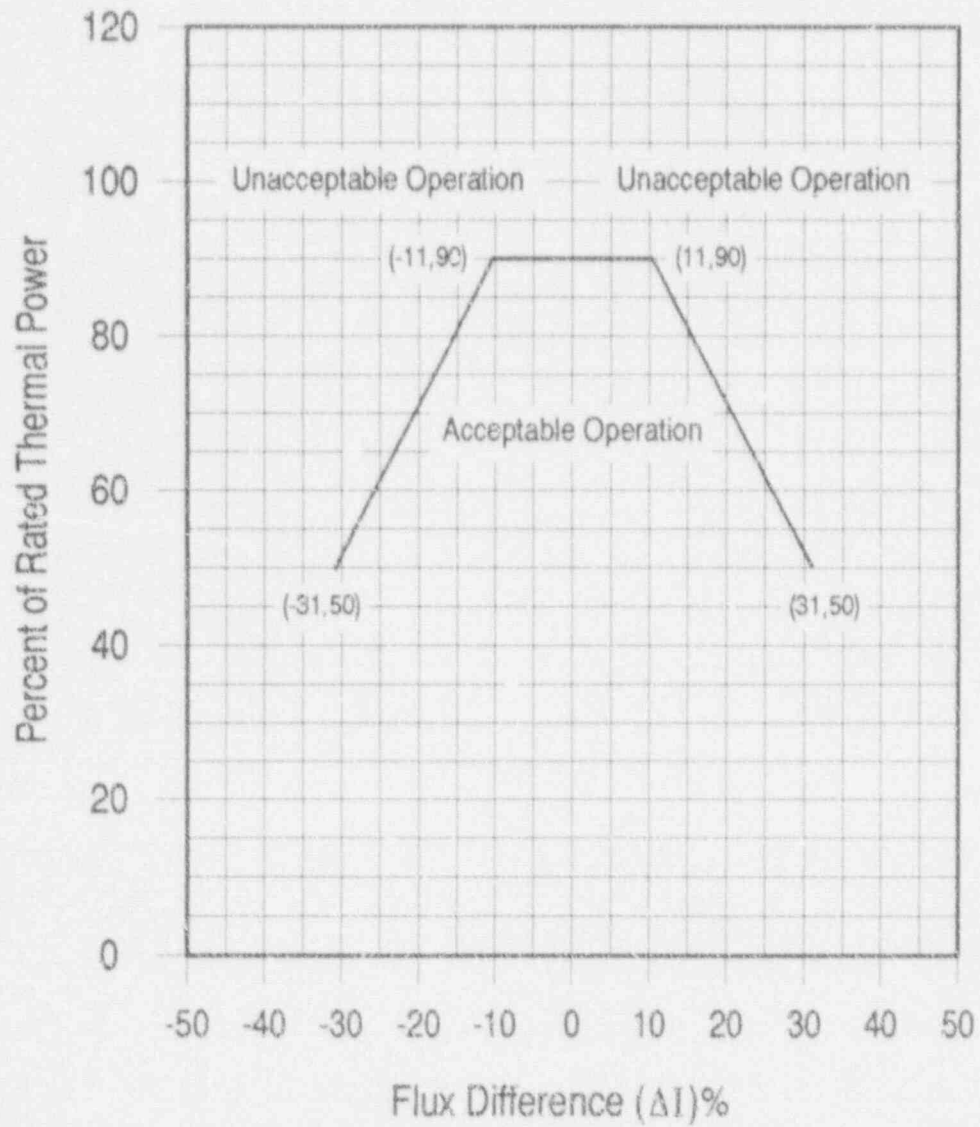
Bank A must be fully withdrawn* prior to power operation



ROD BANK INSERTION LIMITS VERSUS THERMAL POWER
FOUR-LOOP OPERATION

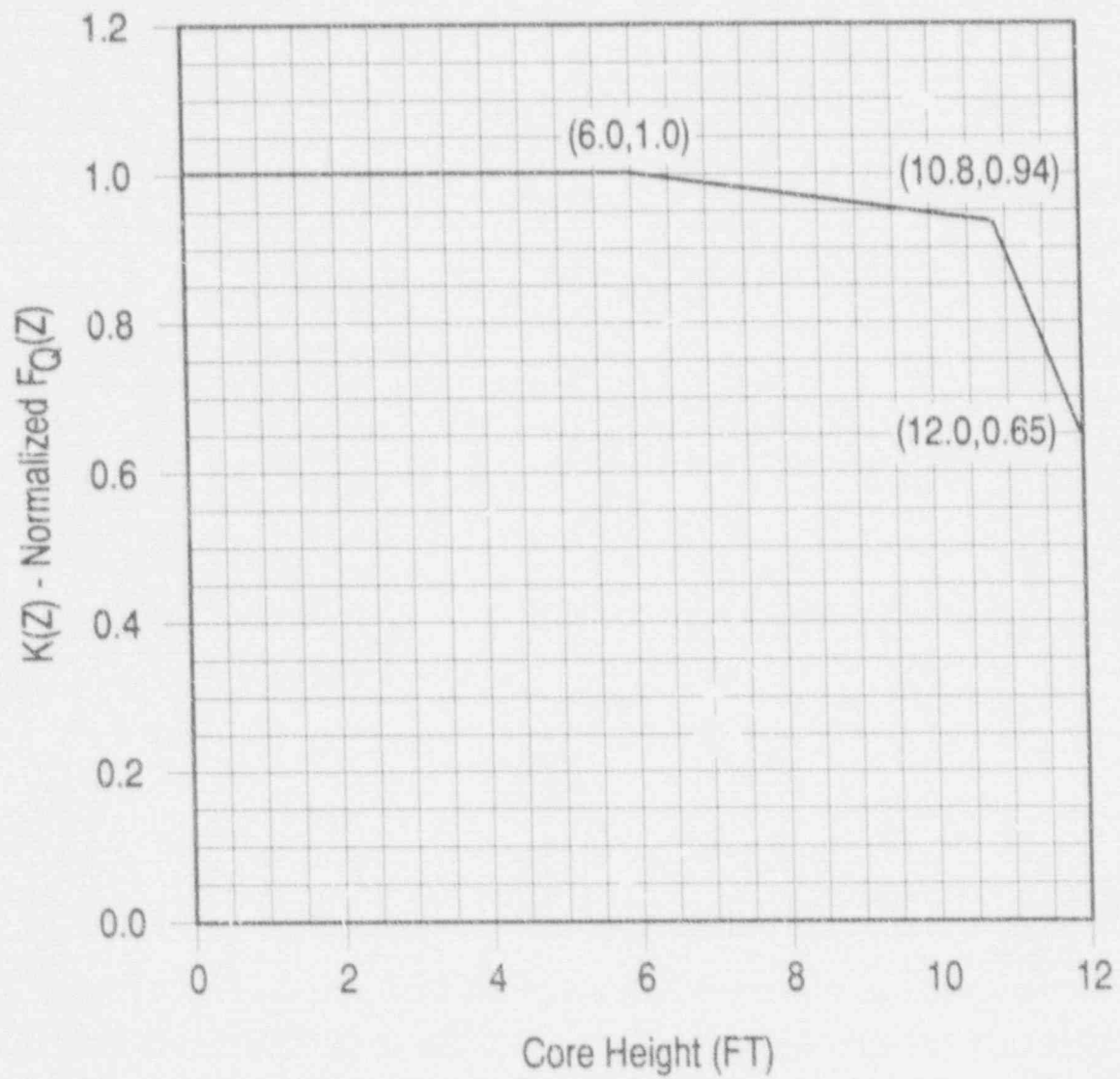
* Fully withdrawn = 225 to the mechanical fully withdrawn position, inclusive

CYCLE 2 COLR FIGURE 2



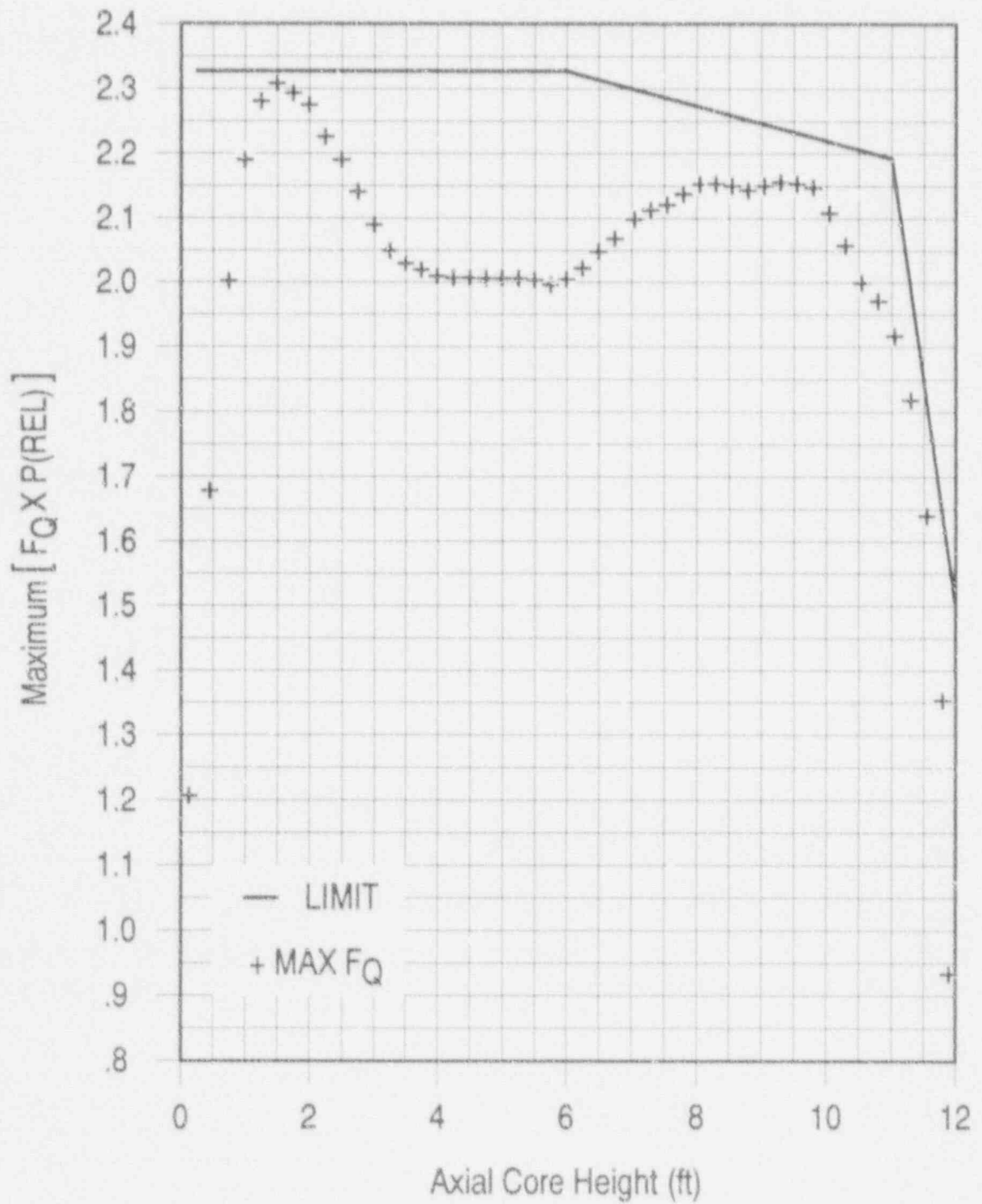
AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF RATED THERMAL POWER

CYCLE 2 COLR FIGURE 3



$K(Z) - \text{NORMALIZED } F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

CYCLE 2 COLR FIGURE 4



MAXIMUM $[F_Q \times P(\text{REL})]$ VERSUS CORE HEIGHT