



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

December 17, 1993

Docket Nos. 50-413  
and 50-414

Mr. David L. Rehn  
Vice President, Catawba Site  
Duke Power Company  
4800 Concord Road  
York, South Carolina 29745

Dear Mr. Rehn:

SUBJECT: ISSUANCE OF AMENDMENTS - CATAWBA NUCLEAR STATION, UNITS 1 AND 2  
REDUCTION IN REACTOR COOLANT SYSTEM FLOW RATE FOR UNIT 1  
(TAC NOS. M88058 AND M88059)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 113 to Facility Operating License NPF-35 and Amendment No. 107 to Facility Operating License NPF-52 for the Catawba Nuclear Station, Units 1 and 2. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated October 25, 1993, as supplemented on December 3 and 6, 1993.

The amendments revise TS Figure 2.1-1, certain TS Table 2.2-1 factors in the equation for the OVERTEMPERATURE  $\Delta T$  and OVERPOWER  $\Delta T$  setpoints, and TS Figure 3.2-1 to reflect a reduction in the required minimum measured reactor coolant system (RCS) flow rate from 385,000 gallons per minute (gpm) to 382,000 gpm for Unit 1. Catawba Unit 2 values are unchanged and, accordingly, certain TS pages are modified to retain the current TS values in effect for Unit 2. The need for the change is attributed to the effects of steam generator tube plugging and to a hot leg temperature streaming phenomenon. The application also proposed to revise the text of TS 2.1.1 and definition for TS Figure 2.1-1. These changes are not related to the changes in RCS flow rate. The staff is continuing to review these proposed changes and, accordingly, they are not dealt with in this amendment.

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*DF01*

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

Robert E. Martin, Project Manager  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 113 to NPF-35
- 2. Amendment No. 107 to NPF-52
- 3. Safety Evaluation

cc w/enclosures:  
See next page

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Mr. David L. Rehn

- 2 - December 17, 1993

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,



Robert E. Martin, Project Manager  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 113 to NPF-35
2. Amendment No. 107 to NPF-52
3. Safety Evaluation

cc w/enclosures:  
See next page



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.

9312290278 931217  
PDR ADOCK 05000413  
P PDR

Mr. David L. Rehn  
Duke Power Company

Catawba Nuclear Station

cc:

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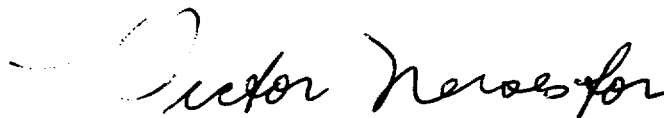
2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-35 is hereby amended to read as follows:

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.

<u>Remove Pages</u>	<u>Insert Pages</u>
III	III
IV	IV
Va	Va
2-2	2-A2
	2-B2
2-4	2-A4
	2-B4
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SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

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2.1.2 REACTOR COOLANT SYSTEM PRESSURE.....	2-1
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BASES

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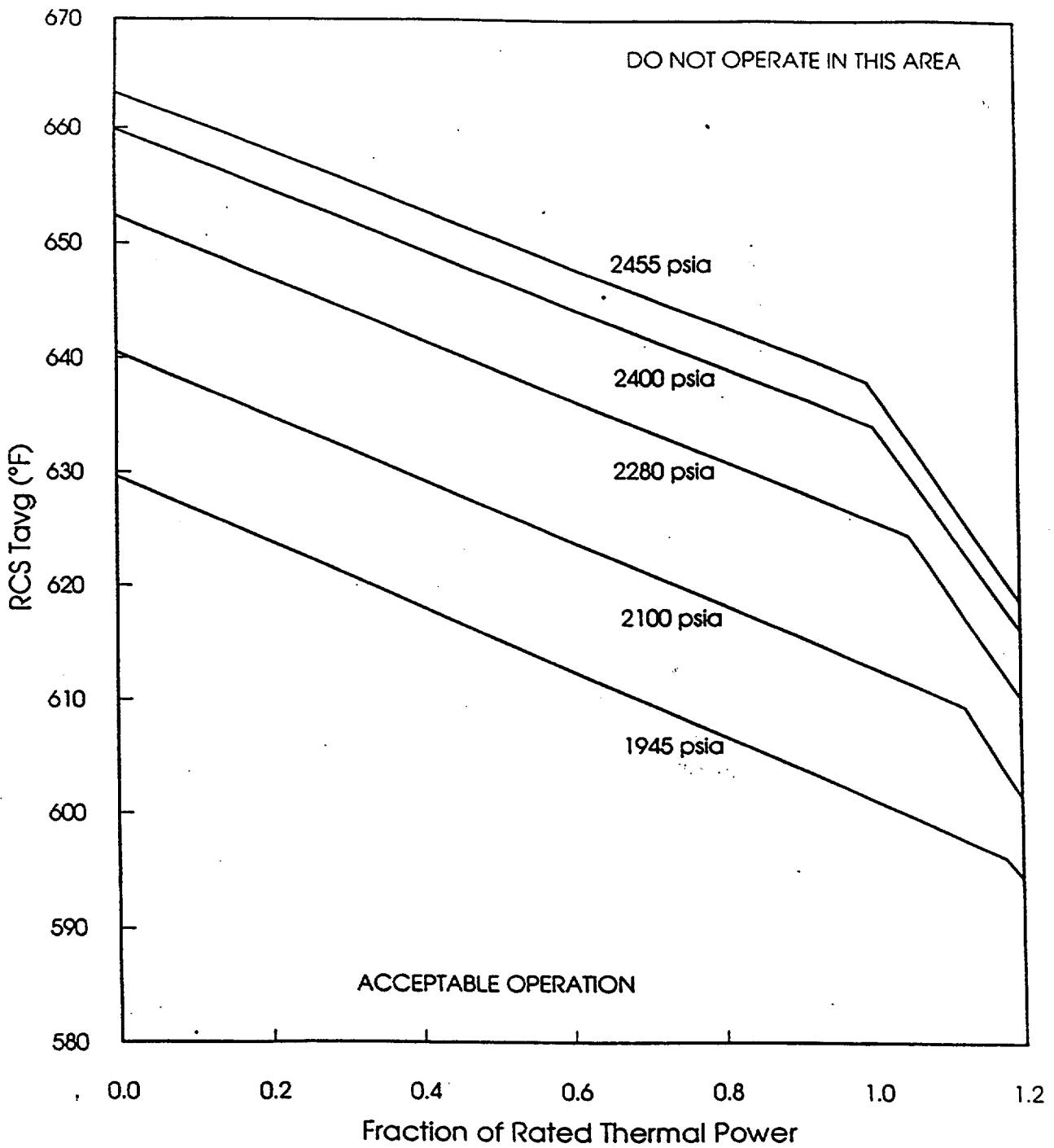


Figure 2.1-1a  
REACTOR CORE SAFETY LIMITS - FOUR LOOPS IN OPERATION  
382,000 gpm

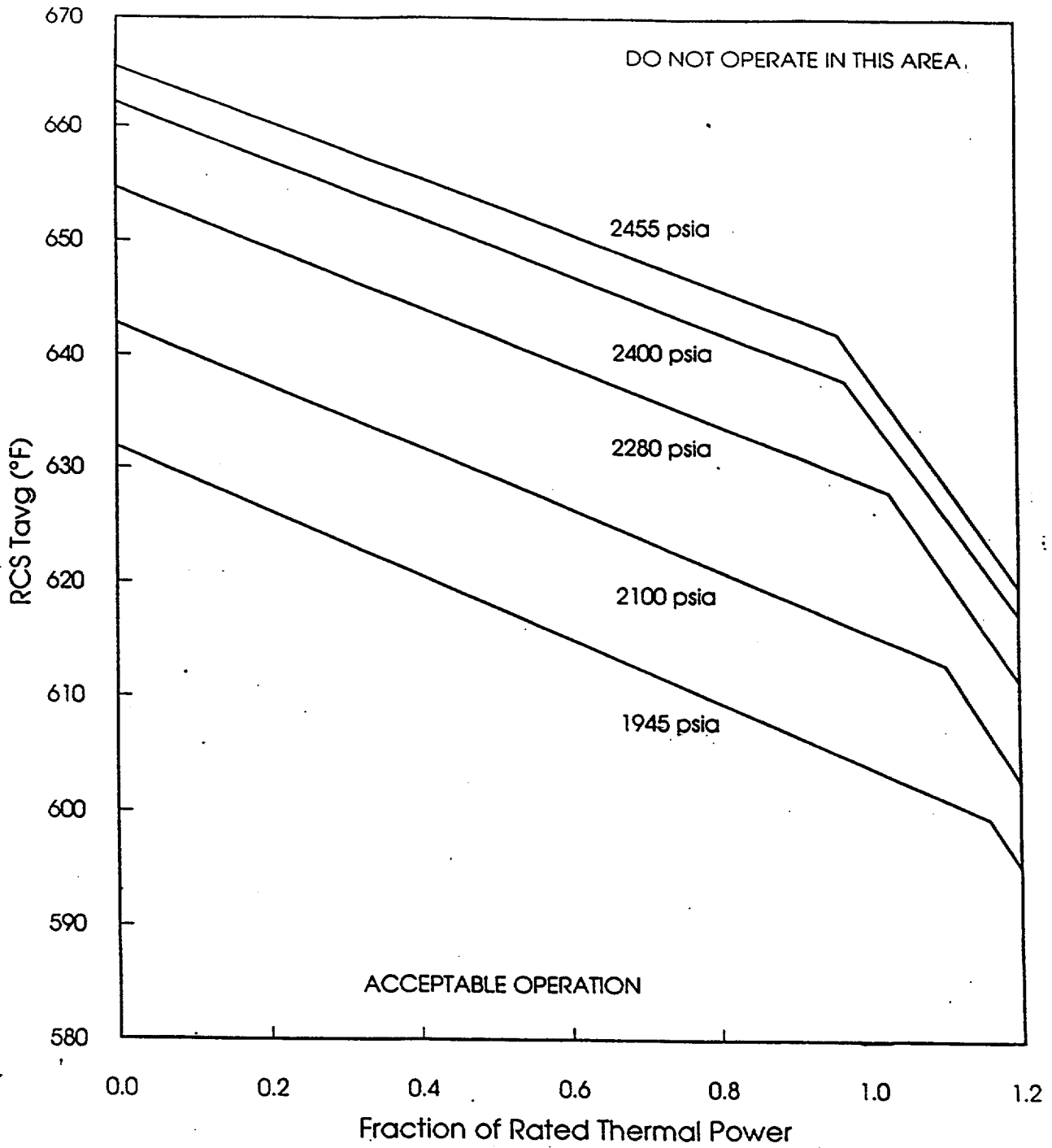


Figure 2.1-1b  
REACTOR CORE SAFETY LIMITS - FOUR LOOPS IN OPERATION  
385,000 gpm

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 $\geq 2$ seconds	$\leq 6.3\%$ of RTP* with a time constant $\geq 2$ 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 $\Delta T$	See Note 1	See Note 2
7. Overpower $\Delta T$	See Note 3	See Note 4
8. Pressurizer Pressure-Low	$\geq 1945$ psig	$\geq 1938$ psig***
9. Pressurizer Pressure-High	$\leq 2385$ psig	$\leq 2399$ 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	≤109% of RTP*	≤110.9% of RTP*
b. Low Setpoint	≤25% of RTP*	≤27.1% of RTP*
3. Power Range, Neutron Flux, High Positive Rate	≤5% of RTP* with a time constant ≥ 2 seconds	≤6.3% of RTP* with a time constant ≥ 2 seconds
4. Intermediate Range, Neutron Flux	≤25% of RTP*	≤31% of RTP*
5. Source Range, Neutron Flux	≤10 <sup>5</sup> cps	≤1.4 x 10 <sup>5</sup> 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	≤92% of instrument span	≤93.8% of instrument span
11. Reactor Coolant Flow-Low	≥90% of loop minimum measured flow**	≥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  $\Delta T$ 

$$\Delta T \frac{(1 + T_1 S)}{(1 + T_2 S)} \left( \frac{1}{1 + T_3 S} \right) \leq \Delta T_o \left\{ K_1 - K_2 \frac{(1 + T_4 S)}{(1 + T_5 S)} \left[ T \left( \frac{1}{1 + T_6 S} \right) - T' \right] + K_3 (P - P') - f_1 (\Delta I) \right\}$$

Where:  $\Delta T$  = Measured  $\Delta T$  by Loop Narrow Range RTDs;

$$\frac{1 + T_1 S}{1 + T_2 S} = \text{Lead-lag compensator on measured } \Delta T;$$

$T_1, T_2$  = Time constants utilized in lead-lag compensator for  $\Delta T$ ,  $T_1 = 12$  s,  
 $T_2 = 3$  s;

$$\frac{1}{1 + T_3 S} = \text{Lag compensator on measured } \Delta T;$$

$T_3$  = Time constants utilized in the lag compensator for  $\Delta T$ ,  $T_3 = 0$ ;

$\Delta T_o$  = Indicated  $\Delta T$  at RATED THERMAL POWER;

$K_1$  = 1.1954

$K_2$  = 0.03371/ $^{\circ}$ F

$\frac{1 + T_4 S}{1 + T_5 S}$  = The function generated by the lead-lag compensator for  $T_{avg}$  dynamic compensation;

$T_4, T_5$  = Time constants utilized in the lead-lag compensator for  $T_{avg}$ ,  $T_4 = 22$  s,  
 $T_5 = 4$  s;

$T$  = Average temperature,  $^{\circ}$ F;

$$\frac{1}{1 + T_6 S} = \text{Lag compensator on measured } T_{avg};$$

$T_6$  = Time constant utilized in the measured  $T_{avg}$  lag compensator,  $T_6 = 0$ ;

TABLE 2.2-1 (Continued)

## TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE  $\Delta T$ 

$$\Delta T \frac{(1 + T_1 S)}{(1 + T_2 S)} \left( \frac{1}{1 + T_3 S} \right) \leq \Delta T_o \left\{ K_1 - K_2 \frac{(1 + T_4 S)}{(1 + T_5 S)} \left[ T \left( \frac{1}{1 + T_6 S} \right) - T' \right] + K_3 (P - P') - f_1 (\Delta I) \right\}$$

Where:  $\Delta T$  = Measured  $\Delta T$  by Loop Narrow Range RTDs;
 $\frac{1 + T_1 S}{1 + T_2 S}$  = Lead-lag compensator on measured  $\Delta T$ ;
 $T_1, T_2$  = Time constants utilized in lead-lag compensator for  $\Delta T$ ,  $T_1 = 12$  s,  
 $T_2 = 3$  s;
 $\frac{1}{1 + T_3 S}$  = Lag compensator on measured  $\Delta T$ ;
 $T_3$  = Time constants utilized in the lag compensator for  $\Delta T$ ,  $T_3 = 0$ ;
 $\Delta T_o$  = Indicated  $\Delta T$  at RATED THERMAL POWER;
 $K_1$  = 1.1953
 $K_2$  = 0.03163/°F
 $\frac{1 + T_4 S}{1 + T_5 S}$  = The function generated by the lead-lag compensator for  $T_{avg}$   
dynamic compensation;
 $T_4, T_5$  = Time constants utilized in the lead-lag compensator for  $T_{avg}$ ,  $T_4 = 22$  s,  
 $T_5 = 4$  s;
 $T$  = Average temperature, °F;
 $\frac{1}{1 + T_6 S}$  = Lag compensator on measured  $T_{avg}$ ;
 $T_6$  = Time constant utilized in the measured  $T_{avg}$  lag compensator,  $T_6 = 0$ ;

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

## NOTE 1: (Continued)

$T' \leq 590.8^\circ\text{F}$  (Nominal  $T_{\text{avg}}$  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  $\Delta I$  that the magnitude of  $q_t - q_b$  is more negative than  $-42.0\%$ , the  $\Delta T$  Trip Setpoint shall be automatically reduced by  $3.672\%$  of  $\Delta T_o$ ; and

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

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  $T_{\text{avg}}$  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  $\Delta I$  that the magnitude of  $q_t - q_b$  is more negative than  $-39.9\%$ , the  $\Delta T$  Trip Setpoint shall be automatically reduced by  $3.910\%$  of  $\Delta T_o$ ; and

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

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  $\Delta T$ 

$$\Delta T \frac{(1 + T_1 S)}{(1 + T_2 S)} \left( \frac{1}{1 + T_3 S} \right) \leq \Delta T_o \left\{ K_4 - K_5 \left( \frac{T_7 S}{1 + T_7 S} \right) \left( \frac{1}{1 + T_6 S} \right) T - K_6 \left[ T \left( \frac{1}{1 + T_6 S} \right) - T'' \right] - f_2(\Delta I) \right\}$$

Where:  $\Delta T$  = As defined in Note 1,
 $\frac{1 + T_1 S}{1 + T_2 S}$  = As defined in Note 1, $T_1, T_2$  = As defined in Note 1,
 $\frac{1}{1 + T_3 S}$  = As defined in Note 1, $T_3$  = As defined in Note 1, $\Delta T_o$  = As defined in Note 1, $K_4$  = 1.0855 $K_5$  = 0.02/°F for increasing average temperature and 0 for decreasing average temperature,
 $\frac{T_7 S}{1 + T_7 S}$  = The function generated by the rate-lag controller for  $T_{avg}$  dynamic compensation, $T_7$  = Time constant utilized in the rate-lag controller for  $T_{avg}$ ,  $T_7 = 10$  s,
 $\frac{1}{1 + T_6 S}$  = As defined in Note 1, $T_6$  = As defined in Note 1,

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: OVERPOWER  $\Delta T$ 

$$\Delta T \frac{(1 + T_1 S)}{(1 + T_2 S)} \left( \frac{1}{1 + T_3 S} \right) \leq \Delta T_o \left\{ K_4 - K_5 \left( \frac{T_7 S}{1 + T_7 S} \right) \left( \frac{1}{1 + T_6 S} \right) T - K_6 \left[ T \left( \frac{1}{1 + T_6 S} \right) - T'' \right] - f_2(\Delta I) \right\}$$

Where:  $\Delta T$  = As defined in Note 1,
 $\frac{1 + T_1 S}{1 + T_2 S}$  = As defined in Note 1, $T_1, T_2$  = As defined in Note 1,
 $\frac{1}{1 + T_3 S}$  = As defined in Note 1, $T_3$  = As defined in Note 1, $\Delta T_o$  = As defined in Note 1, $K_4$  = 1.0819 $K_5$  = 0.02/°F for increasing average temperature and 0 for decreasing average temperature,
 $\frac{T_7 S}{1 + T_7 S}$  = The function generated by the rate-lag controller for  $T_{avg}$  dynamic compensation, $T_7$  = Time constant utilized in the rate-lag controller for  $T_{avg}$ ,  $T_7 = 10$  s,
 $\frac{1}{1 + T_6 S}$  = As defined in Note 1, $T_6$  = 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  $T_{\text{avg}}$  at RATED THERMAL POWER (Calibration temperature for  $\Delta T$  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  $+35\% \Delta I$ ;  $f_2 (\Delta I) = 0$ , 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  $\Delta I$  that the magnitude of  $q_t - q_b$  is more negative than  $-35\% \Delta I$ , the  $\Delta T$  Trip Setpoint shall be automatically reduced by  $7.0\%$  of  $\Delta T_o$ ; and
- (iii) for each percent  $\Delta I$  that magnitude of  $q_t - q_b$  is more positive than  $+35\% \Delta I$ , the  $\Delta T$  Trip Setpoint shall be automatically reduced by  $7.0\%$  of  $\Delta T_o$ .

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  $T_{\text{avg}}$  at RATED THERMAL POWER (Calibration temperature for  $\Delta T$  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%  $\Delta I$ ;  $f_2(\Delta I) = 0$ , 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  $\Delta I$  that the magnitude of  $q_t - q_b$  is more negative than -35%  $\Delta I$ , the  $\Delta T$  Trip Setpoint shall be automatically reduced by 7.0% of  $\Delta T_0$ ; and
- (iii) for each percent  $\Delta I$  that magnitude of  $q_t - q_b$  is more positive than +35%  $\Delta I$ , the  $\Delta T$  Trip Setpoint shall be automatically reduced by 7.0% of  $\Delta T_0$ .

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



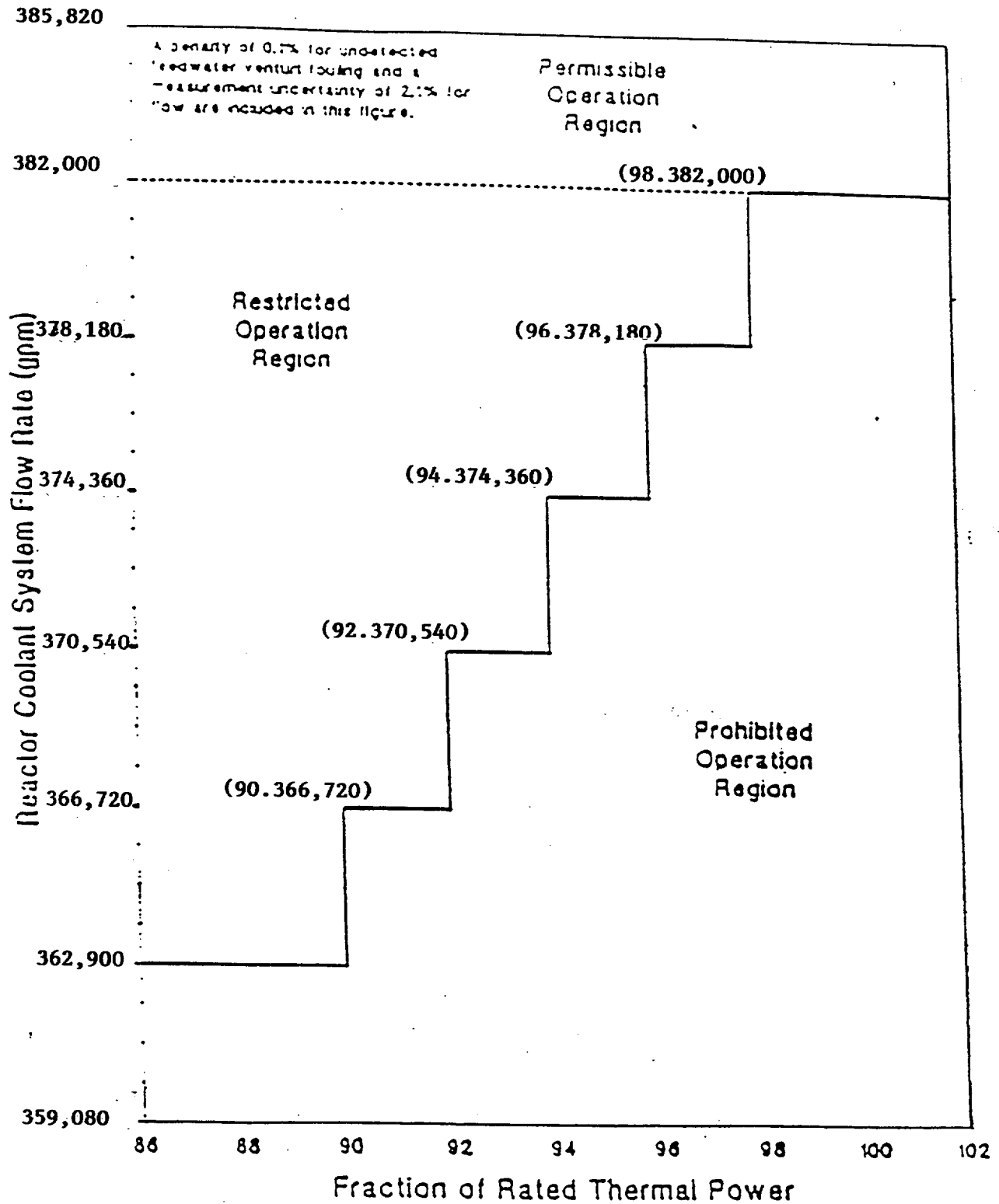


Figure 3.2-1 Reactor Coolant System Total Flow Rate Versus Rated Thermal Power - Four Loops in Operation

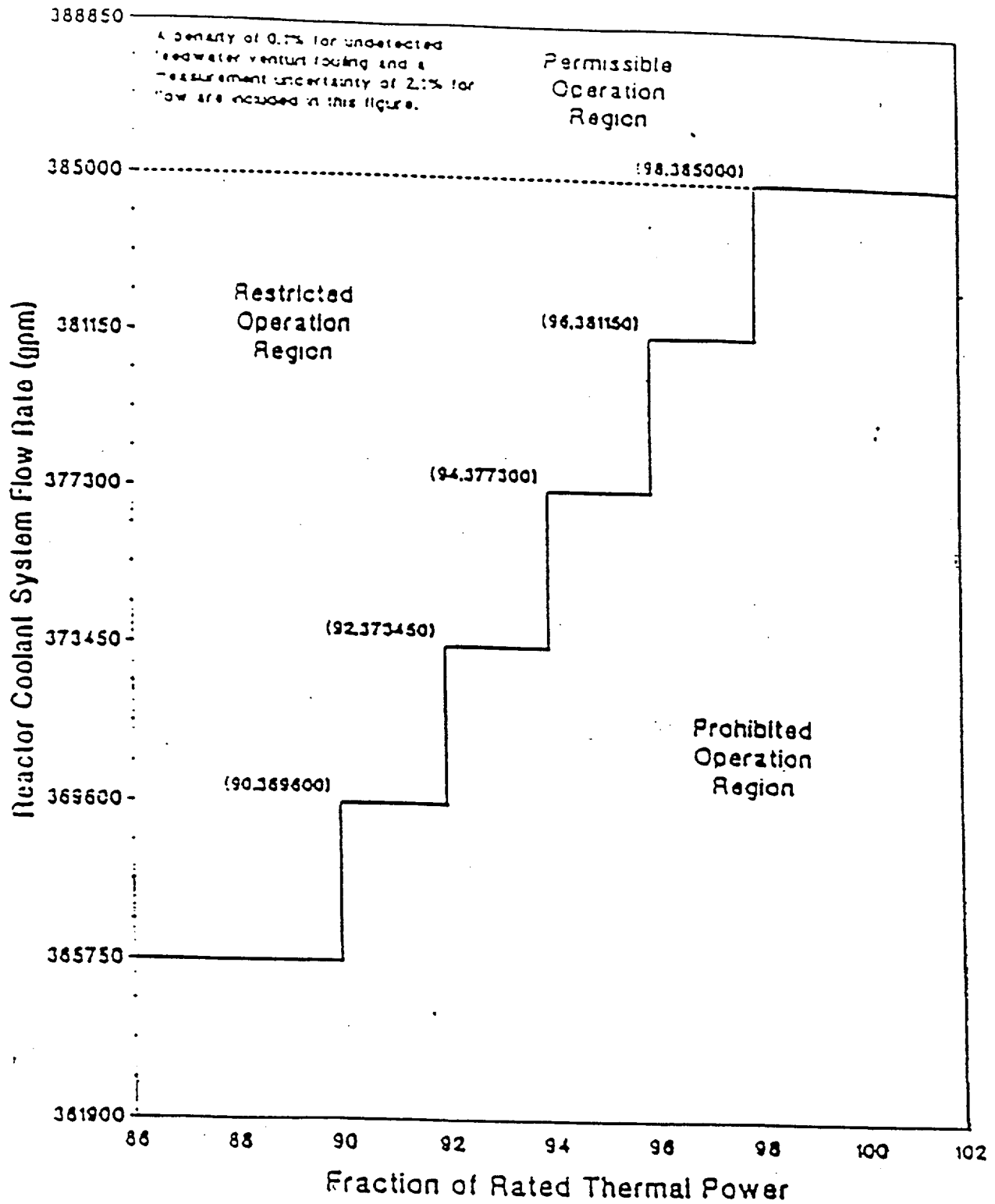


Figure 3.2-1 Reactor Coolant System Total Flow Rate Versus Rated Thermal Power - Four Loops in Operation