



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555-0001

DUKE POWER COMPANY

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

SALUDA RIVER ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-413

CATAWBA NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 113
License No. NPF-35

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Catawba Nuclear Station, Unit 1 (the facility) Facility Operating License No. NPF-35 filed by the Duke Power Company, acting for itself, North Carolina Electric Membership Corporation and Saluda River Electric Cooperative, Inc. (licensees), dated October 25, 1993, as supplemented December 3 and 6, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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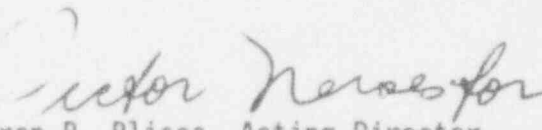
2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-35 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 113 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Duke Power Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective within 30 days of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Loren R. Plisco, Acting Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: December 17, 1993



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555-0001

DUKE POWER COMPANY

NORTH CAROLINA MUNICIPAL POWER AGENCY NO. 1

PIEDMONT MUNICIPAL POWER AGENCY

DOCKET NO. 50-414

CATAWBA NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 107
License No. NPF-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Catawba Nuclear Station, Unit 2 (the facility) Facility Operating License No. NPF-52 filed by the Duke Power Company, acting for itself, North Carolina Municipal Power Agency No. 1 and Piedmont Municipal Power Agency (licensees), dated October 25, 1993, as supplemented December 3 and 6, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

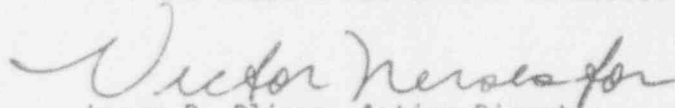
2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-52 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 107, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. Duke Power Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective within 30 days of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Loren R. Plisco, Acting Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: December 17, 1993

ATTACHMENT TO LICENSE AMENDMENT NO.113

FACILITY OPERATING LICENSE NO. NPF-35

DOCKET NO. 50-413

AND

TO LICENSE AMENDMENT NO. 107

FACILITY OPERATING LICENSE NO. NPF-52

DOCKET NO. 50-414

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

Remove Pages

Insert Pages

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III

IV

IV

Va

Va

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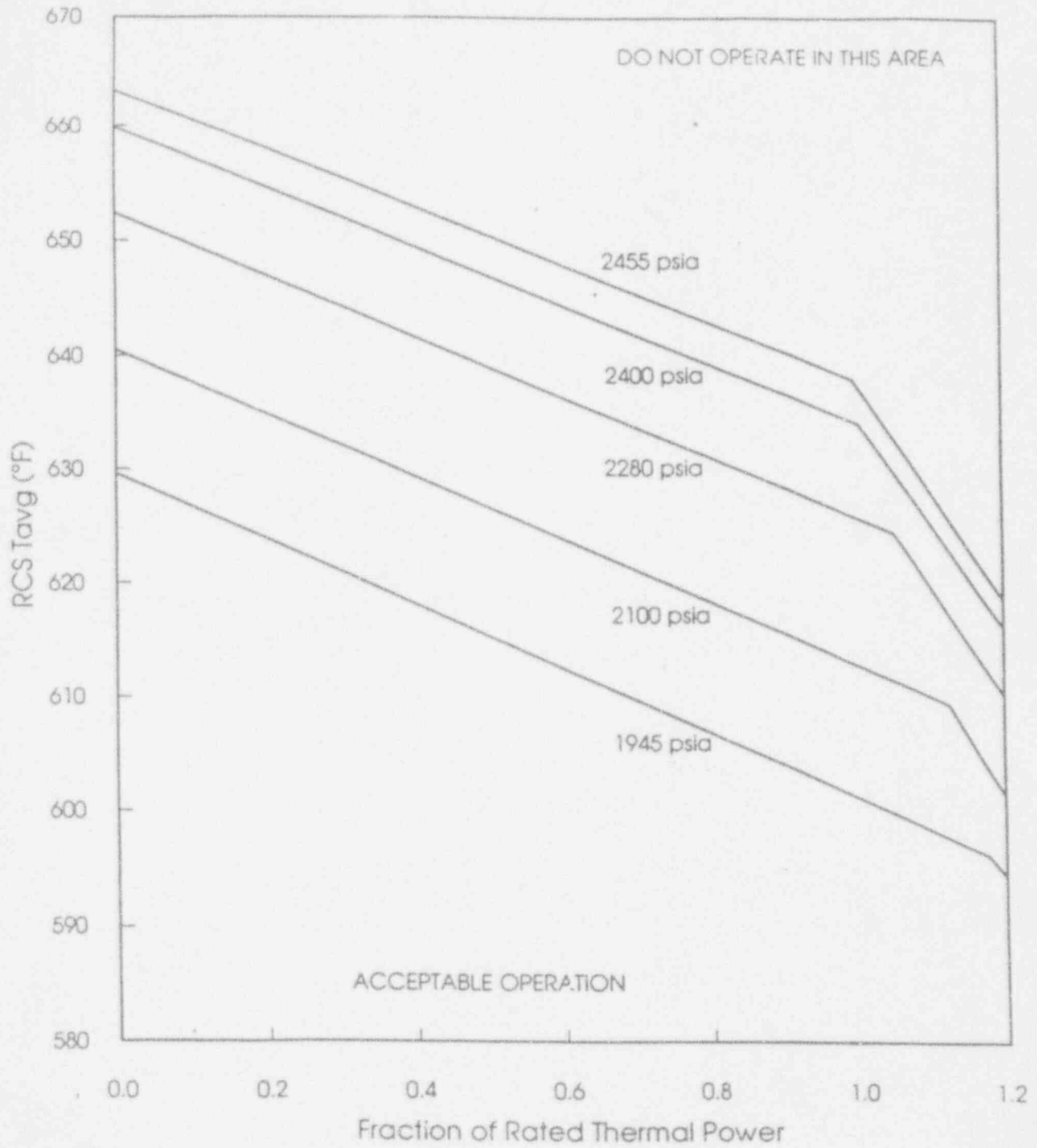


Figure 2.1-1a
REACTOR CORE SAFETY LIMITS - FOUR LOOPS IN OPERATION
382,000 gpm

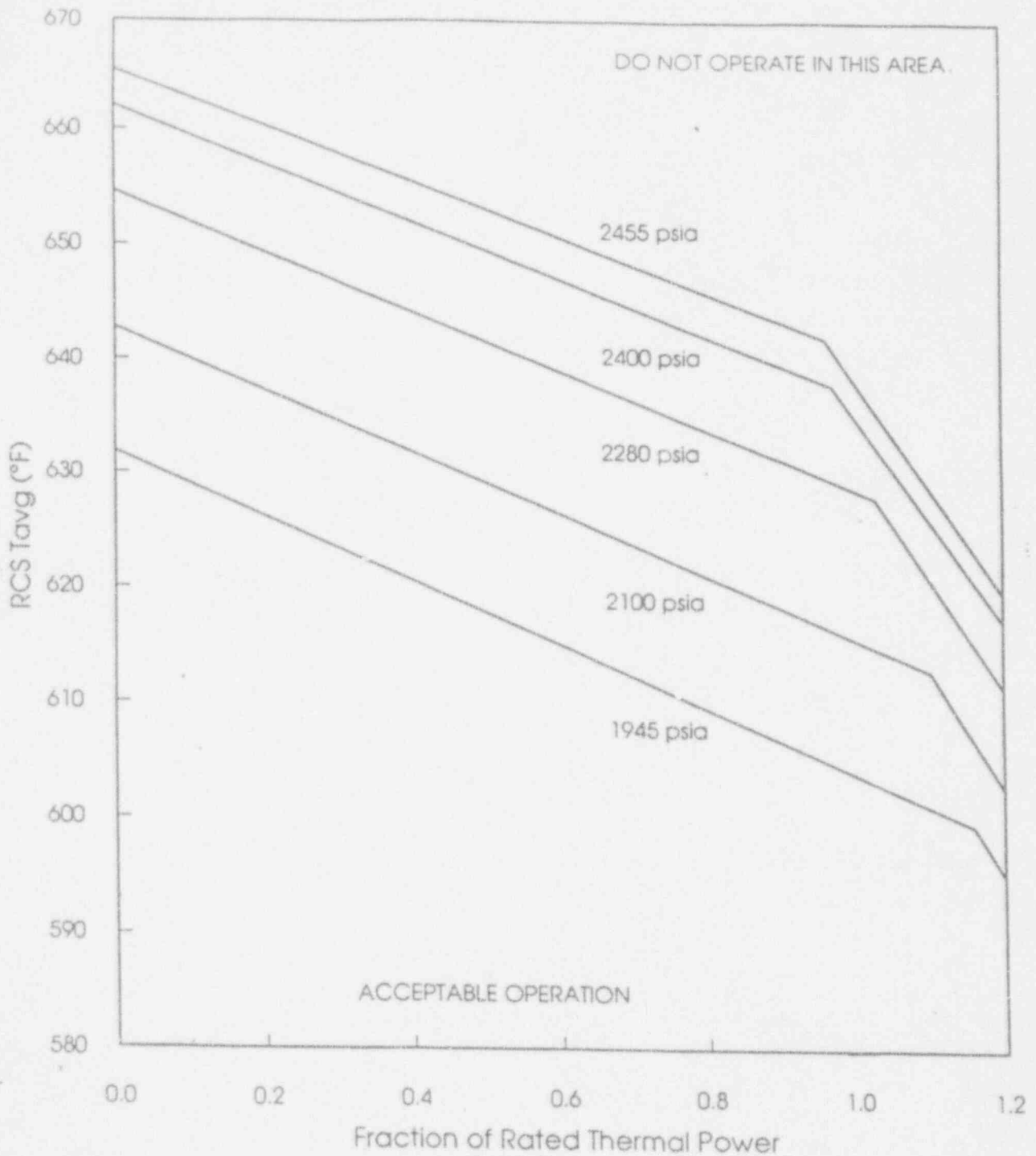


Figure 2.1-1b
REACTOR CORE SAFETY LIMITS - FOUR LOOPS IN OPERATION
385,000 gpm

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
1. Manual Reactor Trip	N.A.	N.A.
2. Power Range, Neutron Flux		
a. High Setpoint	$\leq 109\%$ of RTP*	$\leq 110.9\%$ of RTP*
b. Low Setpoint	$\leq 25\%$ of RTP*	$\leq 27.1\%$ of RTP*
3. Power Range, Neutron Flux, High Positive Rate	$\leq 5\%$ of RTP* with a time constant ≥ 2 seconds	$\leq 6.3\%$ of RTP* with a time constant ≥ 2 seconds
4. Intermediate Range, Neutron Flux	$\leq 25\%$ of RTP*	$\leq 31\%$ of RTP*
5. Source Range, Neutron Flux	$\leq 10^5$ cps	$\leq 1.4 \times 10^5$ cps
6. Overtemperature ΔT	See Note 1	See Note 2
7. Overpower ΔT	See Note 3	See Note 4
8. Pressurizer Pressure-Low	≥ 1945 psig	≥ 1938 psig***
9. Pressurizer Pressure-High	≤ 2385 psig	≤ 2399 psig
10. Pressurizer Water Level-High	$\leq 92\%$ of instrument span	$\leq 93.8\%$ of instrument span
11. Reactor Coolant Flow-Low	$\geq 90\%$ of loop minimum measured flow**	$\geq 88.9\%$ of loop minimum measured flow**

*RTP = RATED THERMAL POWER

**Loop minimum measured flow = 95,500 gpm

***Time constants utilized in the lead-lag controller for Pressurizer Pressure-Low are 2 seconds for lead and 1 second for lag. Channel calibration shall ensure that these time constants are adjusted to these values.

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
1. Manual Reactor Trip	N.A.	N.A.
2. Power Range, Neutron Flux		
a. High Setpoint	$\leq 109\%$ of RTP*	$\leq 110.9\%$ of RTP*
b. Low Setpoint	$\leq 25\%$ of RTP*	$\leq 27.1\%$ of RTP*
3. Power Range, Neutron Flux, High Positive Rate	$\leq 5\%$ of RTP* with a time constant ≥ 2 seconds	$\leq 6.3\%$ of RTP* with a time constant ≥ 2 seconds
4. Intermediate Range, Neutron Flux	$\leq 25\%$ of RTP*	$\leq 31\%$ of RTP*
5. Source Range, Neutron Flux	$\leq 10^5$ cps	$\leq 1.4 \times 10^5$ cps
6. Overtemperature ΔT	See Note 1	See Note 2
7. Overpower ΔT	See Note 3	See Note 4
8. Pressurizer Pressure-Low	≥ 1945 psig	≥ 1938 psig***
9. Pressurizer Pressure-High	≤ 2385 psig	≤ 2399 psig
10. Pressurizer Water Level-High	$\leq 92\%$ of instrument span	$\leq 93.8\%$ of instrument span
11. Reactor Coolant Flow-Low	$\geq 90\%$ of loop minimum measured flow**	$\geq 88.9\%$ of loop minimum measured flow**

*RTP = RATED THERMAL POWER

**Loop minimum measured flow = 96,250 gpm

***Time constants utilized in the lead-lag controller for Pressurizer Pressure-Low are 2 seconds for lead and 1 second for lag. Channel calibration shall ensure that these time constants are adjusted to these values.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S} \right) \leq \Delta T_o \left\{ K_1 - K_2 \frac{(1 + \tau_4 S)}{(1 + \tau_5 S)} [T \left(\frac{1}{1 + \tau_6 S} \right) - T'] + K_3 (P - P') - f_1 (\Delta I) \right\}$$

Where: ΔT = Measured ΔT by Loop Narrow Range RTDs;
 $\frac{1 + \tau_1 S}{1 + \tau_2 S}$ = Lead-lag compensator on measured ΔT ;
 τ_1, τ_2 = Time constants utilized in lead-lag compensator for ΔT , $\tau_1 = 12$ s,
 $\tau_2 = 3$ s;
 $\frac{1}{1 + \tau_3 S}$ = Lag compensator on measured ΔT ;
 τ_3 = Time constants utilized in the lag compensator for ΔT , $\tau_3 = 0$;
 ΔT_o = Indicated ΔT at RATED THERMAL POWER;
 K_1 = 1.1954
 K_2 = 0.03371/ $^{\circ}$ F
 $\frac{1 + \tau_4 S}{1 + \tau_5 S}$ = The function generated by the lead-lag compensator for T_{avg}
dynamic compensation;
 τ_4, τ_5 = Time constants utilized in the lead-lag compensator for T_{avg} , $\tau_4 = 22$ s,
 $\tau_5 = 4$ s;
 T = Average temperature, $^{\circ}$ F;
 $\frac{1}{1 + \tau_6 S}$ = Lag compensator on measured T_{avg} ;
 τ_6 = Time constant utilized in the measured T_{avg} lag compensator, $\tau_6 = 0$;

TABLE 2.2-1 (Continued)

TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S} \right) \leq \Delta T_o \left\{ K_1 - K_2 \frac{(1 + \tau_4 S)}{(1 + \tau_5 S)} \left[T \left(\frac{1}{1 + \tau_6 S} \right) - T' \right] + K_3 (P - P') - f_1 (\Delta I) \right\}$$

Where: ΔT = Measured ΔT by Loop Narrow Range RTDs;
 $\frac{1 + \tau_1 S}{1 + \tau_2 S}$ = Lead-lag compensator on measured ΔT ;
 τ_1, τ_2 = Time constants utilized in lead-lag compensator for ΔT , $\tau_1 = 12$ s,
 $\tau_2 = 3$ s;
 $\frac{1}{1 + \tau_3 S}$ = Lag compensator on measured ΔT ;
 τ_3 = Time constants utilized in the lag compensator for ΔT , $\tau_3 = 0$;
 ΔT_o = Indicated ΔT at RATED THERMAL POWER;
 K_1 = 1.1953
 K_2 = 0.03163/ $^{\circ}$ F
 $\frac{1 + \tau_4 S}{1 + \tau_5 S}$ = The function generated by the lead-lag compensator for T_{avg}
dynamic compensation;
 τ_4, τ_5 = Time constants utilized in the lead-lag compensator for T_{avg} , $\tau_4 = 22$ s,
 $\tau_5 = 4$ s;
 T = Average temperature, $^{\circ}$ F;
 $\frac{1}{1 + \tau_6 S}$ = Lag compensator on measured T_{avg} ;
 τ_6 = Time constant utilized in the measured T_{avg} lag compensator, $\tau_6 = 0$;

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

$T' \leq 590.8^\circ\text{F}$ (Nominal T_{avg} allowed by Safety Analysis);

$K_3 = 0.001529$;

$P =$ Pressurizer pressure, psig;

$P' = 2235$ psig (Nominal RCS operating pressure);

$S =$ Laplace transform operator, s^{-1} ;

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant STARTUP tests such that:

(i) For $q_t - q_b$ between -42.0% and $+8.0\%$,

$f_1(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;

(ii) For each percent ΔI that the magnitude of $q_t - q_b$ is more negative than -42.0% , the ΔT Trip Setpoint shall be automatically reduced by 3.672% of ΔT_o ; and

(iii) For each percent ΔI that the magnitude of $q_t - q_b$ is more positive than $+8.0\%$, the ΔT Trip Setpoint shall be automatically reduced by 1.640% of ΔT_o .

NOTE 2: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 4.5% of Rated Thermal Power.

TABLE 2.2-1 (Continued)
 TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

$T' \leq 590.8^\circ\text{F}$ (Nominal T_{avg} allowed by Safety Analysis);

$K_3 = 0.001414$;

$P =$ Pressurizer pressure, psig;

$P' = 2235$ psig (Nominal RCS operating pressure);

$S =$ Laplace transform operator, s^{-1} ;

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant STARTUP tests such that:

(i) For $q_t - q_b$ between -39.9% and $+3.0\%$,

$f_1(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;

(ii) For each percent ΔI that the magnitude of $q_t - q_b$ is more negative than -39.9% , the ΔT Trip Setpoint shall be automatically reduced by 3.910% of ΔT_o ; and

(iii) For each percent ΔI that the magnitude of $q_t - q_b$ is more positive than $+3.0\%$, the ΔT Trip Setpoint shall be automatically reduced by 2.316% of ΔT_o .

NOTE 2: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 4.5% of Rated Thermal Power.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: OVERPOWER ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S} \right) \leq \Delta T_o \{ K_4 - K_5 \left(\frac{\tau_7 S}{1 + \tau_7 S} \right) \left(\frac{1}{1 + \tau_6 S} \right) T - K_6 \left[T \left(\frac{1}{1 + \tau_6 S} \right) - T'' \right] - f_2(\Delta I) \}$$

Where: ΔT = As defined in Note 1,

$$\frac{1 + \tau_1 S}{1 + \tau_2 S} = \text{As defined in Note 1,}$$

$$\tau_1, \tau_2 = \text{As defined in Note 1,}$$

$$\frac{1}{1 + \tau_3 S} = \text{As defined in Note 1,}$$

$$\tau_3 = \text{As defined in Note 1,}$$

$$\Delta T_o = \text{As defined in Note 1,}$$

$$K_4 = 1.0855$$

$$K_5 = 0.02/^{\circ}\text{F for increasing average temperature and 0 for decreasing average temperature,}$$

$$\frac{\tau_7 S}{1 + \tau_7 S} = \text{The function generated by the rate-lag controller for } T_{avg} \text{ dynamic compensation,}$$

$$\tau_7 = \text{Time constant utilized in the rate-lag controller for } T_{avg}, \tau_7 = 10 \text{ s,}$$

$$\frac{1}{1 + \tau_6 S} = \text{As defined in Note 1,}$$

$$\tau_6 = \text{As defined in Note 1,}$$

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: OVERPOWER ΔT

$$\Delta T \frac{(1 + \tau_1 S)}{(1 + \tau_2 S)} \left(\frac{1}{1 + \tau_3 S} \right) \leq \Delta T_0 \left\{ K_4 - K_5 \left(\frac{\tau_7 S}{1 + \tau_7 S} \right) \left(\frac{1}{1 + \tau_6 S} \right) T - K_6 \left[T \left(\frac{1}{1 + \tau_6 S} \right) - T'' \right] - f_2(\Delta I) \right\}$$

Where: ΔT = As defined in Note 1, $\frac{1 + \tau_1 S}{1 + \tau_2 S}$ = As defined in Note 1, τ_1, τ_2 = As defined in Note 1, $\frac{1}{1 + \tau_3 S}$ = As defined in Note 1, τ_3 = As defined in Note 1, ΔT_0 = As defined in Note 1, K_4 = 1.0819 K_5 = 0.02/°F for increasing average temperature and 0 for decreasing average temperature, $\frac{\tau_7 S}{1 + \tau_7 S}$ = The function generated by the rate-lag controller for T_{avg} dynamic compensation, τ_7 = Time constant utilized in the rate-lag controller for T_{avg} , $\tau_7 = 10$ s, $\frac{1}{1 + \tau_6 S}$ = As defined in Note 1, τ_6 = As defined in Note 1,

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: (Continued)

$K_6 = 0.001262/^\circ\text{F}$ for $T > 590.8^\circ\text{F}$ and $K_6 = 0$ for $T \leq 590.8^\circ\text{F}$,

$T =$ As defined in Note 1,

$T'' =$ Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, $\leq 590.8^\circ\text{F}$),

$S =$ As defined in Note 1,

and $f_2(\Delta I)$ is a function of the indicated differences between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that:

- (i) for $q_t - q_b$ between -35% and $+35\%$ ΔI ; $f_2(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;
- (ii) for each percent ΔI that the magnitude of $q_t - q_b$ is more negative than -35% ΔI , the ΔT Trip Setpoint shall be automatically reduced by 7.0% of ΔT_0 ; and
- (iii) for each percent ΔI that magnitude of $q_t - q_b$ is more positive than $+35\%$ ΔI , the ΔT Trip Setpoint shall be automatically reduced by 7.0% of ΔT_0 .

NOTE 4: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 3.0% Rated Thermal Power.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: (Continued)

- K_6 = 0.001291/°F for $T > 590.8^\circ\text{F}$ and $K_6 = 0$ for $T \leq 590.8^\circ\text{F}$,
- T = As defined in Note 1,
- T'' = Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, $\leq 590.8^\circ\text{F}$),
- S = As defined in Note 1,

and $f_2(\Delta I)$ is a function of the indicated differences between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that:

- (i) for $q_t - q_b$ between -35% and +35% ΔI ; $f_2(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;
- (ii) for each percent ΔI that the magnitude of $q_t - q_b$ is more negative than -35% ΔI , the ΔT Trip Setpoint shall be automatically reduced by 7.0% of ΔT_0 ; and
- (iii) for each percent ΔI that magnitude of $q_t - q_b$ is more positive than +35% ΔI , the ΔT Trip Setpoint shall be automatically reduced by 7.0% of ΔT_0 .

NOTE 4: The channel's maximum Trip Setpoint shall not exceed its computed Trip Setpoint by more than 3.3% of Rated Thermal Power.

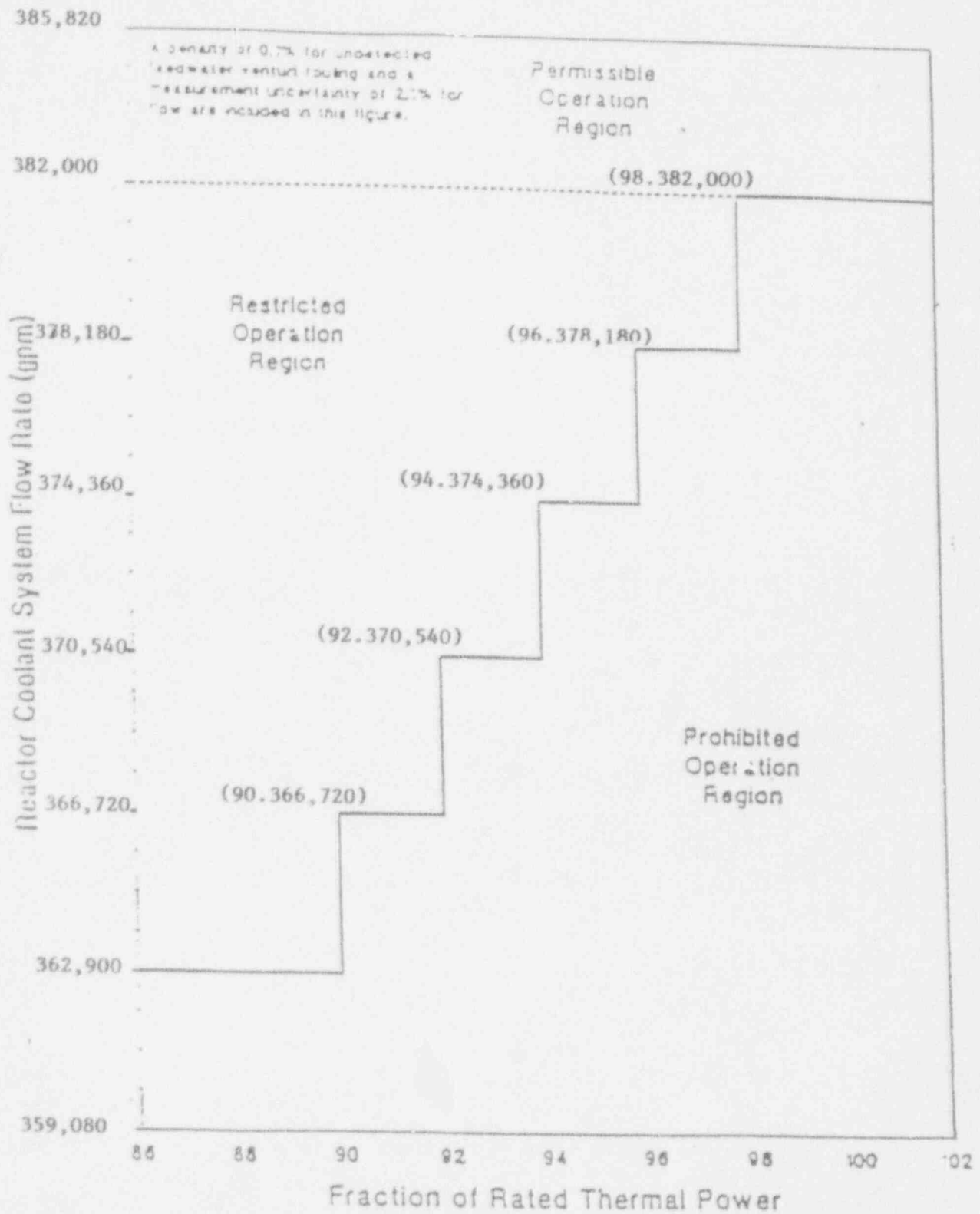


Figure 3.2-1 Reactor Coolant System Total Flow Rate Versus Rated Thermal Power - Four Loops in Operation

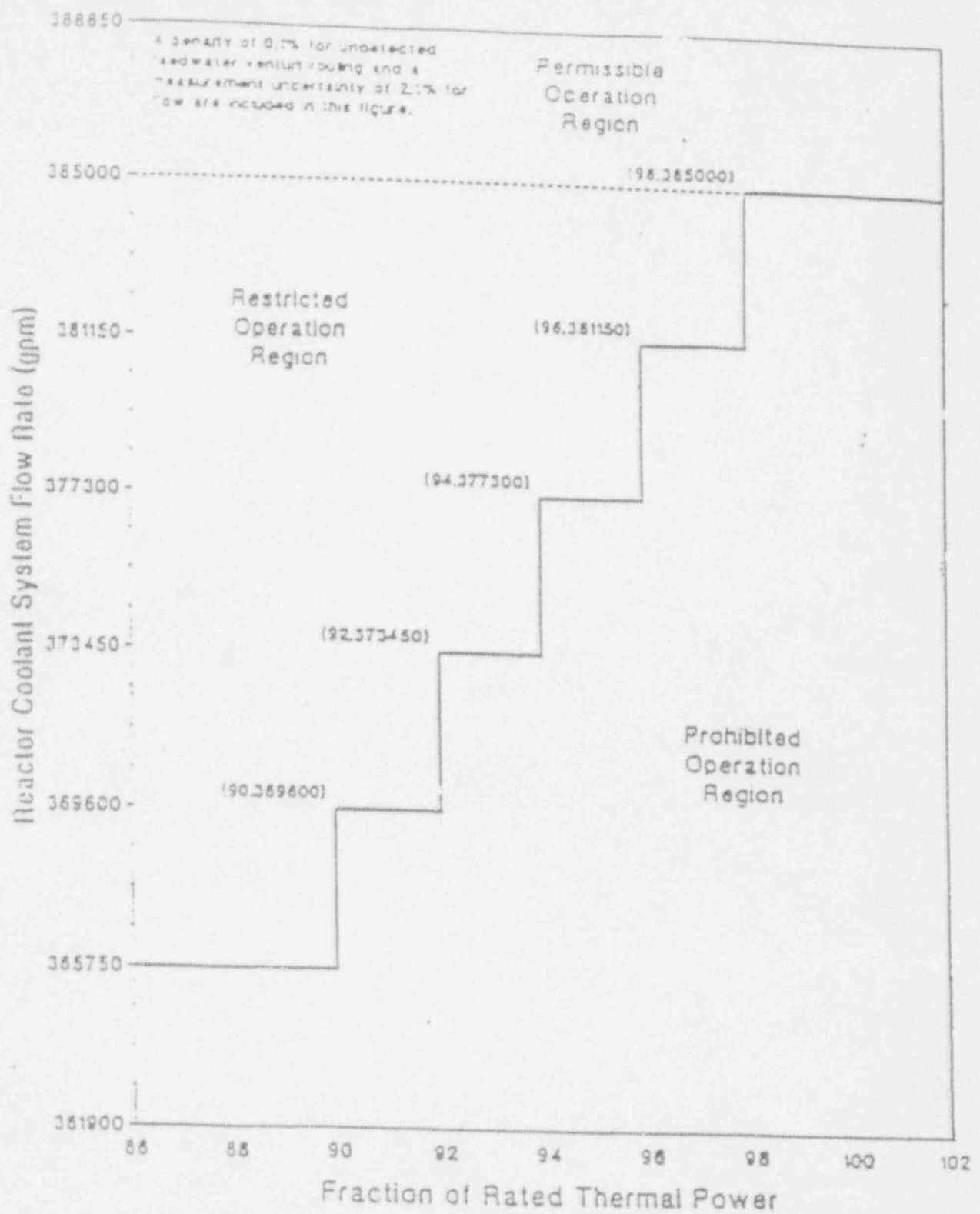


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