

REACTOR COOLANT SYSTEM

3/4.4.6 PRESSURE/TEMPERATURE LIMITS

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION

3.4.6.1 The reactor coolant system temperature and pressure shall be limited in accordance with the limit lines shown on (1) ~~Figure 3.4.6.1-1~~<sup>in the Pressure/Temperature Limits Report (PTLR)</sup> for heatup by non-nuclear means, cooldown following a nuclear shutdown, and low power PHYSICS TESTS; (2) ~~Figure 3.4.6.1-2~~ for operations with a critical core other than low power PHYSICS TESTS or when the reactor vessel is vented; and (3) ~~Figures 3.4.6.1-3a, 3.4.6.1-3b, or 3.4.6.1-3c~~ as applicable for inservice hydrostatic or leak testing ~~with~~.

- a. A maximum heatup of 100°F in any one-hour period, except for inservice hydrostatic or leak testing at which time the maximum heatup shall not exceed 30°F in any one-hour period.
- b. A maximum cooldown of 100°F in any one-hour period except for inservice hydrostatic or leak testing at which time maximum cooldown shall not exceed 30°F in any one-hour period.
- c. A maximum temperature change limited to 10°F in any one-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves, and
- d. The reactor vessel flange and head flange temperatures greater than or equal to 70°F when reactor vessel head bolting studs are under tension.

APPLICABILITY: At all times.

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ACTION:

*PTLR*

With any of the above limits exceeded, restore the temperature and/or pressure to within the limits within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the fracture toughness properties of the reactor coolant system; determine that the system remains acceptable for continued operations, or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1.1 The reactor coolant system temperature and pressure shall be determined to be within the limits at least once per 30 minutes during system heatup, cooldown, and inservice leak and hydrostatic testing operations.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

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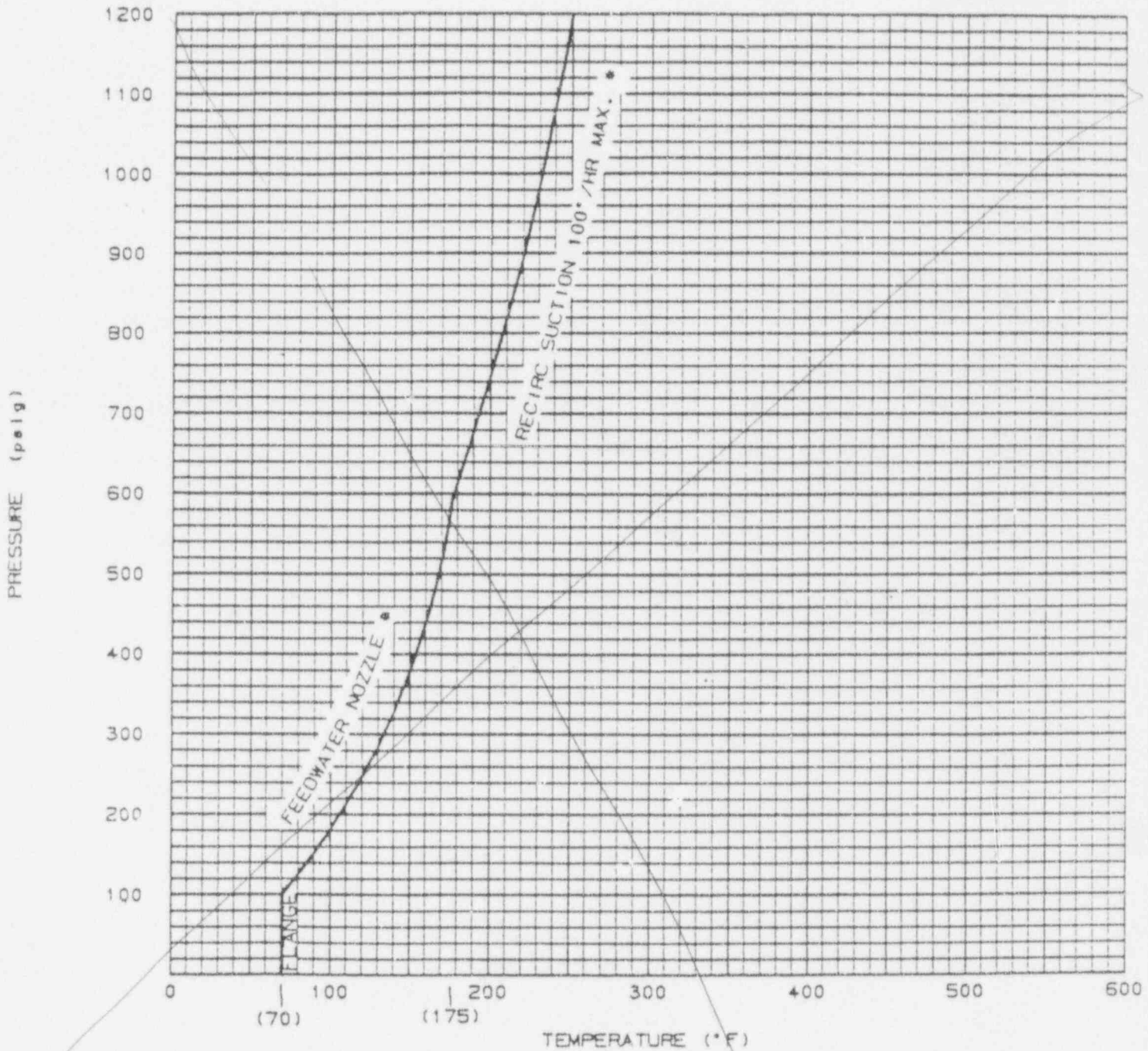
4.4.6.1.2 The reactor coolant system temperature and pressure shall be determined to be to the right of the criticality limit line of *shown in the PTLR* ~~Figure 3.4.6.1-2~~ within 15 minutes prior to the withdrawal of control rods to bring the reactor to criticality.

4.4.6.1.3 The reactor material irradiation surveillance specimens shall be removed and examined to determine changes in material properties at the intervals shown in ~~Table 4.4.6.1.3-1~~. *the PTLR* The results of these examinations shall be used to update ~~Figures 3.4.6.1-1, 3.4.6.1-2, 3.4.6.1-3a, 3.4.6.1-3b, and 3.4.6.1-3c~~, as applicable. The cumulative effective full power years shall be determined at least once per 18 months.

FIGURE 3.4.6.1-1  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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NORMAL OPERATION WITH CORE NOT CRITICAL



BASES:

1. FUEL IN REACTOR
2.  $\leq 10$  EFPY
3.  $7.1 \times 10^{17} \text{ N/CM}^2 > 1 \text{ MEV}$
4.  $RT_{NDT} = 81.4^\circ (1/4 T)$
5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
6. REG. GUIDE 1.99 REV. 2

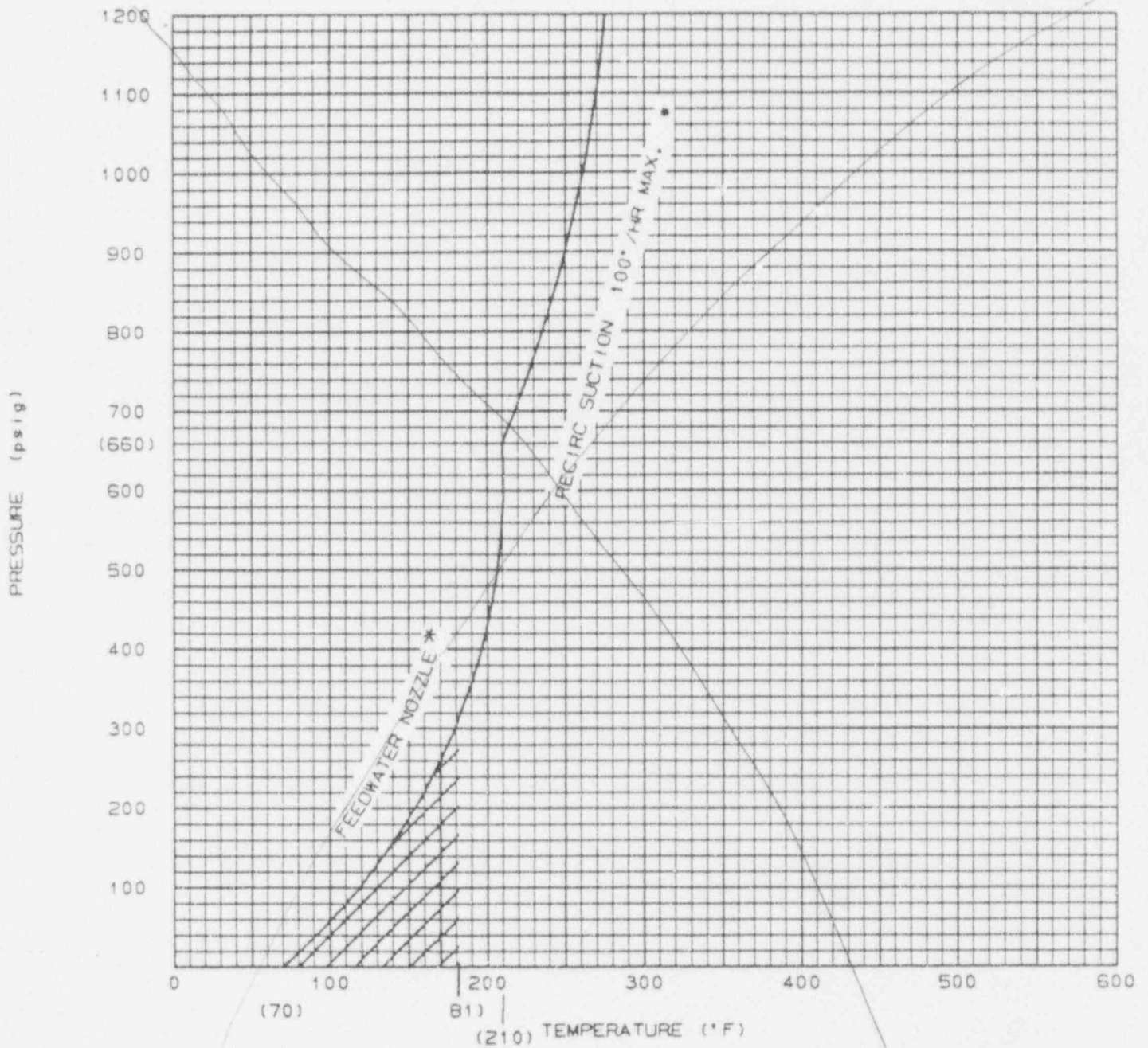
NOTES:

1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES

FIGURE 3.4.6.1-2  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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NORMAL OPERATION WITH CORE CRITICAL



BASES:

1. FUEL IN REACTOR
2.  $\leq 16$  EFPY
3.  $7.1 \times 10^{17} \text{ N/CM}^2 > 1 \text{ MEV}$
4.  $RT_{NDT} = 81.4 (1/4 T)$
5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
6. REG. GUIDE 1.99 REV. 2

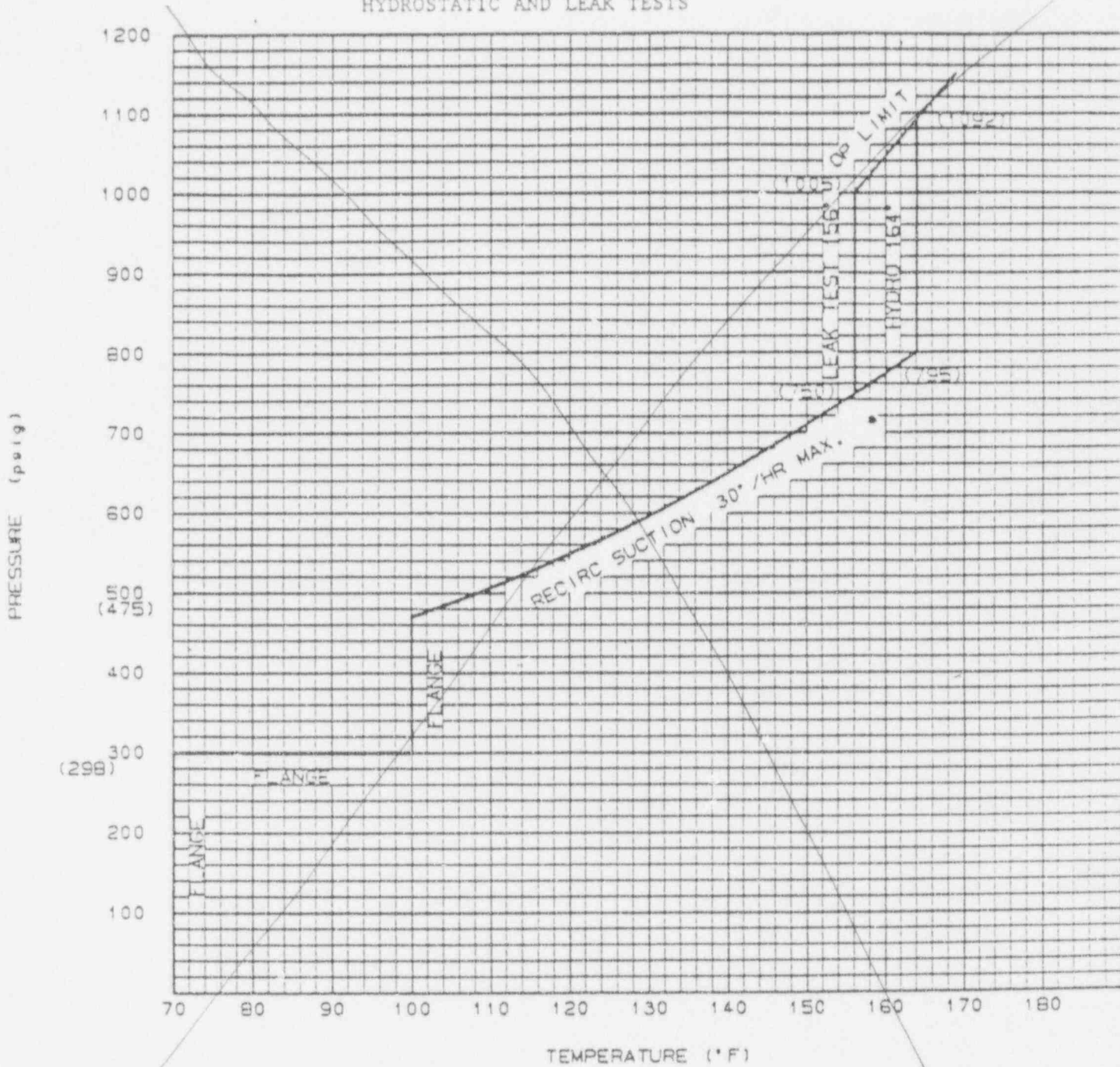
NOTES:

1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
4. OPERATION IN CROSS-HATCHED AREA PERMITTED ONLY WHEN WATER LEVEL IS WITHIN NORMAL RANGE FOR POWER OPERATION.

FIGURE 3.4.6.1-3a  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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HYDROSTATIC AND LEAK TESTS



BASES:

1. FUEL IN REACTOR
2. REACTOR NOT CRITICAL
3. REG. GUIDE 1.99 REV. 2
4.  $\leq 8$  EFPY<sup>17</sup>
5.  $3.5 \times 10^{17}$  N/CM<sup>2</sup> > 1 MEV
6. RT<sub>NOT</sub> = 66° (1/4 T)
7. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED

NOTES:

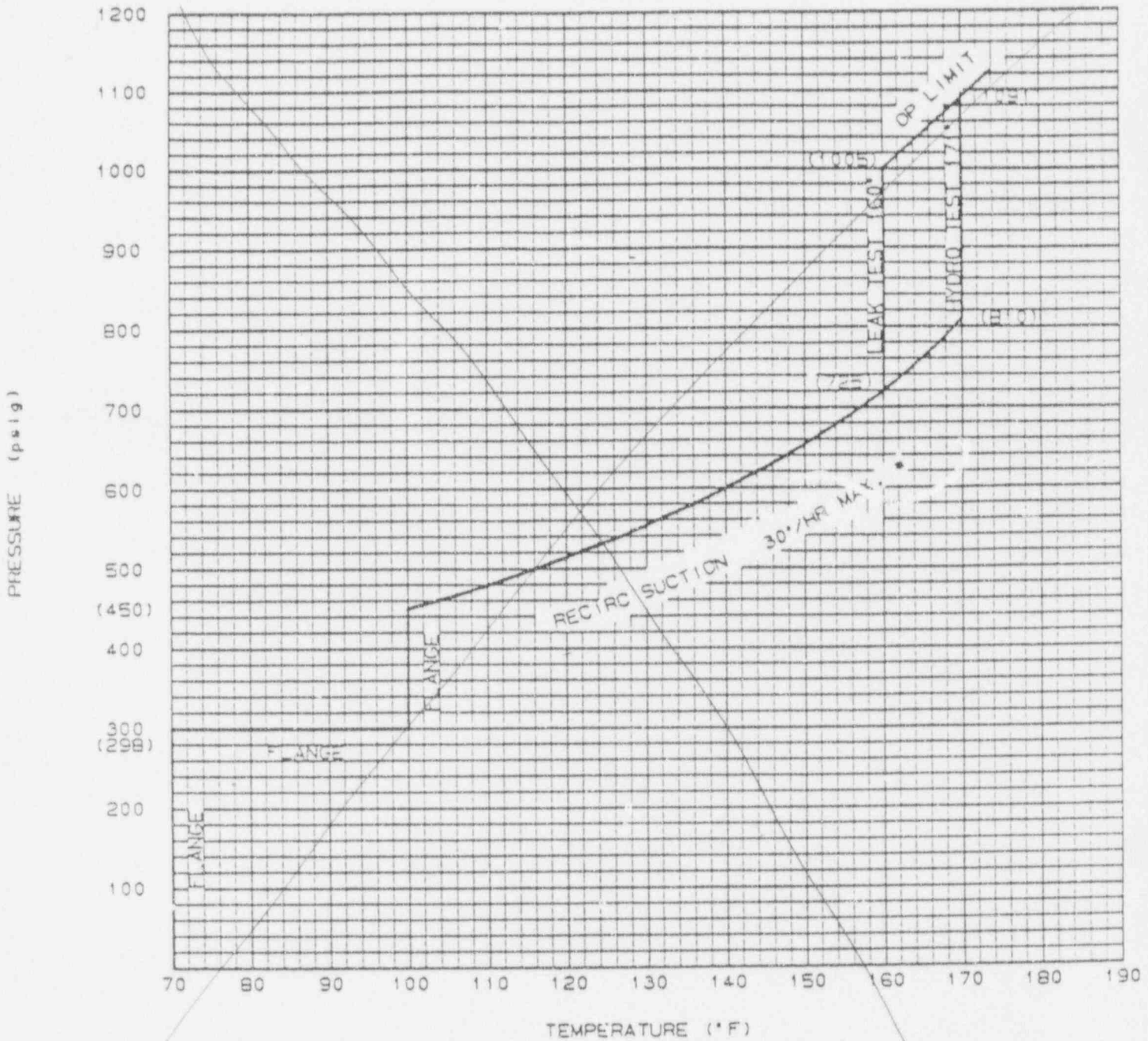
1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
4. OPERATING LIMIT INDICATES TEMPERATURE REQUIRED IF TEST PRESSURE WAS EXCEEDED.



FIGURE 3.4.6.1-3b  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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HYDROSTATIC AND LEAK TESTS



BASES:

1. FUEL IN REACTOR
2.  $\leq 10$  EPFY
3.  $4.4 \times 10^{17}$  N/CM<sup>2</sup> > 1 MEV
4. RT<sub>NDT</sub> = 73° (1/4 T)
5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
6. REG. GUIDE 1.99 REV. 2
7. REACTOR NOT CRITICAL

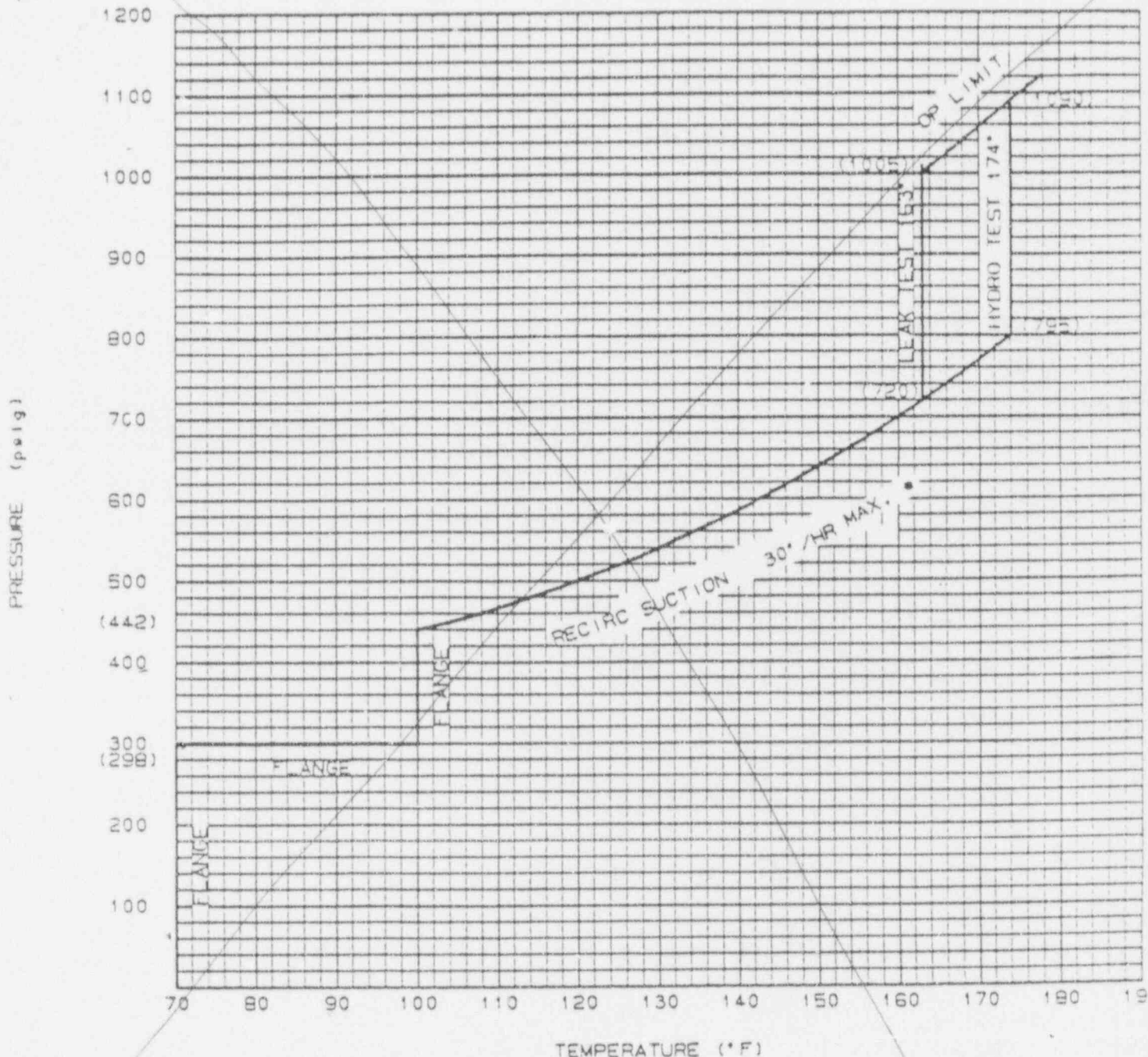
NOTES:

1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
4. OPERATING LIMIT INDICATES TEMPERATURE REQUIRED IF TEST PRESSURE WAS EXCEEDED.

FIGURE 3.4.6.1-3c  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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HYDROSTATIC AND LEAK TESTS



- BASES:
1. FUEL IN REACTOR
  2.  $\leq 12$  EF<sub>PI</sub>
  3.  $5.3 \times 10^{17}$  N/CM<sup>2</sup> > 1 MEV
  4. RT<sub>NDT</sub> = 76° (1/4 T)
  5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
  6. REG. GUIDE 1.99 REV. 2
  7. REACTOR NOT CRITICAL

- NOTES:
1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
  2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
  3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
  4. OPERATING LIMIT INDICATES TEMPERATURE REQUIRED IF TEST PRESSURE WAS EXCEEDED

TABLE 4.4.6.1.3-1

REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM CAPSULE WITHDRAWAL SCHEDULE

<u>CAPSULE NUMBER</u>	<u>VESSEL LOCATION</u>	<u>WITHDRAWAL TIME<sup>(a)</sup> (EFPY)</u>
3	300°	8
2	120°	(b)
1	30°	(b)

(a) The specimen shall be withdrawn during refueling outage immediately preceding or following the specified withdrawal time.

(b) The schedule for removal of the second and third capsule shall be proposed after the results of the first capsule have been evaluated.

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ENCLOSURE 6

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2  
NRC DOCKET NOS. 50-325 & 50-324  
OPERATING LICENSE NOS. DPR-71 & DPR-62  
REQUEST FOR LICENSE AMENDMENT  
REMOVAL OF PRESSURE-TEMPERATURE CURVES AND VESSEL SURVEILLANCE  
CAPSULE WITHDRAWAL SCHEDULE FROM TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATION PAGES - UNIT 2

REACTOR COOLANT SYSTEM

3/4.4.6 PRESSURE/TEMPERATURE LIMITS

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION

*in the Pressure and Temperature Limits Report (PTLR)*

3.4.6.1 The reactor coolant system temperature and pressure shall be limited in accordance with the limit lines shown on (1) ~~Figure 3.4.6.1-1~~ for heatup by non-nuclear means, cooldown following a nuclear shutdown, and low power PHYSICS TESTS; ~~(2) Figure 3.4.6.1-2~~ for operations with a critical core other than low power PHYSICS TESTS or when the reactor vessel is vented; and ~~(3) Figures 3.4.6.1-3a, 3.4.6.1-3b, or 3.4.6.1-3c~~, as applicable for inservice hydrostatic or leak testing ~~with~~.

- a. A maximum heatup of 100°F in any one-hour period, except for inservice hydrostatic or leak testing at which time the maximum heatup shall not exceed 30°F in any one-hour period.
- b. A maximum cooldown of 100°F in any one-hour period except for inservice hydrostatic or leak testing at which time maximum cooldown shall not exceed 30°F in any one-hour period.
- c. A maximum temperature change limited to 10°F in any one-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves, and
- d. The reactor vessel flange and head flange temperatures greater than or equal to 70°F when reactor vessel head bolting studs are under tension.

*delete*

APPLICABILITY: At all times.

ACTION:

*PTLR*

With any of the above limits exceeded, restore the temperature and/or pressure to within the limits within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the fracture toughness properties of the reactor coolant system; determine that the system remains acceptable for continued operations, or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1.1 The reactor coolant system temperature and pressure shall be determined to be within the limits at least once per 30 minutes during system heatup, cooldown, and inservice leak and hydrostatic testing operations.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

4.4.6.1.2 The reactor coolant system temperature and pressure shall be determined to be to the right of the criticality limit line *(of shown in the PTLR,*  
~~Figure 3.4.6.1-2~~ within 15 minutes prior to the withdrawal of control rods to bring the reactor to criticality.

4.4.6.1.3 The reactor material irradiation surveillance specimens shall be removed and examined to determine changes in material properties at the intervals shown in ~~Table 4.4.6.1.3-1~~. The results of these examinations shall be used to update ~~figures 3.4.6.1-1, 3.4.6.1-2, 3.4.6.1-3a, 3.4.6.1-3b, and 3.4.6.1-3c,~~ as applicable. The cumulative effective full power years shall be determined at least once per 18 months.

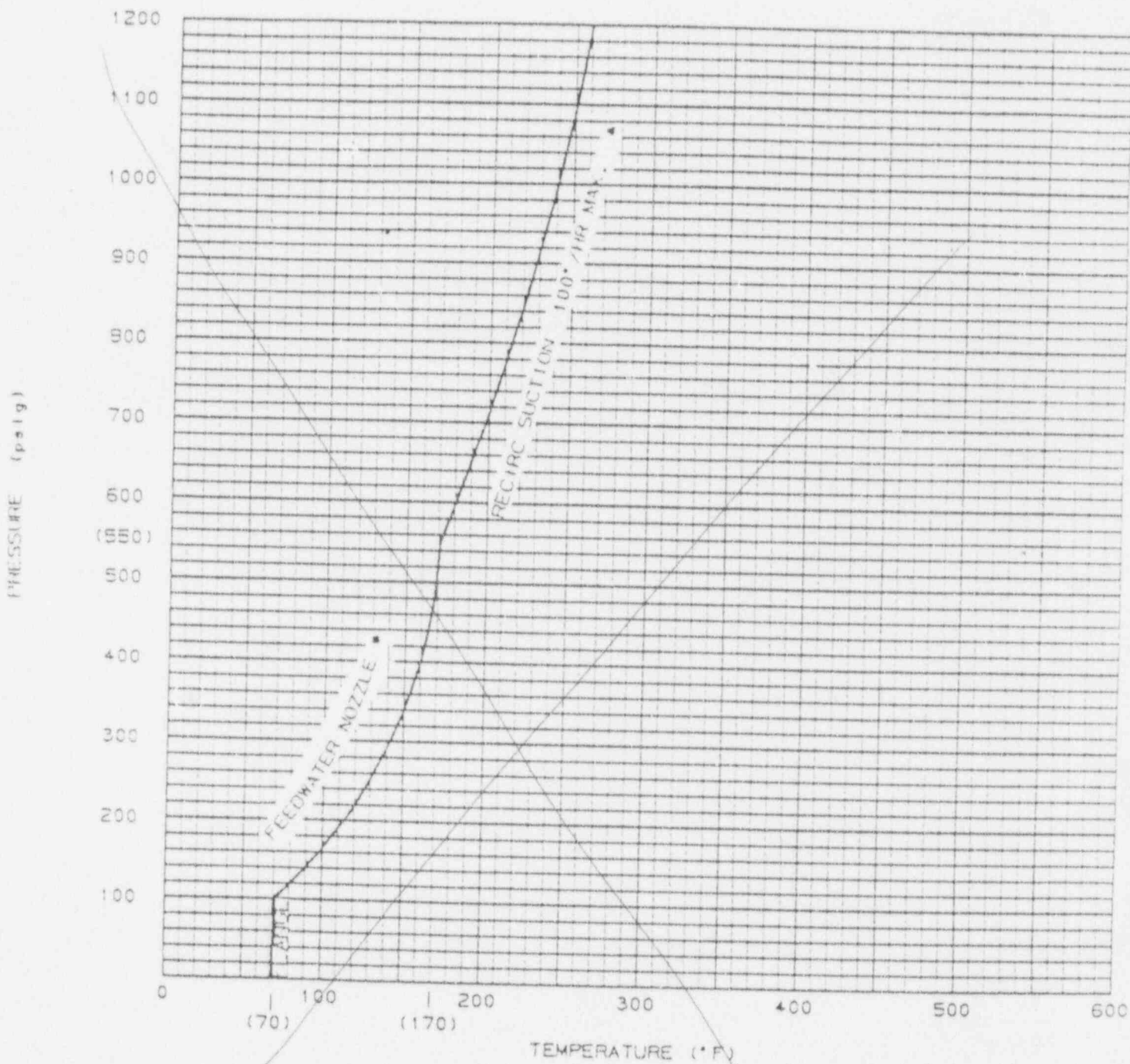
*the PTLR*

*the PTLR*

FIGURE 3.4.6.1-1  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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NORMAL OPERATION WITH CORE NOT CRITICAL



BASES:

1. FUEL IN REACTOR
2.  $\leq 16$  EFPY
3.  $7.1 \times 10^{17}$  N/CM<sup>2</sup> > 1 MEV
4. RT<sub>NDT</sub> = 93° (1/4 T)
5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
6. REG. GUIDE 1.99 REV. 2

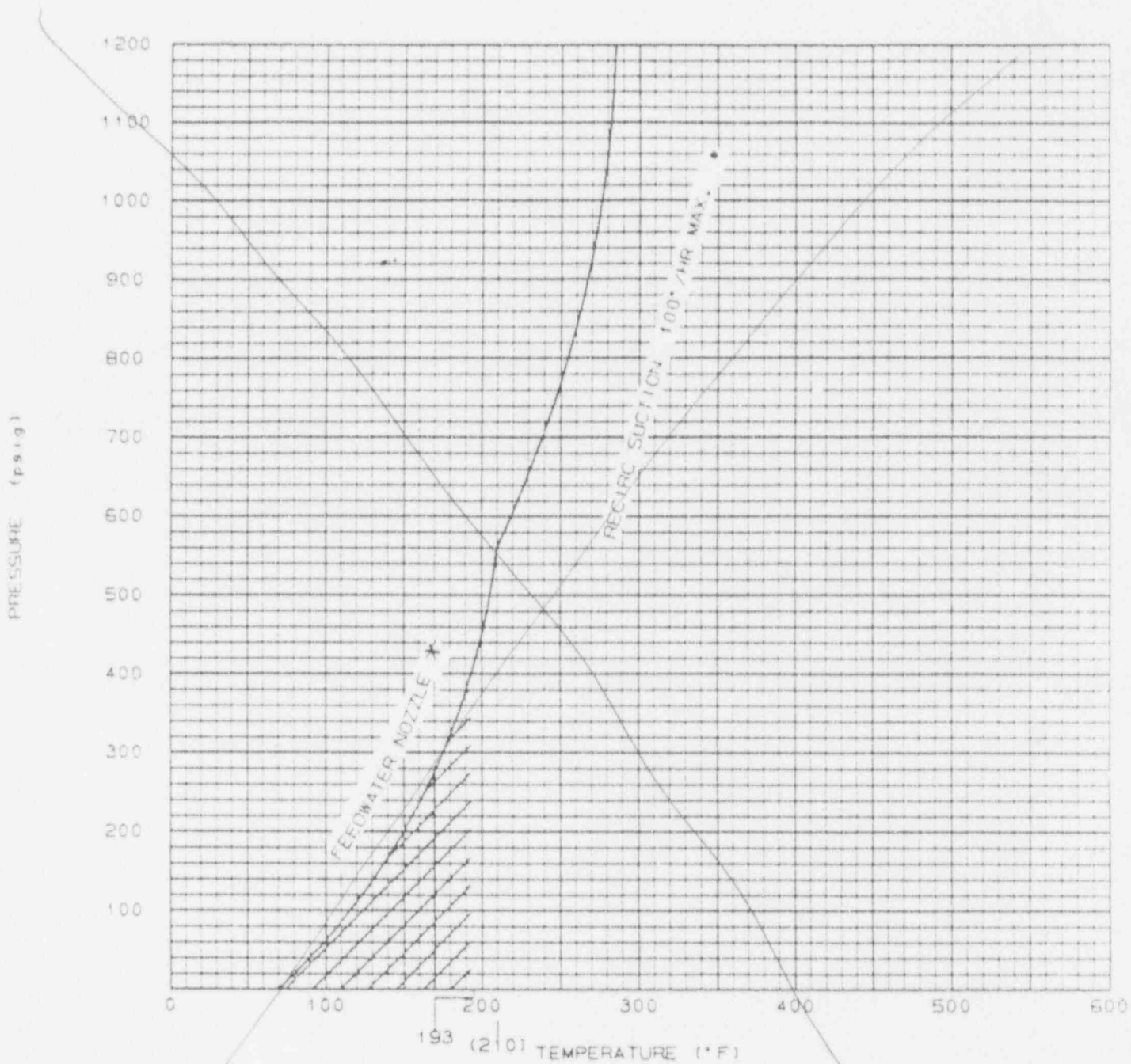
NOTES:

1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES

FIGURE 3.4.6.1-2  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

NORMAL OPERATION WITH CORE CRITICAL

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BASES:

1. FUEL IN REACTOR
2.  $\leq 16$  EFPPY
3.  $7.1 \times 10^{17}$  N/CM<sup>2</sup>  $> 1$  MEV
4.  $R_{1,NDT} = 93^\circ (1/4 T)$
5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
6. REG. GUIDE 1.99 REV. 2

NOTES:

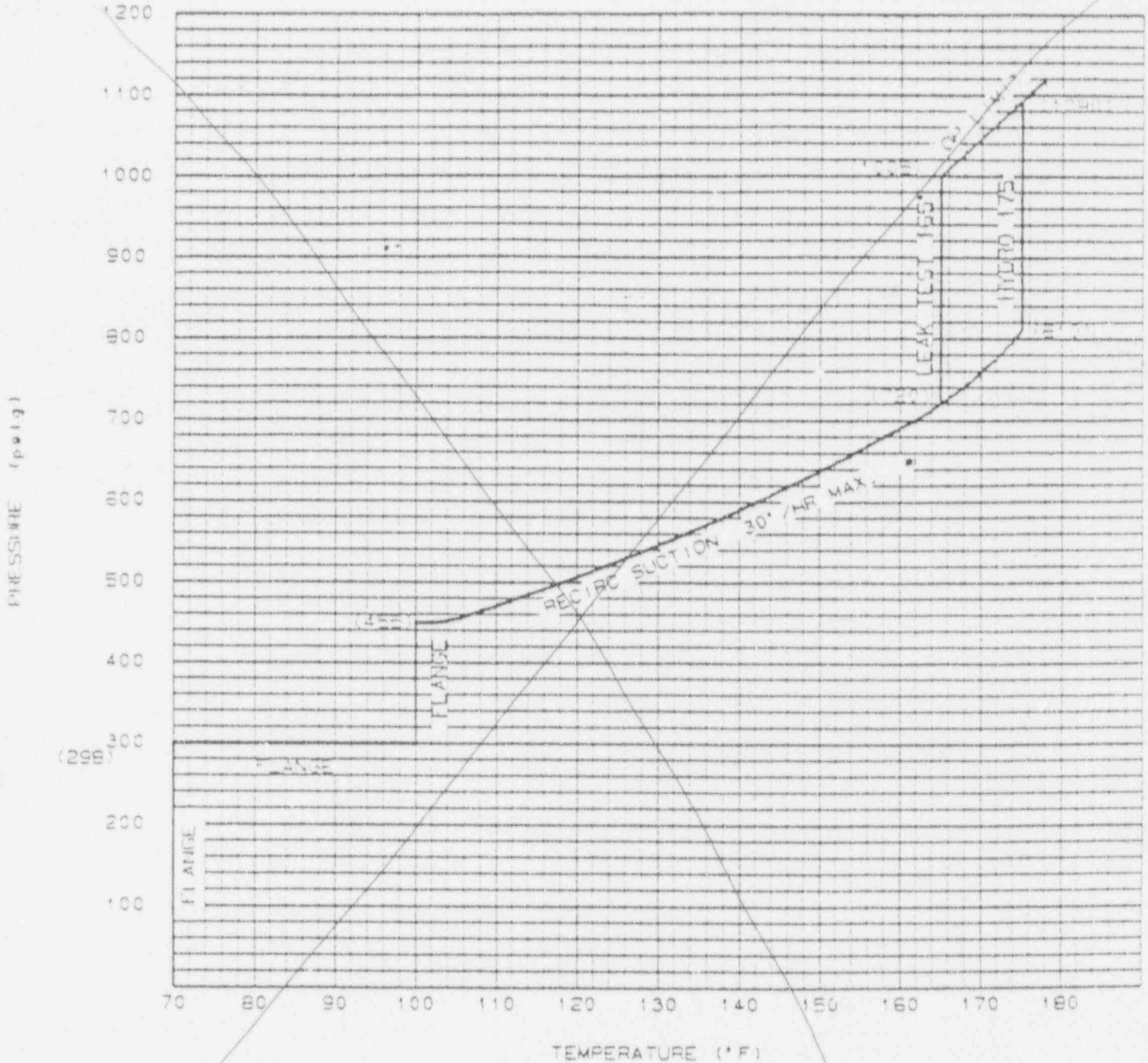
1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
4. OPERATION IN CROSS-HATCHED AREA PERMITTED ONLY WHEN WATER LEVEL IS WITHIN NORMAL RANGE FOR POWER OPERATION



FIGURE 3.4.6.1-3a  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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HYDROSTATIC AND LEAK TESTS



BASES:

1. FUEL IN REACTOR
2. REACTOR NOT CRITICAL
3. REG. GUIDE 1 99 REV. 2
4.  $\leq 8$  EFPY
5.  $3.5 \times 10^{-11}$  N/CM<sup>2</sup> > 1 MEV
6. RT<sub>NDT</sub> = 77°C (1/4 T)
7. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED

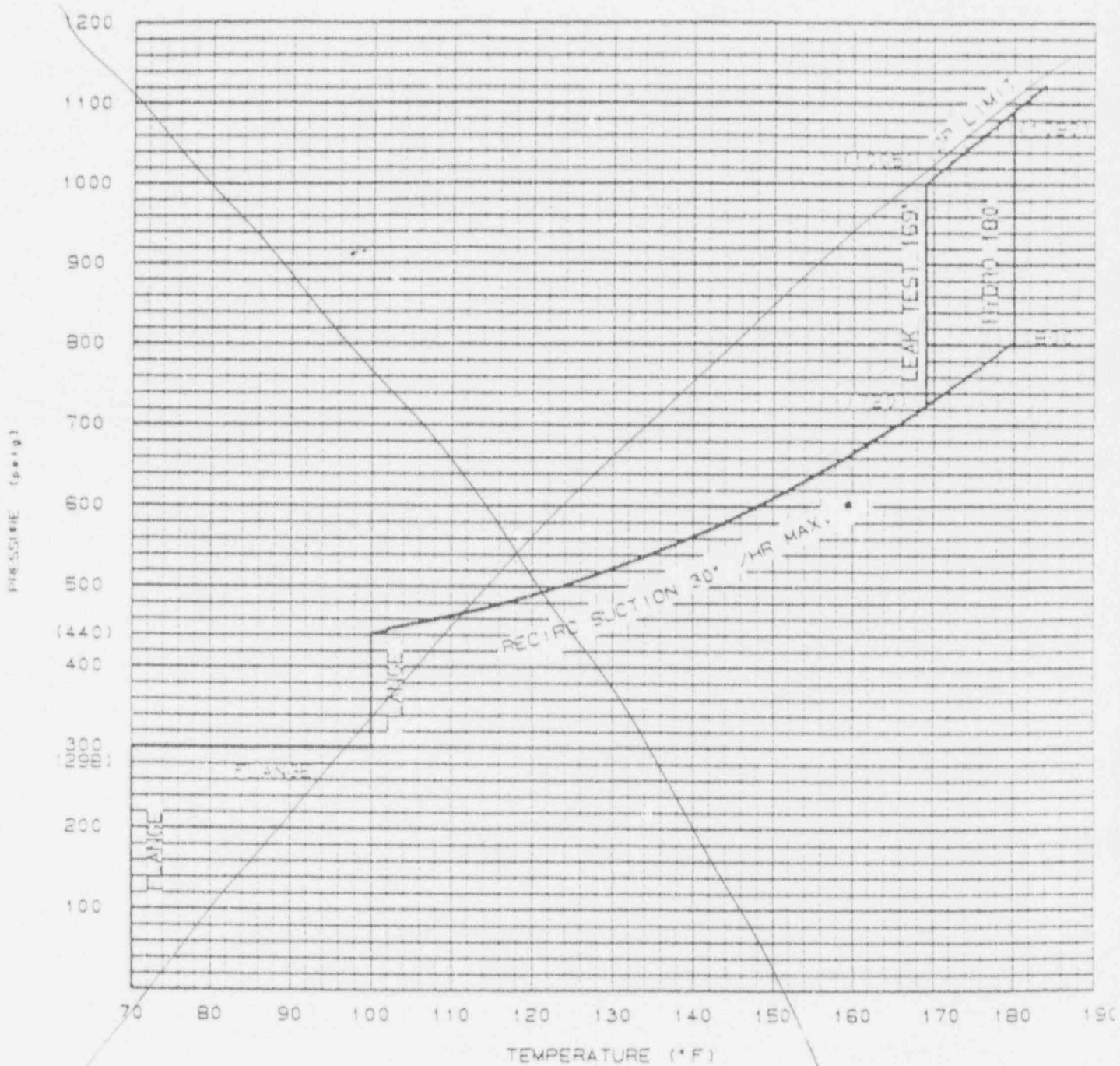
NOTES:

1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
4. \* OPERATING LIMIT INDICATES TEMPERATURE REQUIRED IF TEST PRESSURE WAS EXCEEDED.

FIGURE 3 4 6 1-3b  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL

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HYDROSTATIC AND LEAK TESTS

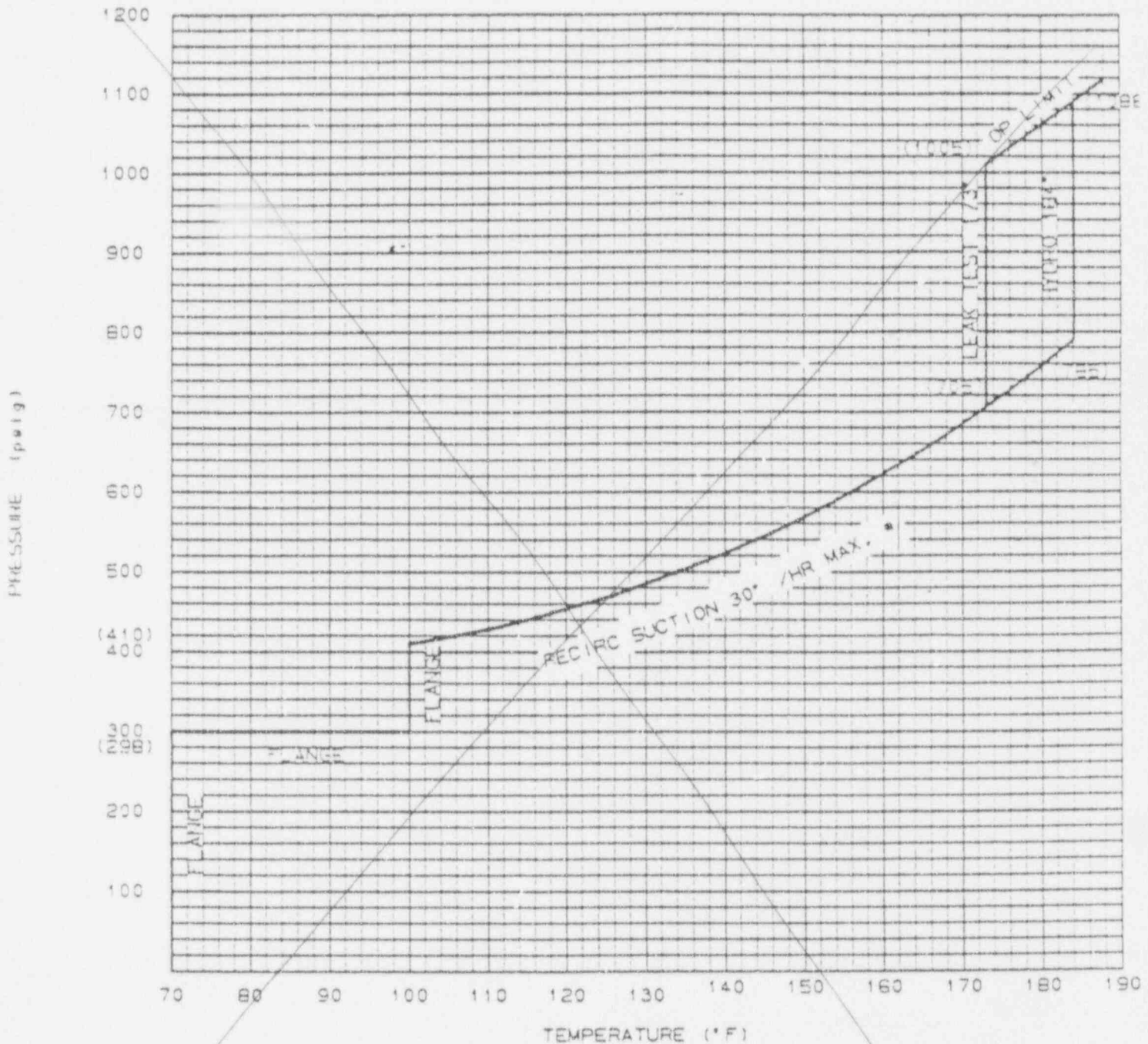


- BASES:
1. FUEL IN REACTOR
  2.  $\leq 10$  EFPPY
  3.  $4.4 \times 10^{17}$  N/CM<sup>2</sup>  $\geq 1$  MEV
  4. RT<sub>NO2</sub> = 82° (1/4 T)
  5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
  6. REG. GUIDE 1.99 REV. 2
  7. REACTOR NOT CRITICAL

- NOTES:
1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
  2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
  3. PRESSURE AND TEMPERATURE INTERSECTIONS NOTED BY PARENTHESES
  4. OPERATING LIMIT INDICATES TEMPERATURE REQUIRED IF TEST PRESSURE WAS EXCEEDED

FIGURE 3.4.6.1-3c  
 PRESSURE-TEMPERATURE LIMITS  
 REACTOR VESSEL  
 HYDROSTATIC AND LEAK TESTS

Delete



BASES:

1. FUEL IN REACTOR
2.  $\leq 12$  EFPY
3.  $5.3 \times 10^{17}$  N/CM<sup>2</sup> > 1 MEV
4. RT<sub>NDT</sub> = 86° (1/4 T)
5. 15 PSI INSTRUMENT LOCATION CORRECTION INCLUDED
6. REG. GUIDE 1.99 REV. 2
7. REACTOR NOT CRITICAL

NOTES:

1. OPERATE TO RIGHT AND/OR BELOW LIMITING LINES
2. \* INDICATES BOTH HEATUP AND COOLDOWN RATE
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TABLE 4.4.6.1.3-1

REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM CAPSULE WITHDRAWAL SCHEDULE

<u>CAPSULE NUMBER</u>	<u>VESSEL LOCATION</u>	<u>WITHDRAWAL TIME<sup>(a)</sup> (EFPY)</u>
3	300°	10
2	120°	(b)
1	30°	(b)

- (a) The specimen shall be withdrawn during refueling outage immediately preceding or following the specified withdrawal time.
- (b) The schedule for removal of the second and third capsule shall be proposed after the results of the first capsule have been evaluated.

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