Duke Power Company
Oconee Nuclear Station

Attachment 1

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3.1.2.7 Prior to exceeding fifteen (Unit 1)
fifteen (Unit 2)
fifteen (Unit 3)

effective full power years of operation.

Figures 3.1.2-1A (Unit 1), 3.1.2-2A (Unit 1)
3.1.2-1B (Unit 2), 3.1.2-2B (Unit 2)
3.1.2-1C (Unit 2), 3.1.2-2C (Unit 3)

and 3.1.2-3A (Unit 1)
3.1.2-3B (Unit 2)
3.1.2-3C (Unit 3)

and Technical Specification 3.1.2.1, 3.1.2.2 and 3.1.2.3 shall be updated for the next service period in accordance with 10 CFR 50, Appendix G, Section V.B. and V.E.

3.1.2.8 The updated proposed technical specification referred to in 3.1.2.7 shall be submitted for NRC review at least 90 days prior to the end of the service period for Units 1, 2 and 3.

3.1.2.9 Two trains of the low temperature overpressure protection (LTOP) system shall be operable.

1. One LTOP train is comprised of the PORV with a lift setting of $\leq$ 500 psig for Units 1 and 2, $\leq$ 480 psig for Unit 3. The PORV shall be operable when:

   a) The temperature of one or more of the RCS cold legs is $\leq$ 325°F, and

   b) When RCS pressure is $\geq$ 100 psig or HPI pumps are operating.

2. The second LTOP train is comprised of the controls which assure that 10 minutes are available for operator action to mitigate an LTOP event. The second LTOP train shall be operable when the temperature of one or more of the RCS cold legs is $\leq$ 325°F and a RCS vent path equivalent to the PORV is not open. The following controls comprise the second LTOP train:

   a) RCS pressure is limited to $\leq$ 350 psig for Units 1 and 2, $\leq$ 345 psig for Unit 3 below an RCS temperature of 220°F.

   b) Deactivating train A and B of HPI.

   c) Deactivating both core flood tanks.

   d) Pressurizer level shall be controlled such that 10 minutes are available for operator action to mitigate an LTOP event.

e) Makeup flow shall be restricted such that 10 minutes are available for operator action to mitigate an LTOP event.

f) Alarms shall be provided such that 10 minutes are available for operator action to mitigate an LTOP event.

3. a.1 If the PORV is inoperable, the PORV shall be returned to operable status or the RCS shall be heated above 325°F within 24 hours.

a.2 If the provisions of a.1 above cannot be fulfilled, the RCS shall be depressurized to < 100 psig and HPI shall be removed from service within the next 12 hours.

b. If the second LTOP train is inoperable, action shall be initiated to restore the second train to operable status and compensatory measures shall be provided to monitor for initiation of an LTOP event within 4 hours.

Bases - Units 1, 2 and 3

All components in the Reactor Coolant System are designed to withstand the effects of cyclic loads due to system temperature and pressure changes. These cyclic loads are introduced by normal load transients, reactor trips, startup and shutdown operations, and inservice leak and hydrostatic tests. The various categories of load cycles used for design purposes are provided in Table 5.2-1 of the FSAR.

The major components of the reactor coolant pressure boundary have been analyzed in accordance with Appendix G to 10 CFR 50. Results of this analysis, including the actual pressure-temperature limitations of the reactor coolant pressure boundary, are given in BAW-1699 and BAW-1697.

The Figures specified in 3.1.2-1, 3.1.2-2 and 3.1.2-3 present the pressure-temperature limit curves for normal heatup, normal cooldown and hydrostatic tests respectively. The limit curves are applicable up to the indicated effective full power years of operation. These curves are adjusted by 25 psi and 10°F for possible errors in the pressure and temperature sensing instruments. The pressure limit is also adjusted for the pressure differential between the point of system pressure measurement and the limiting component for all operating reactor coolant pump combinations.

The cooldown limit curves are not applicable to conditions of off-normal operation (e.g., small LOCA and extended loss of feedwater) where cooling is achieved for extended periods of time by circulating water from the HPI through the core. If core cooling is restricted to meet the cooldown limits under other than normal operation, core integrity could be jeopardized.

The pressure-temperature limit lines shown on the figures specified in 3.1.2-1 for reactor criticality and one the figures referred to in 3.1.2-3 for hydrostatic testing have been provided to assure compliance with the minimum temperature requirements of Appendix G to 10 CFR 50 for reactor criticality and for inservice hydrostatic testing.

The actual shift in RT_{NDT} of the beltline region material will be established periodically during operation by removing and evaluating, in accordance with Appendix H to 10 CFR 50, reactor vessel material irradiation surveillance specimens which are installed near the inside wall of this or a similar reactor vessel in the core region, or in test reactors.

The limitations on steam generator pressure and temperature provides protection against nonductile failure of the secondary side of the steam generator. At metal temperatures lower than the RT_{NDT} of +60°F, the protection against nonductile failure is achieved by limiting the secondary coolant pressure to 20 percent of the preoperational system hydrostatic test pressure.

The limitations of 110°F and 237 psig are based on the highest estimated RT_{NDT} of +40°F and the preoperational system hydrostatic test pressure of 1312 psig. The average metal temperature is assumed to be equal to or greater than the coolant temperature. The limitations include margins of 25 psi and 10°F for possible instrument error.

The requirements to perform leakage tests of systems outside of containment which could potentially contain radioactivity were established by the NRC following TMI. Oconee performs the leak test of LPI by establishing RCS pressure at about 300 psig and with LPI at this same pressure, checking for leakage. Such a test is within the scope of testing upon which the curves referenced in Specification 3.1.2.2 are based--that is, they are not routine evolutions, such as heatup and cooldown, but rather infrequent leak tests conducted on a refueling outage basis. As such, the hydrostatic/leak test pressure-temperature limitations are applicable for the RCS when performing leak tests of the LPI system.

The spray temperature difference is imposed to maintain the thermal stresses at the pressurized spray line nozzle below the design limit.

The reactor vessel is protected against damage due to excessive pressures at low temperatures by the Low Temperature Overpressure Protection (LTOP) System. LTOP vulnerability is assumed when RCS cold leg temperature is ≤ 325°F and a RCS vent path equivalent to the PORV is not open.

The LTOP System consists of two trains. One train is the pressurizer PORV calibrated to a low setpoint of less than or equal to 500 psig for Units 1 and 2 and 480 psig for Unit 3. The PORV block valve must be open for the PORV to be operable. The capacity of the pressurizer PORV is sufficient to maintain the RCS pressure below the appropriate brittle fracture pressure limits during LTOP events in which boiling does not occur in the core. The remaining train is operator action and is based on an operating philosophy that precludes the plant from being in a water solid condition (except for system hydrotests). The fact that the Oconee units are operated with a steam or gas space in the pressurizer allows sufficient time for operator action to terminate an LTOP event prior to exceeding the appropriate brittle fracture pressure limits. Assuming an LTOP event was to occur at Oconee, and a single failure disables either train, the remaining train must be capable of maintaining RCS pressure below the appropriate brittle fracture pressure limits.

The Oconee LTOP System provides protection from pressure transients at low temperatures, by limiting the pressure of such a transient to below the limits set by 10CFR 50 Appendix G utilizing a conservative safety factor of 1.5. In addition, the following conditions are imposed by the NRC for the evaluation of the acceptability of LTOP Systems:

a. The most limiting initial conditions must be used.
b. The most limiting single failure, distinct from the initiating event, must be used.
c. No credit can be taken for mitigative operator action until 10 minutes after the operators become aware that a pressure transient is in progress.

For the Oconee units, the most limiting single failure is failure of the single pressurizer PORV to open at its low pressure setpoint. Operator awareness is assumed to be achieved by actuation of control room alarms. The following scenarios have the potential to result in an LTOP event:

1) Makeup Control Valve (HP-120) fails full open.

2) Erroneous opening of a core flood tank (CFT) discharge valve.

3) Erroneous actuation of the HPI system.

4) All pressurizer heaters erroneously energized.

5) Temporary loss of decay heat removal.

6) Thermal expansion of the RCS after starting an RCP due to stored energy in the steam generator.

Specification 3.1.2.9.2 requires that both CFTs and both HPI trains be isolated from the RCS, thus preventing these scenarios. Physical restriction of makeup flow, control of pressurizer level, and alarms ensure that at least 10 minutes are available for operator action to mitigate the remaining events.

In order to assure 10 minutes are available for operator action, the operational restrictions of Specification 3.1.2.9.2 must be implemented:

Deactivating train A of HPI is accomplished by one of the following methods:

1) Shutting and deactivating valve HP-26 by tagging open the valve breaker and tagging the valve handwheel in the closed position, shutting valve HP-410 and tagging the valve switch in the closed position.
2) Deactivating all HPI pumps aligned to A HPI train and tagging the pump breakers open.

Deactivating train B of HPI is accomplished by one of the following methods:

1) Shutting and deactivating valve HP-27 by tagging open the valve breaker and tagging the valve handwheel in the closed position, shutting valve HP-409 and tagging the valve switch in the closed position.
2) Deactivating all HPI pumps aligned to B HPI train and tagging the pump breakers open.

Deactivating both core flood tanks is accomplished by shutting valves CF-1 and CF-2, tagging open the valve breaker, and tagging the valves in the closed position. Alternately, core flood tanks may be deactivated by maintaining core flood tank pressure below the maximum allowable RCS pressure for the existing RCS temperature (per Figures 3.1.2-1 and 3.1.2-2).

Makeup flow must be restricted such that 10 minutes are available for operator action to mitigate the event.

Audible alarms must be provided such that 10 minutes are available for operator action to mitigate the event.

The intent of the action statements provided in Specification 3.1.2.9.3 is to place the reactor vessel in a condition in which it is not vulnerable to a LTOP event via the safest and most prompt course of action. In some cases, it may be more prudent to heat up above 325°F (cold leg temperature) rather than depressurize and open an RCS vent.

The allowable outage times (AOTs) provided in Specification 3.1.2.9.3 have been established based on the following considerations:

a. The most rapid LTOP scenarios exist with HPI pumps in operation, or with RCS pressure $\geq$ 100 psig. As such, the 24 hour AOT is sufficiently brief to assure a minimal period of operation while vulnerable to a single failure of the PORV.

b. In the event of '2nd train' inoperabilities, a time period of 4 hours is sufficient to return the train to operable status or to implement the compensatory measures.

REFERENCES

(1) Analysis of Capsule OCII-E from Duke Power Company Oconee Unit 2 Reactor Vessel Materials Surveillance Program, BAW-2051, October, 1988.

(2) Analysis of Capsule OCIII-B from Duke Power Company Oconee Unit 3 Reactor Vessel Materials Surveillance Program, BAW-1697, October, 1981.

(3) Analysis of Capsule OCI-C from Duke Power Company Oconee Unit 1 Reactor Vessel Materials Surveillance Program, BAW-2050, October, 1988.

TABLE 3.1-1

OPERATIONAL SPECIFICATIONS FOR PLANT HEATUP

I. RC Temperature Constraints

RC Temperature(1)	Maximum Heatup Rate
$T \leq 280°F$	50°F/HR
$T > 280°F$	100°F/HR

II. RC Pump Constraints

RC Temperature(1)	Allowed Pump Combination
$T > 250°F$	Any
$T \leq 250°F$	No more than 1 pump per loop

(1) RC Temperature is cold leg temperature if one or more RC pumps are in operation; otherwise it is the LPI cooler outlet temperature.

TABLE 3.1-2

OPERATIONAL SPECIFICATIONS FOR PLANT COOLDOWN

I. RC Temperature Constraints

RC Temperature(1)	Maximum Cooldown Rate(2)
T > 280°F	$\leq$ 50°F in any 1/2 hour period
150°F < T $\leq$ 280°F	$\leq$ 25°F in any 1/2 hour period
T $\leq$ 150°F	$\leq$ 10°F in any 1 hour period
RCS depressurized (3)	$\leq$ 50°F in any 1 hour period

II. RC Pump Constraints For Validity of Guidance

RC Temperature(1)	Allowed Pump Combinations
T > 270°F	Any
200°F < T $\leq$ 270°F	No more than 1 pump per loop
T $\leq$ 200°F	No more than 1 pump

(1) RC Temperature is cold leg temperature if one or more RC pumps are in operation or if on natural circulation cooldown; otherwise it is the LPI cooler outlet temperature.

(2) These rate limits must be applied to the change in temperature indication from cold leg temperature to LPI cooler outlet temperature per Note (1).

(3) When the RCS is depressurized such that all three of the following conditions exist:

a) RCS temperature < 200°F,
b) RCS pressure < 50 psig,
c) All RC Pumps off,

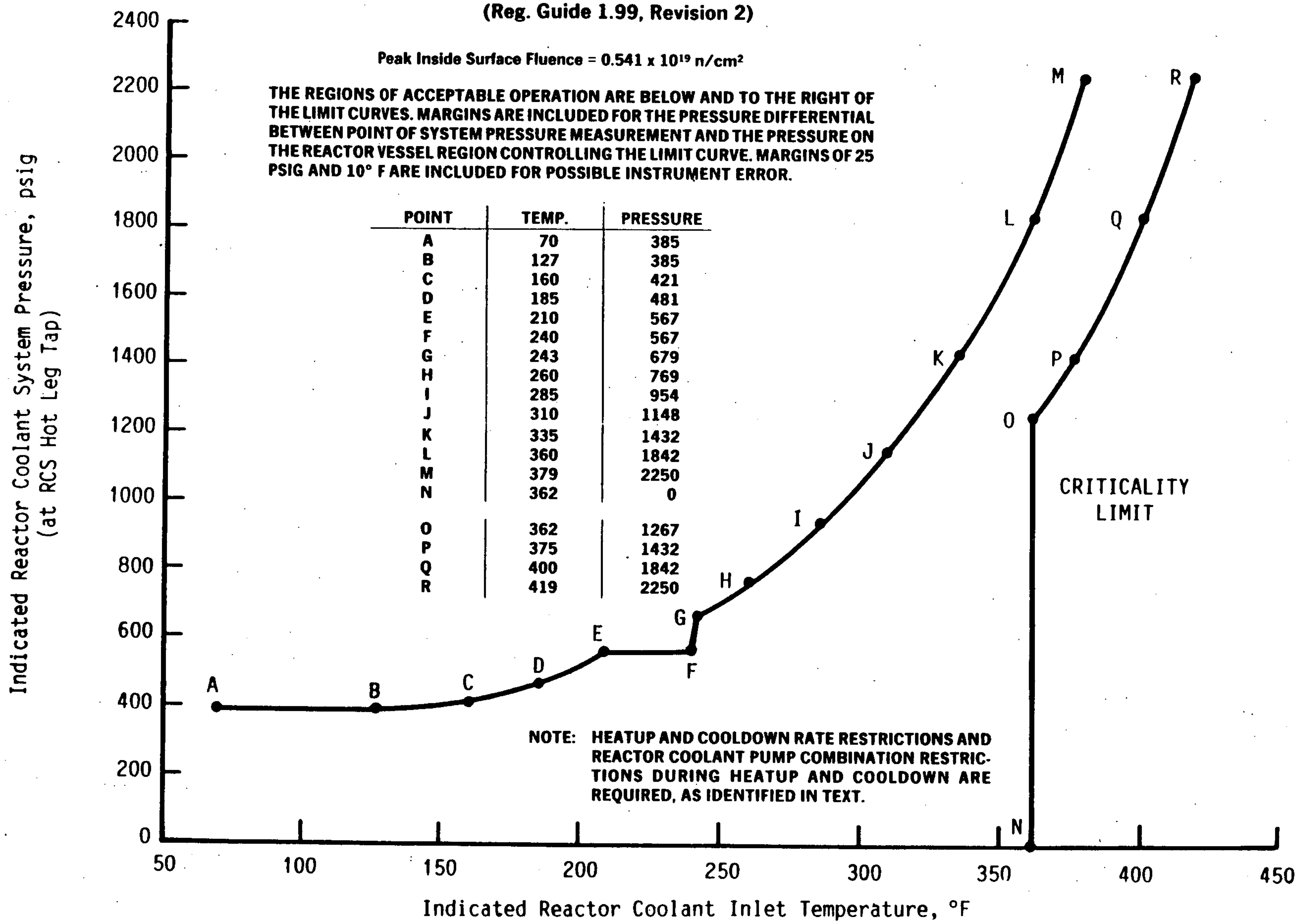
the maximum cooldown rate shall be relaxed to $\leq$ 50°F in any 1 hour period.

Unit 1 Oconee Nuclear Station
Reactor Coolant System Normal Operation Heatup
Limitations Applicable for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)

Peak Inside Surface Fluence = 0.541 x 10^{19} n/cm^2

THE REGIONS OF ACCEPTABLE OPERATION ARE BELOW AND TO THE RIGHT OF THE LIMIT CURVES. MARGINS ARE INCLUDED FOR THE PRESSURE DIFFERENTIAL BETWEEN POINT OF SYSTEM PRESSURE MEASUREMENT AND THE PRESSURE ON THE REACTOR VESSEL REGION CONTROLLING THE LIMIT CURVE. MARGINS OF 25 PSIG AND 10° F ARE INCLUDED FOR POSSIBLE INSTRUMENT ERROR.

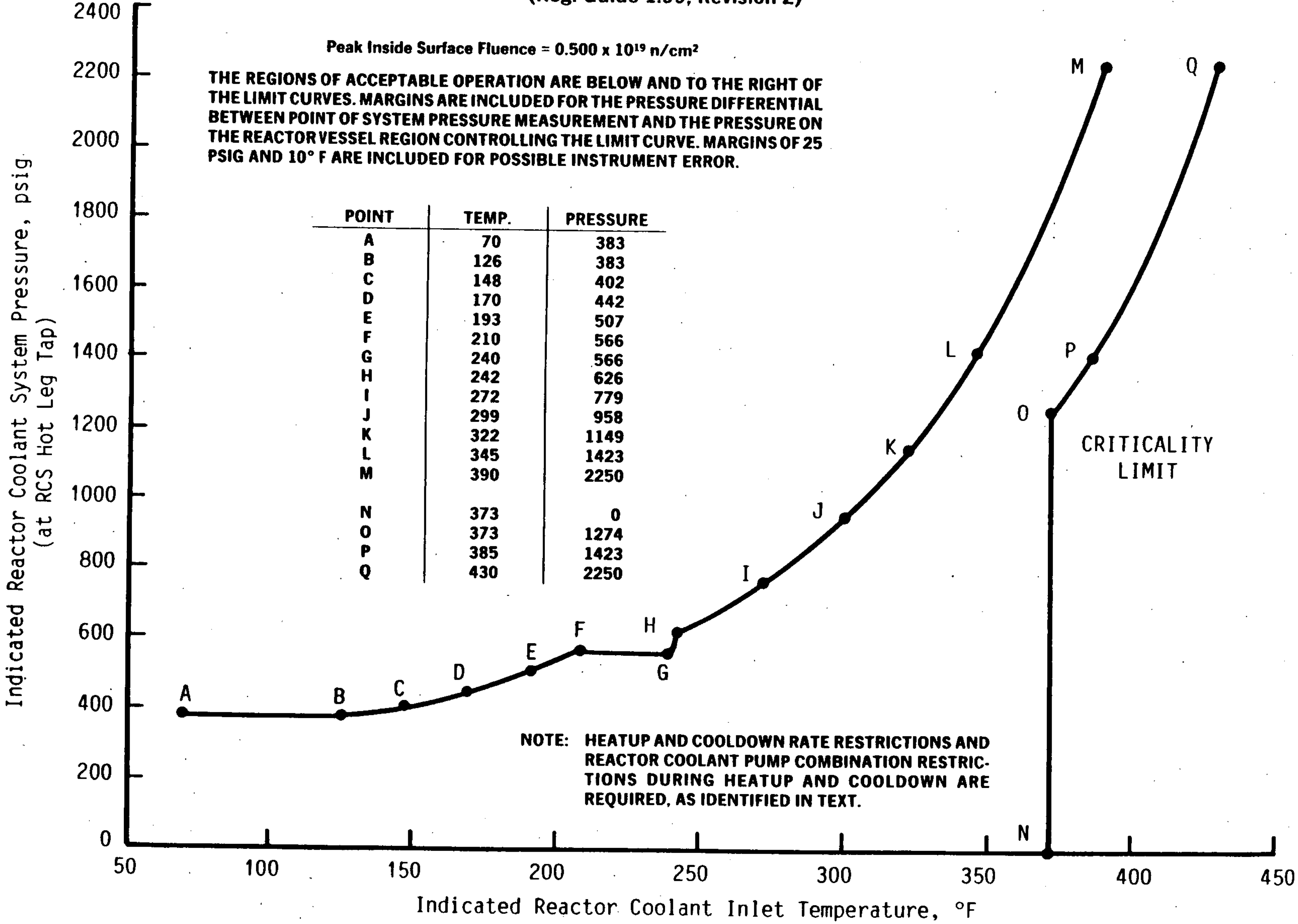
POINT	TEMP.	PRESSURE
A	70	385
B	127	385
C	160	421
D	185	481
E	210	567
F	240	567
G	243	679
H	260	769
I	285	954
J	310	1148
K	335	1432
L	360	1842
M	379	2250
N	362	0
O	362	1267
P	375	1432
Q	400	1842
R	419	2250



NOTE: HEATUP AND COOLDOWN RATE RESTRICTIONS AND REACTOR COOLANT PUMP COMBINATION RESTRICTIONS DURING HEATUP AND COOLDOWN ARE REQUIRED, AS IDENTIFIED IN TEXT.

Figure 3.1.2-1A

Unit 2 Oconee Nuclear Station
Reactor Coolant System Normal Operation
Heatup Limitations Applicable for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	383
B	126	383
C	148	402
D	170	442
E	193	507
F	210	566
G	240	566
H	242	626
I	272	779
J	299	958
K	322	1149
L	345	1423
M	390	2250
N	373	0
O	373	1274
P	385	1423
Q	430	2250

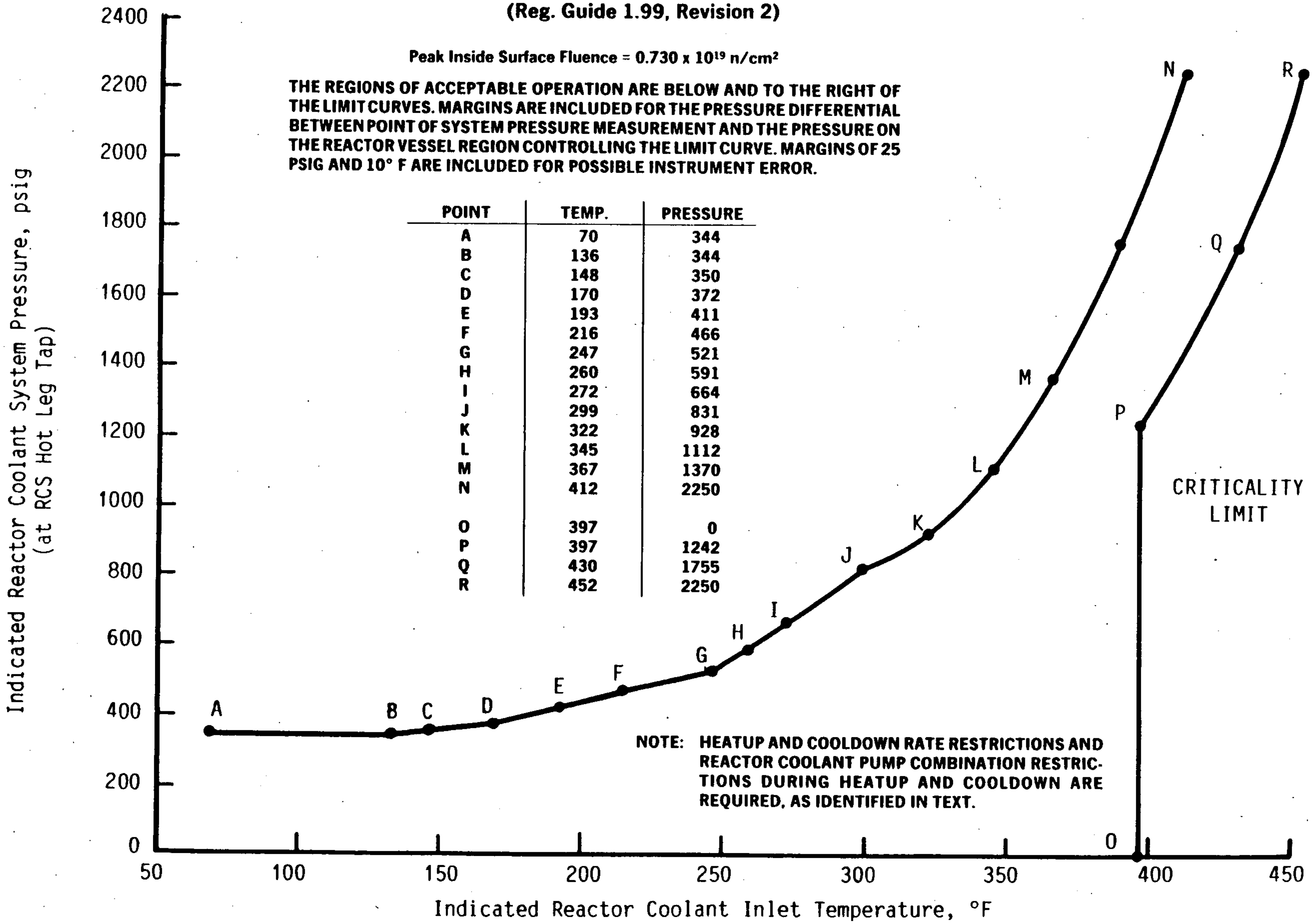
Figure 3.1.2-1B

Unit 3 Oconee Nuclear Station
Reactor Coolant System Normal Operation Heatup
Limitations Applicable for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)

Peak Inside Surface Fluence = 0.730 x 10^{19} n/cm^2

THE REGIONS OF ACCEPTABLE OPERATION ARE BELOW AND TO THE RIGHT OF THE LIMIT CURVES. MARGINS ARE INCLUDED FOR THE PRESSURE DIFFERENTIAL BETWEEN POINT OF SYSTEM PRESSURE MEASUREMENT AND THE PRESSURE ON THE REACTOR VESSEL REGION CONTROLLING THE LIMIT CURVE. MARGINS OF 25 PSIG AND 10° F ARE INCLUDED FOR POSSIBLE INSTRUMENT ERROR.

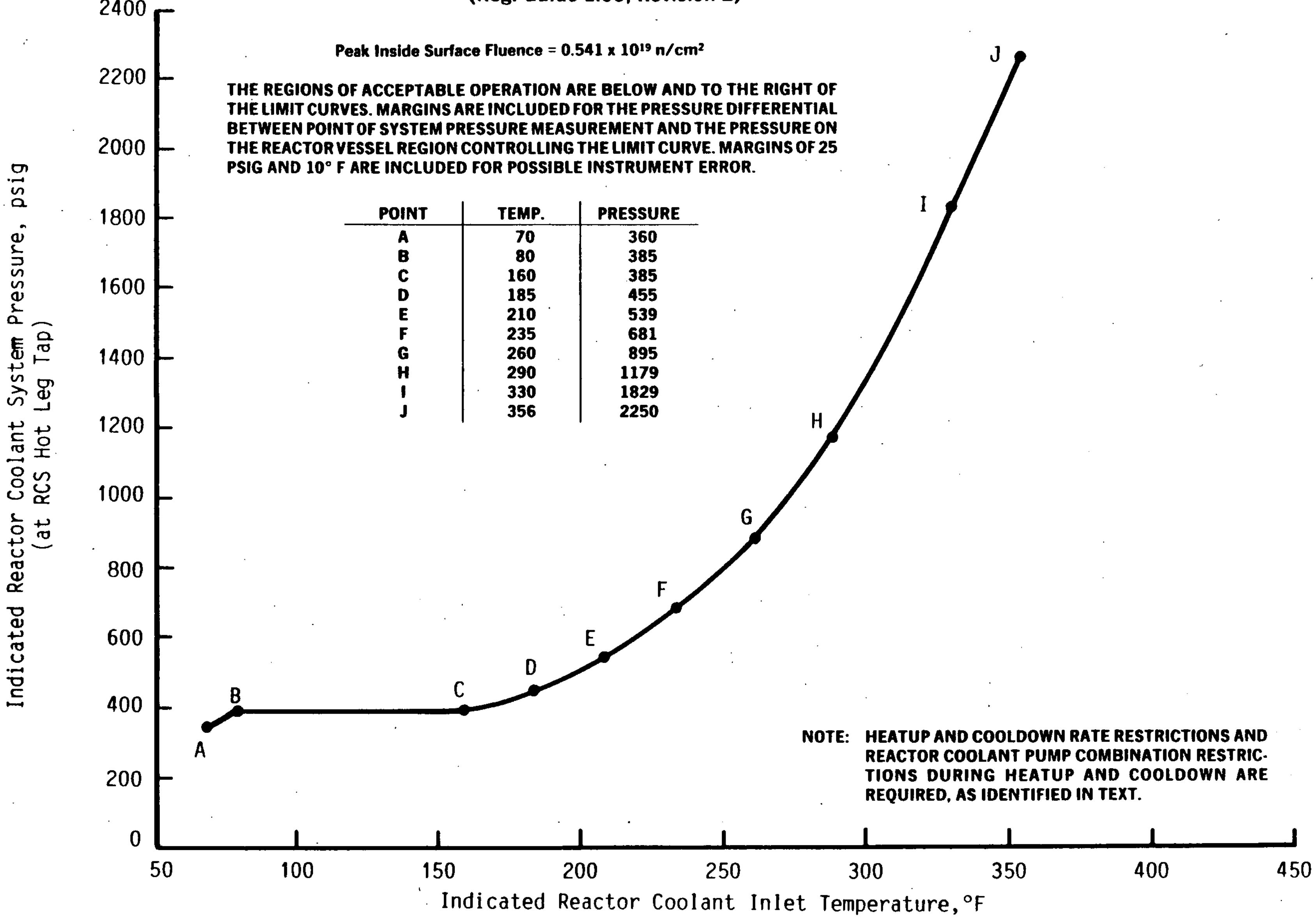
POINT	TEMP.	PRESSURE
A	70	344
B	136	344
C	148	350
D	170	372
E	193	411
F	216	466
G	247	521
H	260	591
I	272	664
J	299	831
K	322	928
L	345	1112
M	367	1370
N	412	2250
O	397	0
P	397	1242
Q	430	1755
R	452	2250



NOTE: HEATUP AND COOLDOWN RATE RESTRICTIONS AND REACTOR COOLANT PUMP COMBINATION RESTRICTIONS DURING HEATUP AND COOLDOWN ARE REQUIRED, AS IDENTIFIED IN TEXT.

Figure 3.1.2-1C

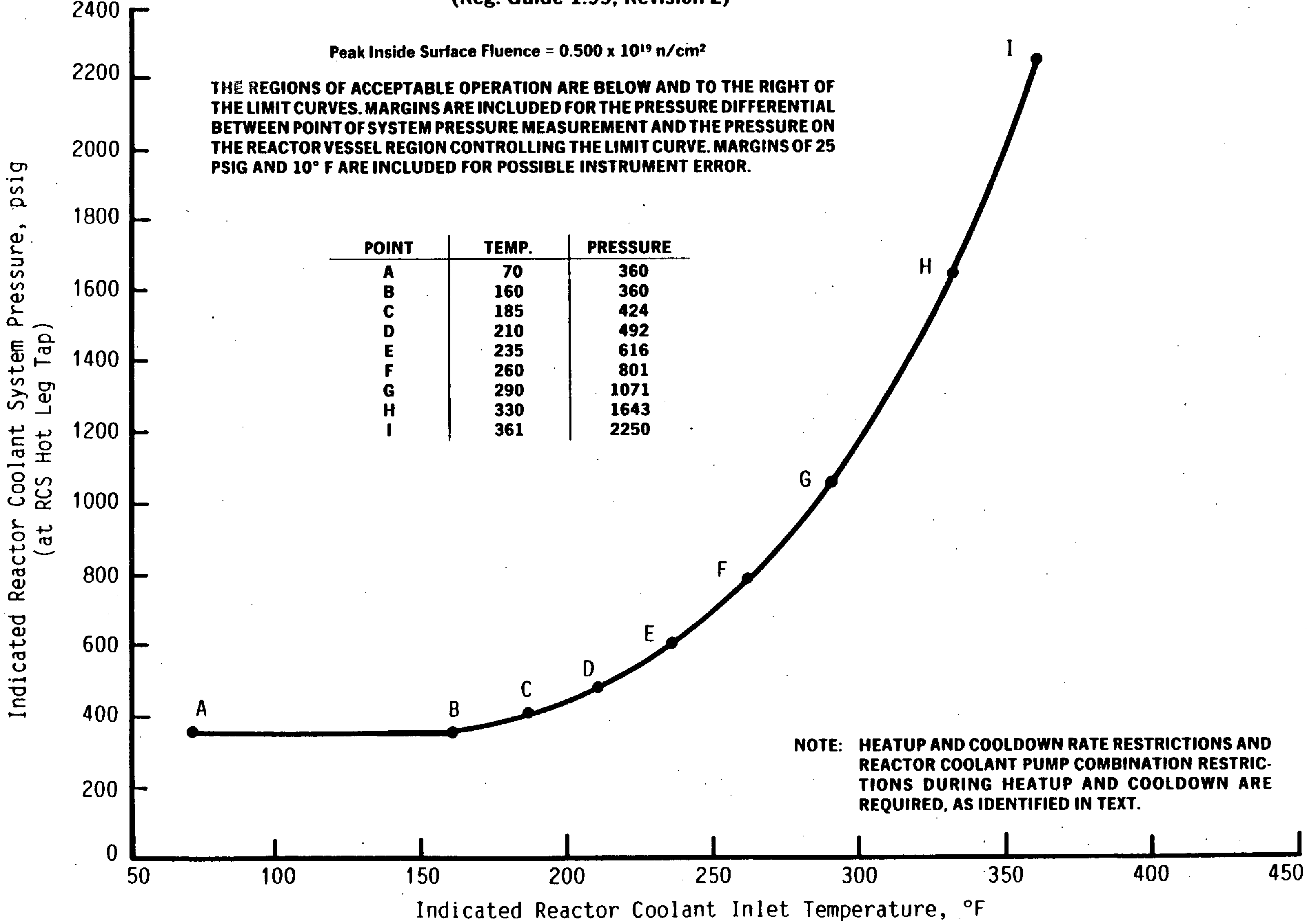
Unit 1 Oconee Nuclear Station
Reactor Coolant System Normal Operation
Cooldown Limitations Applicable for First 15 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	360
B	80	385
C	160	385
D	185	455
E	210	539
F	235	681
G	260	895
H	290	1179
I	330	1829
J	356	2250

Figure 3.1.2-2A

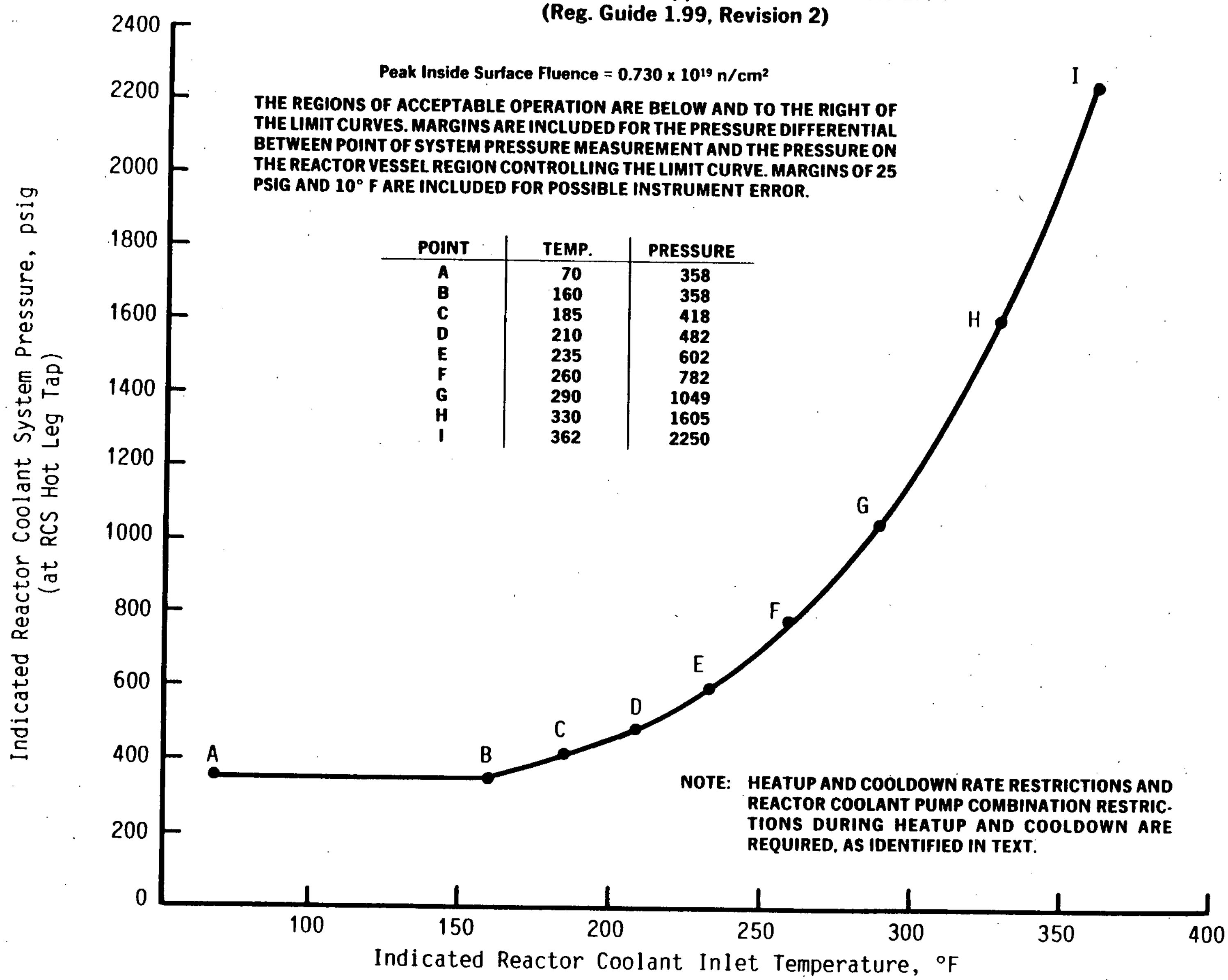
Unit 2 Oconee Nuclear Station
Reactor Coolant System Normal Operation Cooldown
Limitations Applicable for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	360
B	160	360
C	185	424
D	210	492
E	235	616
F	260	801
G	290	1071
H	330	1643
I	361	2250

Figure 3.1.2-2B

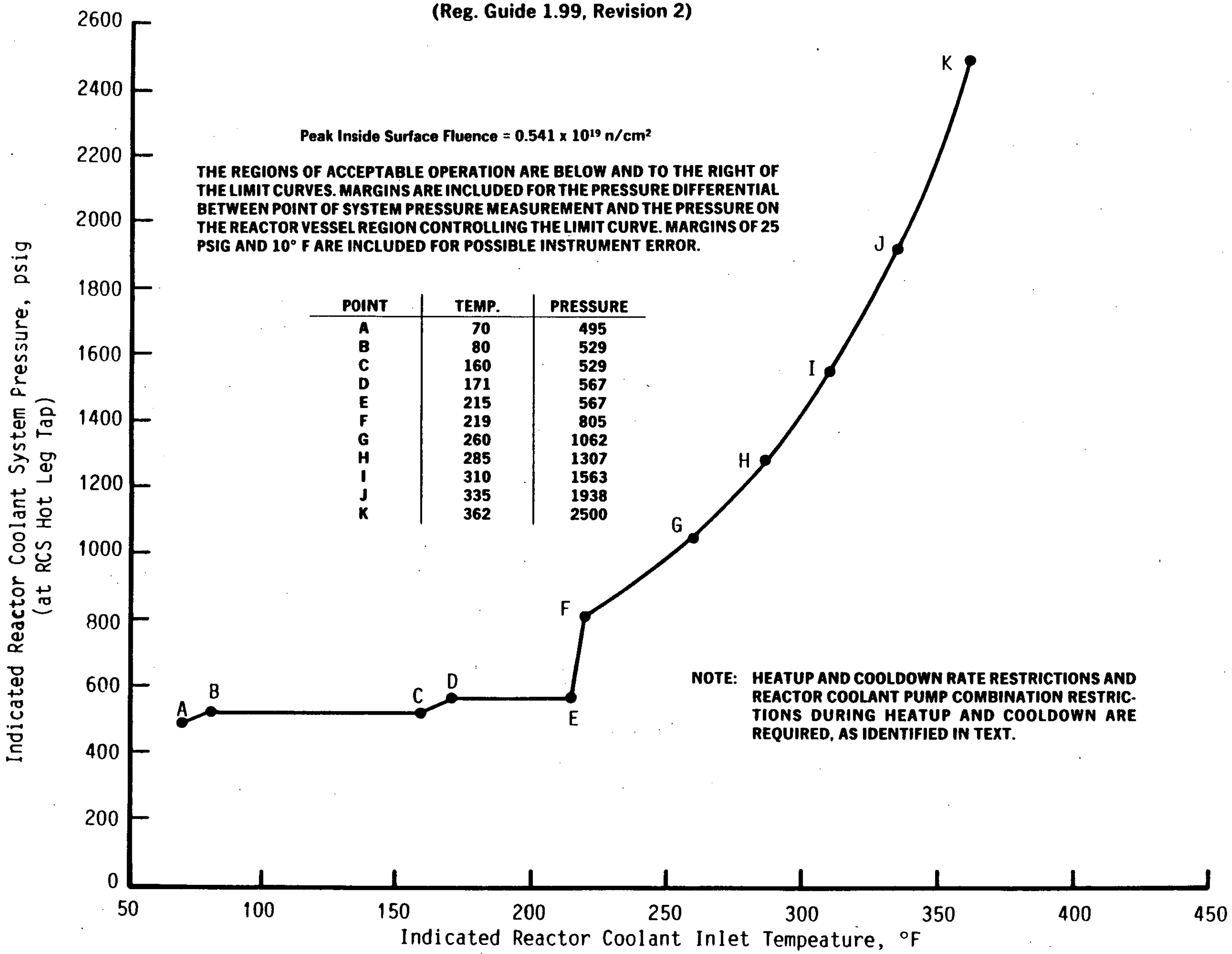
Unit 3 Oconee Nuclear Station
Reactor Coolant System Normal Operation Cooldown
Limitations Applicable for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	358
B	160	358
C	185	418
D	210	482
E	235	602
F	260	782
G	290	1049
H	330	1605
I	362	2250

Figure 3.1.2-2C

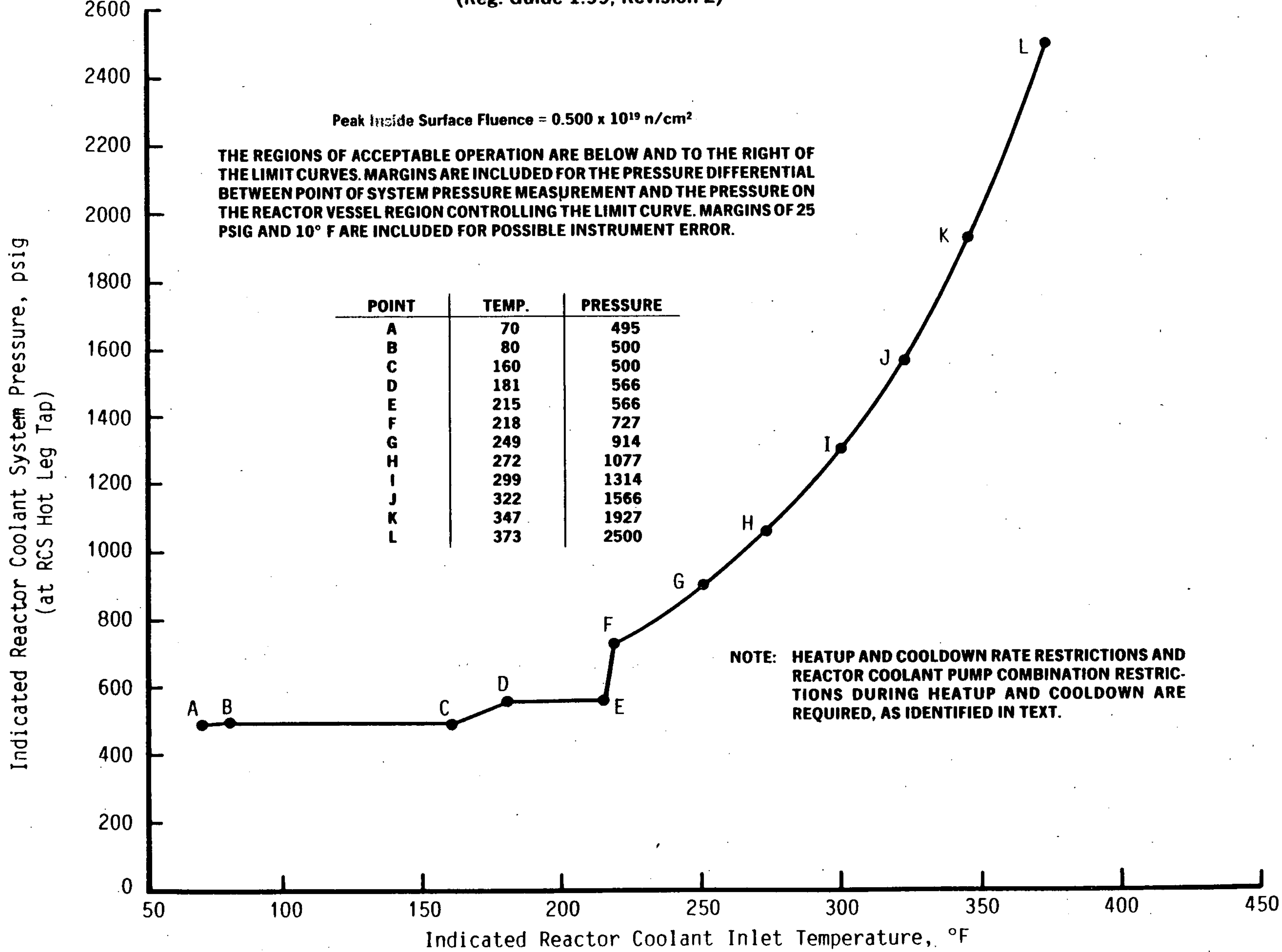
Unit 1 Oconee N[illegible] Station
Reactor Coolant S[illegible]n Inservice Leak and Hydrostatic Test
Heatup and Cooldown Limitation Applicable for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	495
B	80	529
C	160	529
D	171	567
E	215	567
F	219	805
G	260	1062
H	285	1307
I	310	1563
J	335	1938
K	362	2500

Figure 3.1.2-3A

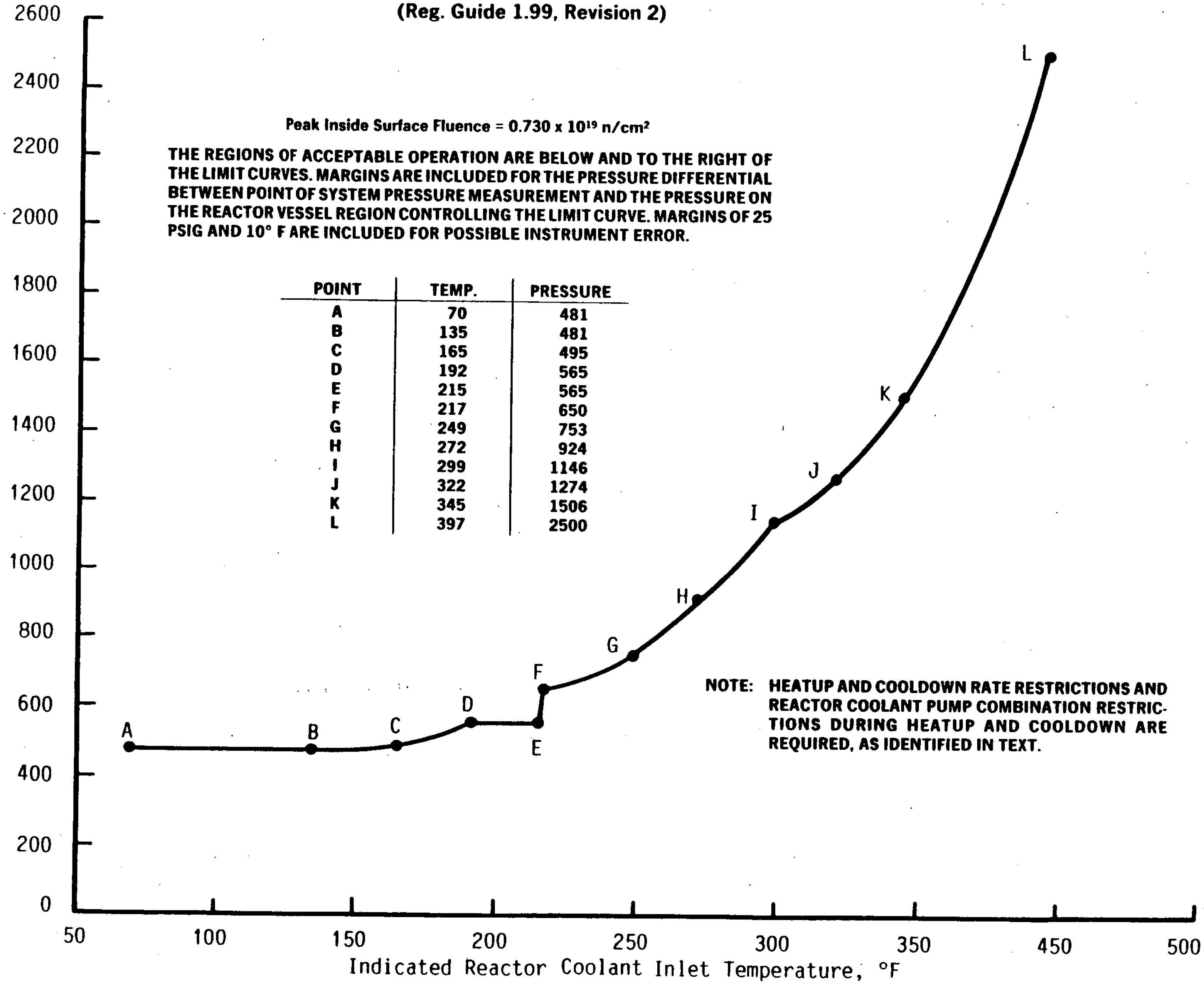
Unit 2 Oconee Nuclear Station
Reactor Coolant System Inservice Leak and Hydrostatic
Test Heatup and Cooldown Limitations Applicable for 15.0 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	495
B	80	500
C	160	500
D	181	566
E	215	566
F	218	727
G	249	914
H	272	1077
I	299	1314
J	322	1566
K	347	1927
L	373	2500

Figure 3.1.2-3B

Unit 3 Oconee [illegible]ear Station
Reactor Coola[illegible]stem Inservice Leak and Hydrostatic Test
Heatup and Cooldown Limitations for First 15.0 EFPY
(Reg. Guide 1.99, Revision 2)



POINT	TEMP.	PRESSURE
A	70	481
B	135	481
C	165	495
D	192	565
E	215	565
F	217	650
G	249	753
H	272	924
I	299	1146
J	322	1274
K	345	1506
L	397	2500

Figure 3.1.2-3C

Duke Power Company
Oconee Nuclear Station

Attachment 2

15 EFPY Pressure/Temperature Limits

Technical Justification

15 EFPY Pressure/Temperature Limits

Technical Justification

By letter dated July 12, 1988, the NRC issued Generic Letter (GL) 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and its Impact on Plant Operations." By letter dated January 31, 1989 Duke submitted the results of the technical analysis of Regulatory Guide (RG) 1.99, Rev. 2. This analysis indicated the need to revise the existing Technical Specification 15 EFPY Pressure/Temperature (P/T) limits. In addition, this analysis indicated the need to revise the Low Temperature Overpressure Protection (LTOP) system Technical Specifications.

As required by GL 88-11, P/T limits revised in accordance with RG 1.97, Rev. 2 are provided in Figure 3.1.2 (Attachment 1). In addition, operational limits for plant heatup (including additional reactor coolant pump constraints) and cooldown are provided in Tables 3.1-1 and 3.1-2 respectively. The methods and criteria employed to establish operating P/T limits are described in NRC approved topical report BAW-10046A, June 1986. Thus, the revised P/T limits and heatup and cooldown constraints provided in Attachment 1 prevent nonductile failure during any normal operating condition, including anticipated operational occurrences and system hydrostatic tests.

Data utilized to generate the P/T curves has been provided in the following capsule reports pursuant to 10CFR50, Appendix H:

- o BAW-2050, "Analysis of Capsule OCI-C Duke Power Company-Oconee Nuclear Station-Unit 1", October 1988.
- o BAW-2051, "Analysis of Capsule OCII-E Duke Power Company-Oconee Nuclear Station-Unit 2", October 1988.
- o BAW-1697, "Analysis of Capsule OCIII-B Duke Power Company-Oconee Nuclear Station-Unit 3", October 1981.

The objective of these limits is to prevent nonductile failure during any normal operating condition, including anticipated operation occurrences and system hydrostatic tests. The loading conditions of interest include the following:

1. Normal operations, including heatup and cooldown.
2. Inservice leak and hydrostatic tests.
3. Reactor core operation.

The major components of the RCPB have been analyzed in accordance with 10CFR50, Appendix G. The closure head region, the reactor vessel outlet nozzle, and the beltline region have been identified as the only regions of the reactor vessel (and consequently of RCPB) that require the pressure-temperature limits. Since the closure head region is significantly stressed at relatively low temperatures (due to mechanical loads resulting from bolt preload), this region largely controls the pressure-temperature limits of the first several service periods. The reactor vessel outlet nozzle also affects the pressure-temperature limit curves of the first several service periods. This is due to the high local stresses at the inside corner of the nozzle. After several years of neutron radiation exposure, the RT_{NDT} of the vessel beltline region materials will control the pressure-temperature limits of the RCPB.

The limit curves for Oconee 1, 2, and 3 are based on the predicted values of the adjusted reference temperature of the limiting beltline region material for each unit at the end of the fifteenth EFPY. The adjusted reference temperatures are calculated by adding the predicted radiation-induced RT_{NDT} to the initial RT_{NDT}. The predicted RT_{NDT} is calculated using the respective vessel's neutron fluence and chemistry. The predicted reactor vessel inside surface peak fluence value at 15 EFPY for each of the Oconee Units is summarized below. Regulatory Guide 1.99, Rev. 2, was used to predict the radiation-induced RT_{NDT} values as a function of the material's copper and nickel content and neutron fluence. using these fluence values and the vessel's chemistry, the adjusted RT_{NDT} values of the beltline region at the end of the fifteenth full-power year are provided below. The adjusted RT_{NDT} values are given for he 1/4T and 3/4T vessel wall locations (T = wall thickness). The assumed RT_{NDT} of the closure head region and the outlet nozzle steel forgings is 60F, in accordance with BAW-10046A.

Using the methodology documented in BAW-10046A, pressure-temperature limits for the closure head region, the outlet nozzle, and the beltline region were determined for the heatup and cooldown rates summarized in Attachment 1. Differential pressure corrections were then applied to the unadjusted P/T limits to account for the pressure differential between the analyzed regions of the reactor vessel and the system pressure sensor on the reactor coolant system based on the reactor coolant pump operational constraints also summarized in Attachment 1. Instrumentation errors for pressure and temperature were then applied. Finally, the maximum allowable pressure as a function of fluid temperature is obtained through a point-by-point comparison of the three limiting regions, corrected for sensor location and instrumentation error. The maximum allowable pressure is taken to be the lowest of the three calculated pressures. The resulting corrected data points determine the bounding P/T Technical Specification curves.

15 EFPY RV Inside Surface (Max Location)

Oconee 1: 0.541E19 n/cm^2

Oconee 2: 0.500E19 n/cm^2

Oconee 3: 0.730E19 n/cm^2

15 EFPY RT_{NDT}(s)

	1/4T (^{o}F)	3/4T (^{o}F)
Oconee 1:	184	140
Oconee 2:	193	139
Oconee 3:	195	171

Duke Power Company
Oconee Nuclear Station
Attachment 3

Low Temperature Overpressure Protection Technical Justification

Technical Justification
Low Temperature Overpressure Protection

I. BACKGROUND INFORMATION

General

This evaluation examines the effectiveness of the Low Temperature Overpressure Protection (LTOP) System in mitigating Reactor Coolant System (RCS) pressure increases during startup and shutdown conditions. The following scenarios have been identified as potential overpressure transients in the previous evaluations submitted by Duke Power Company (References 1 and 2):

1. Erroneous actuation of the High Pressure Injection (HPI) System.

2. Erroneous opening of the core flood tank discharge valve.

3. Erroneous addition of nitrogen to the pressurizer.

4. Makeup control valve (makeup to the RCS) fails full open.

5. All pressurizer heaters erroneously energized.

6. Temporary loss of the Decay Heat Removal (DHR) System's capability to remove decay heat from the RCS.

7. Thermal expansion of the RCS after starting a reactor coolant pump (RCP), as a result of stored thermal energy in the steam generators.

No additional scenarios have been identified. Each of these transients is examined in this evaluation.

The reactor vessel is protected from damage resulting from excessive pressures at low temperature conditions by the Low Temperature Overpressure Protection System. The LTOP System consists of two diverse trains. One train consists of the pressurizer power operated relief valve (PORV) with a dual lift pressure setpoint. The second train consists of operator action, assisted by administrative controls, alarms, and an operating philosophy that maintains a steam or gas bubble in the pressurizer during all modes of operation (except for during in-service hydrostatic testing). Either train is capable of maintaining the RCS pressure below the appropriate pressure-temperature limits. Each LTOP System train is discussed in detail below.

Pressurizer PORV Train

The pressurizer PORV has a dual setpoint for valve opening. During normal operation, the lift (opening) setpoint is 2450 psig. A lower PORV lift setpoint is used during startup and shutdown operations to provide overpressure protection. The lower setpoint is enabled by actuation of a switch in the control room whenever the RCS temperature is below 325°F. In order to prevent the LTOP pressure-temperature limits from being exceeded, the following PORV low pressure lift setpoints will be used:

1. For Units 1 and 2, the PORV lift setpoint is less than or equal to 500 psig.

2. For Unit 3, the PORV lift setpoint is less than or equal to 480 psig.

Operator Action Train

As reflected in the proposed revision to Technical Specification 3.1.2.9, the second LTOP train is comprised of the following controls to assure that 10 minutes are available for operator action to mitigate the event:

1. RCS pressure is limited to less than or equal to 350 psig (345 psig for Unit 3) when the RCS temperature is below 220°F. For temperatures between 220°F and 325°F, the RCS pressure is to remain below the pressurizer PORV low pressure setpoint, 500 psig (480 psig for Unit 3). Note that the RCS pressure is obtained from the RCS low range pressure indication, which measures the pressurizer pressure.

2. The pressurizer level is limited to less than or equal to 260 inches when the RCS temperature is above 220°F and below 325°F. The level is restricted to 220 inches for pressures above 100 psig and temperatures at or below 220°F. For pressures equal to or below 100 psig, the pressurizer level must be below 310 inches.

3. Below 250°F, no more than one RCP can be operating per RCS loop.

4. The A and B injection trains of the HPI System are deactivated. Cross-connect valves HP-409 and HP-410 are tagged closed, with the valve power supplies remaining available. Additional controls shall be provided to prevent inadvertent operation of these valves.

5. Both core flood tanks are deactivated, to prevent spurious injection.

6. HPI makeup flow is restricted such that at least 10 minutes are available for operator action to mitigate the event.

7. Alarms are provided such that at least 10 minutes exists between the actuation of the first alarm and the time the RCS pressure reaches the new pressure-temperature limits.

Pressure-Temperature Limits for Low Temperature Operations

References 3 through 7 require that the reactor vessel to be protected from pressure transients at low temperatures by limiting the resulting pressures to below limits obtained per 10CFR50 Appendix G methodology.

The proposed pressure-temperature limits for low temperature operations are provided by the inservice leak and hydrostatic test curves for heatup and cooldown. These curves have been developed in accordance with Appendix G methodology and incorporate a safety factor of 1.5 (Reference 8). The NRC staff has recognized as acceptable the use of the hydrostatic curves to establish the LTOP System setpoints, as long as a pressurizer gas bubble exists (Reference 9). The Oconee units are always operated with either a steam or nitrogen bubble in the pressurizer.

The proposed Technical Specification requires the LTOP System to be operable whenever the RCS is closed, with the RCS temperature below 325°F. Section II.B.2 of Standard Review Plan 5.2.2 (Reference 6) states the following about the determination of the enable temperature:

> " The low temperature overpressure protection system should be operable during startup and shutdown conditions below the enable temperature, defined as the water temperature corresponding to a metal temperature of at least RT_{NDT} + 90°F at the beltline location (1/4 t or 3/4 t) that is controlling in the Appendix G limit calculations".

The RT_{NDT} for each unit is provided in Reference 10. A RCS cold leg temperature of 325 F will conservatively bound the RT_{NDT} + 90°F enable temperature requirement.

The most restrictive portions of the new pressure-temperature limit curves are for temperatures below approximately 220°F, for all three Oconee units. A PORV low setpoint of 500 psig or less will protect the Units 1 and 2 pressure-temperature limits below 325°F. The Units 1 and 2 pressure-temperature limits decrease to less than 500 psig below 80°F. The 500 psig setpoint provides sufficient protection for the following reasons:

a. A RCS temperature below 80°F is not a normal condition during shutdown or startup operations. The RCS temperature is normally maintained tens of degrees higher than this. A temperature as low as 80°F is expected after extended unit outages, when very low decay heat levels are present.

b. The only pressurization transients that are credible when the RCS temperature is below 80°F are the loss of decay heat removal scenario and the pressurizer heater actuation scenario. The RCS pressure will be initially well below 100 psig, and the pressure-temperature limits will not be challenged until well after ten minutes after the first alarm.

The Unit 3 PORV low setpoint of 480 psig will protect the reactor vessel pressure-temperature limits down to the lowest expected temperatures.

General Information on Reanalysis of Potential Events

Based on the guidance provided in References 1 and 3, the following criteria are incorporated in the analyses:

1. Evaluations of LTOP scenarios assume initiation of the transient plus the most limiting single-point failure in the LTOP System. Evaluations are to be performed with the most limiting initial conditions.

   The limiting single failure is the failure of the pressurizer PORV. With the failure of this train, the redundant train will terminate the transient produced by an initiating event. The scenario that produces the most rapid rate of pressure increase will result in the least amount of time for mitigative operator action.

2. No credit can be taken for operator action until 10 minutes after the operator is aware that a pressure transient is in progress.

3. The RCS pressure will not exceed pressure-temperature limitations obtained by the methodology set forth in Appendix G of Regulatory Guide 1.99.

The various analyses assume various initial pressurizer levels. The relationships of these levels to the pressurizer level range and the various level setpoints are described in the submittal of April 1, 1977 (Reference 2).

The reevaluated analyses have taken into account uncertainty in the pressurizer level indication when defining initial levels. The initial pressurizer level affects the rate of pressure increase; in general, the lower the initial level, the slower the pressure increase will be. However, the opposite is true for the pressurizer heater scenario.

For all scenarios involving mass injection from the HPI System, it is assumed that the letdown storage tank (the normal suction supply for the HPI pumps) water level is at the high level alarm setpoint. This provides the largest amount of water available to be injected. The relationship of this level to the letdown storage tank (LDST) level range and level alarm setpoints is described in Reference 2.

II. RESULTS OF THE EVALUATION

A. Erroneous Actuation of the HPI System

This scenario is not considered credible, because the proposed Technical Specification requires the A and B injection trains of the HPI System to be deactivated while the RCS temperature is below 325°F, the enable temperature.

B. Erroneous Actuation of the Core Flood Tank Discharge Valves

This scenario is not considered credible, because the proposed Technical Specification requires the core flood tank injection function to be deactivated while the RCS temperature is below 325°F.

C. Erroneous Addition of Nitrogen to the Pressurizer

This scenario will not cause the RCS pressure to increase above the new LTOP pressure-temperature limits. As discussed in the submittal of April 1, 1977, the maximum pressure that could be reached for this event is 150 psig.

D. Loss of Decay Heat Removal During Startup and Shutdown

The Decay Heat Removal System provides cooling of the reactor core at low temperature and pressure conditions, when heat removal is not available from the steam generators. Review of the previous analysis revealed the need to reevaluate this scenario with new initial conditions and new LTOP pressure restrictions. The initial conditions employed in the analysis described in the April 1, 1977 submittal no longer provide the most limiting cases.

Current Oconee operating procedures allow RCPs to be operating while removal of the core decay heat load is being transferred between the steam generators and the Decay Heat Removal System. The new LTOP pressure-temperature curves are based on the restriction that no more than one RCP can be operating per loop for temperatures below 250°F.

The following initial conditions are used in the analysis:

1. The transient is a complete loss of decay heat removal. Two reactor coolant pumps are assumed to run throughout the scenario. No secondary-side heat removal is available.

   At the start of the transient, the RCS is assumed to have been cooled down from full power conditions, at the maximum permitted cooldown rate. For conservatism, the decay heat level used bounds the levels expected at the end of cycle. The combination of running RCPs and the high decay heat level produce a bounding heat load.

2. The RCS pressurizer pressure is 350 psig (345 psig for Unit 3), with the RCS temperature at 220°F.

   The most limiting margin between the allowable operating pressur and the pressure-temperature limits occur for RCS temperatures below approximately 220°F, for all three Oconee units. Reactor coolant pumps will be operating at temperatures below 220°F, so a maximum allowable operating pressure of 350 psig (345 psig for Unit 3) is established, to provide sufficient RCP net positive suction head at these temperatures. The PORV setpoint that will protect the Units 1 and 2 pressure-temperature limits below 325°F is 500 psig. A PORV setpoint of 480 psig will protect the Unit 3 limits below 325°F.

3. The indicated pressurizer level is 220 inches (the normal operating level). The uncertainty in the pressurizer level indication is accounted for in the analysis.

The boundary condition conservatisms include:

1. No credit is taken for steam condensation on the pressurizer walls as the RCS pressure increases.

2. No heat transfer between the pressurizer water and steam regions is modelled.

Depending upon the cause of the loss of decay heat removal, one or more of the following alarms will actuate:

1. Low flow alarms for the decay heat removal loops of the Low Pressure Injection (LPI) System.

2. LPI System high temperature alarm for cold shutdown conditions.

3. LPI pump high suction temperature alarms.

4. LPI pump low differential pressure alarms.

5. Decay heat exchanger high outlet temperature alarms.

6. Low header pressure alarms for the Low Pressure Service Water (LPSW) System. The LPSW System removes the decay heat from the decay heat coolers.

The operators will become aware of the situation practically immediately, and the analysis assumes operator awareness at the beginning of the transient.

The RETRAN-02 MOD003 computer code (Reference 11) is used for the dynamic simulation of this transient. The RETRAN plant simulation model employed is a detailed two-loop representation of a typical Oconee unit. The model includes a detailed representation of the reactor vessel and internals, the hot and cold legs, the steam generators, the pressurizer and the reactor coolant pumps (RCPs). Primary system structures that can absorb heat are modelled. The pressurizer is modelled as a nonequilibrium volume.

Figure 1 shows the transient pressure response associated with this scenario, for Oconee Units 1 and 2. The pressure response for Unit 3 is very similar. In each case, at least 10 minutes is available between the start of the transient and the time the pressurizer pressure reaches 500 psig (480 psig for Unit 3). The maximum allowable pressurizer pressure and level for operations with the RCS temperature below 220°F are determined by the initial conditions of this analysis.

E. Makeup Control Valve HP-120 (RCS makeup) Fails Full Open

Valve HP-120 regulates the amount of makeup flow provided to the RCS by the HPI System. This valve is automatically controlled to maintain a desired pressurizer water level. Review of the previous analysis revealed the need to reevaluate this scenario with new initial conditions and new LTOP pressure-temperature restrictions. The initial conditions employed in the analysis described in the April 1, 1977 submittal no longer provide the most limiting cases.

The following initial conditions are assumed:

1. The initial indicated pressurizer water level is 220 inches.
2. The initial RCS pressure and temperature are 350 psig (345 psig for Unit 3) and 220°F, respectively.
3. The LDST water level is 86 inches (high level alarm).
4. No credit is taken for increased letdown flow as the RCS pressure increases.
5. No credit is taken for pressurizer spray.
6. No credit is taken for steam condensation on the pressurizer walls as the insurge takes place. Following a rapid cooldown from full power conditions, the pressurizer walls will be sufficiently hotter than the steam bubble to preclude taking credit for steam condensation.
7. No credit is taken for heat transfer between the pressurizer water and steam masses.
8. Makeup valve HP-120 fails full open to initiate the transient.

A sensitivity case is performed, with the initial pressurizer level at 315 inches, the RCS pressure at 100 psig, and the RCS temperature at 150°F.

The RETRAN-02 MOD003 computer code is used to perform the dynamic simulation of this transient. The RETRAN plant model used is a simple representation of the Reactor Coolant System. The degree of modelling detail is consistent with past LTOP makeup flow analyses submitted by Duke Power for the Oconee Nuclear Station. A volume representing the pressurizer surge line connects the pressurizer volume with a lumped representation of the remainder of the RCS. The pressurizer is modelled as a nonequilibrium volume.

As shown in Figure 2, this scenario will cause the RCS pressure to increase above the new pressure and temperature limits in under 10 minutes. As a result, Duke Power Company has decided to restrict flow through the makeup path in order to meet the 10 minute operator inaction criterion. The maximum allowable flow rate through the makeup path is determined in the following manner for each Oconee unit:

1. A number of RCS alarms (pressurizer pressure and pressurizer level, for example) are used to provide early warning that a pressure transient is in progress.

2. The following initial conditions are assumed for the units:

   a. The maximum allowable operating pressure below 220°F is 350 psig (345 psig for Unit 3), with a maximum indicated pressurizer level of 220 inches.

   b. The maximum allowable operating pressure above 220°F and below 325°F is the pressurizer PORV low lift setpoint, with a maximum indicated pressurizer level of 260 inches.

   c. When the RCS pressure is 100 psig or less, the pressurizer water level can be increased as high as 310 inches. This water level is lower than in previous submittals to take advantage of the pressurizer high-high level alarm at 315 inches.

3. Sensitivity studies are performed with various HPI flow rates and RCS pressures to determine the most limiting flow rate that allows the 10 minute criterion to be met. Note that operator awareness is assumed to begin when the first control room alarm actuates, not necessarily at the beginning of the transient.

4. After the most limiting makeup flow rate has been determined for each unit, the associated flow indication uncertainty is subtracted to obtain the maximum allowable flow rate for use during plant operations with the RCS temperature below 325°F.

For an example, Figure 2 shows that flow through the makeup path has to be restricted to about 100 gpm or so, if a pressure alarm is assumed to actuate at 360 psig.

The maximum allowable flow is different for each unit because of the differences in the three LTOP pressure-temperature limit curves. Note that the maximum allowable flow rate is highly dependent upon the setpoints of the alarms that provide early warning of the transient.

F. All Pressurizer Heaters Erroneously Energized.

The combined heat output of the pressurizer heaters is 1638 kW. Erroneous actuation of the heaters will cause a RCS pressure increase, as the pressurizer water boils, generating steam. The rate of the pressure increase is highly dependent on the initial pressurizer level. Review of the previous analysis revealed the need to reevaluate this scenario with new initial conditions and new LTOP pressure restrictions. The pressure restrictions used in the April 1, 1977 submittal no longer provide the most limiting cases.

The rate of pressurization is inversely proportional to the initial pressurizer water level, being determined by the volume of the pressurizer steam bubble. The most limiting pressurization rates occur when all pressurizer heaters are actuated. As a result, there will be limits placed upon the minimum allowable pressurizer levels, so that the 10 minute operator criterion can be met.

The limiting minimum pressurizer levels are unit-specific, because of differences in the pressure-temperature limits. In addition, the allowable minimum pressurizer level is highly dependent upon the setpoints of the alarms used to alert the operators. The minimum allowable pressurizer level to meet the 10 minute criterion is determined in the following manner for each unit:

1. The RCS pressure alarms are established to provide early warning that a pressure transient is in progress. The same setpoints used to alert an operator of an HPI makeup flow transient are used for this transient.

2. The following initial conditions are assumed for the units:

   a. The maximum allowable operating pressure below 220°F is 350 psig (345 psig for Unit 3).

   b. The maximum allowable operating pressure above 220°F and below 325°F is the pressurizer PORV low lift setpoint.

3. Sensitivity studies are performed with various RCS pressures and pressurizer levels to determine the most limiting level that allows the 10 minute criterion to be met. Note that operator awareness is assumed to begin when the first control room alarm actuates, not necessarily at the beginning of the transient.

The RETRAN-02 MOD003 computer code is used to perform the simulations. The simplified, three-volume representation of the RCS utilized in with the HPI makeup flow transient analysis is used. The following boundary conditions and conservatisms are used:

1. All pressurizer heaters are simultaneously actuated to start the transient.

2. No heat transfer between the pressurizer walls, steam region, and water is modelled.

3. The initial pressurizer level is adjusted to account for level indication uncertainty.

As mentioned previously, the minimum allowable pressurizer level will provide at least 10 minutes between the first alarm and the time the pressure-temperature limits are reached, for the most limiting initial conditions. For example, if a pressure alarm is assumed to actuate at 360 psig, the indicated pressurizer level must be maintained above 102 inches for Units 1 and 2 (refer to Figure 3).

G. Start of a RCP with Stored Thermal Energy in the Reactor Coolant System

The submittal of April 1, 1977 examined two types of situations involving RCP starts that lead to possible RCS pressurization transients. The two types are:

Type A : Filling the steam generator secondary side with hot water, followed by the start of a reactor coolant pump.

Type B : Restarting a reactor coolant pump during plant heatup, following a period of stagnant (no flow) conditions.

G.1 Start of a Reactor Coolant Pump under Type A Conditions

This scenario involves starting a RCP during unit startup, after the steam generators have been heated to temperatures much higher than the RCS inventory. In the submittal of April 1, 1977 (Reference 2), the following initial conditions are employed:

a. RCS pressure is 300 psig

b. RCS temperature is 140°F

c. Pressurizer level is 315 inches

d. Pressurizer PORV setpoint of 550 psig

e. Steam generator water temperature is 420°F.

Many, but not all, of these initial conditions are limiting. The new pressure-temperature restrictions cause the most limiting conditions to exist for temperatures below 220°F. The maximum allowable operating pressure is restricted to 350 psig (345 psig for Unit 3), below 220°F. For these operating conditions, the pressurizer is limited to 220 inches, so a level of 315 inches yields conservative results. The HPI seal flow to the RCPs is started by the time the RCS temperature reaches 150°F. Therefore, the use of the 140°F value is conservative, as will be the secondary-to-primary heat transfer rate. The RCS pressure of 300 psig and the PORV setpoint of 550 psig no longer provide limiting results.

The pressure increase resulting from this analysis is self-limiting; a peak pressure increase of 130 psig is observed for the 300-psig case. Using an initial pressure of 350 psig (345 for Unit 3), while keeping all other initial conditions the same as before, yields a peak pressure increase that is not expected to differ greatly from 130 psig. This is because the thermodynamic properties of 140°F water change only slightly between 300 and 350 psig. This transient, initiated from 350 psig and 140°F, would not cause the RCS pressure to exceed the 500 psig PORV setpoint limit for Units 1 and 2. Starting from 345 psig and 140°F, the resulting peak pressure response will approach the PORV setpoint limit of 480 psig. However, based on the fact that a conservatively high initial pressurizer level is used, the peak pressure is not expected to exceed 480 psig. At temperatures above 140°F, the pressure response will be less severe, because of the smaller secondary-to-primary temperature difference.

G.2 Start of a Reactor Coolant Pump under Type B Conditions

This scenario involves the circulation of a very cool (50°F) mass of water through a heated RCS upon the start of an idle RCP. The analysis described in the April 1, 1977 submittal assumed initial conditions of 450 psig and 275°F in the RCS. The resulting pressure increase is self-limiting, with a peak pressure increase of 75 psig.

With the new LTOP limits, the maximum allowed operating pressure above 220°F is 500 psig (480 psig for Unit 3). Initiating this transient from 500 psig (480 psig for Unit 3) and 275°F will not cause the RCS pressure to exceed the new limits. The peak pressure increase will not change much from 75 psig, because the thermodynamic properties of 50°F water change only slightly between 450 and 500 psig. For RCS temperatures below 275°F, the peak pressure increase will be less than 75 psig, because the temperature difference between the 50°F water and the rest of the RCS inventory is not as great. The pressure limits will not be exceeded for these temperatures. For temperatures between 275° and 325°F, the margin between the new pressure-temperature limits and the PORV setpoint pressure will be much greater than the anticipated peak pressure. It is concluded that this transient will not cause the RCS pressure to exceed the pressure-temperature limits at any temperature.

III. CONCLUSIONS

The preceding evaluation demonstrates that the reactor vessel is protected from overpressurization during potential pressurization transients at low temperature conditions. The evaluation reviewed previously identified scenarios and did not identify any additional scenarios. The initial conditions and assumptions used in previously performed analyses have been examined in relation to the new pressure-temperature limits and to the operational requirements of RCS equipment. When necessary, adjustments have been made to the initial conditions. The results of this evaluation show that all acceptance criteria are met. The LTOP System for each unit at the Oconee Nuclear Station is demonstrated to protect the reactor vessel from overpressurization during startup and shutdown conditions.

IV. ACCEPTABILITY OF PROPOSED TECHNICAL SPECIFICATIONS

Based upon the preceeding analyses, the action statements in Specification 3.1.2.9 have been revised to ensure that the reactor vessel is placed in a condition in which it is not vulnerable to an LTOP event via the safest and most prompt course of action.

1) Specification 3.1.2.9.3.a allows a relatively brief period of operation while vulnerable to a single failure of the PORV. The time period of 24 hours has been established since the most rapid LTOP scenarios exist with RCS pressure _ 100 psig and/or with HPI pumps in operation. This specification explicitly includes heatup above the LTOP enable temperature as a viable option to exit the LCO. This option was implicitly included in the existing Technical Specification, thus addition of this statement is provided for clarification.

2) Specification 3.1.2.9.3.b allows a brief period of operation in the event of 2nd train inoperabilities. The time period 4 hours has been established to ensure compensatory measures will be implemented promptly. In general, compensatory measures are the substitution of alternative or additional controls which assure 10 minutes are available for operator action to mitigate an LTOP event.

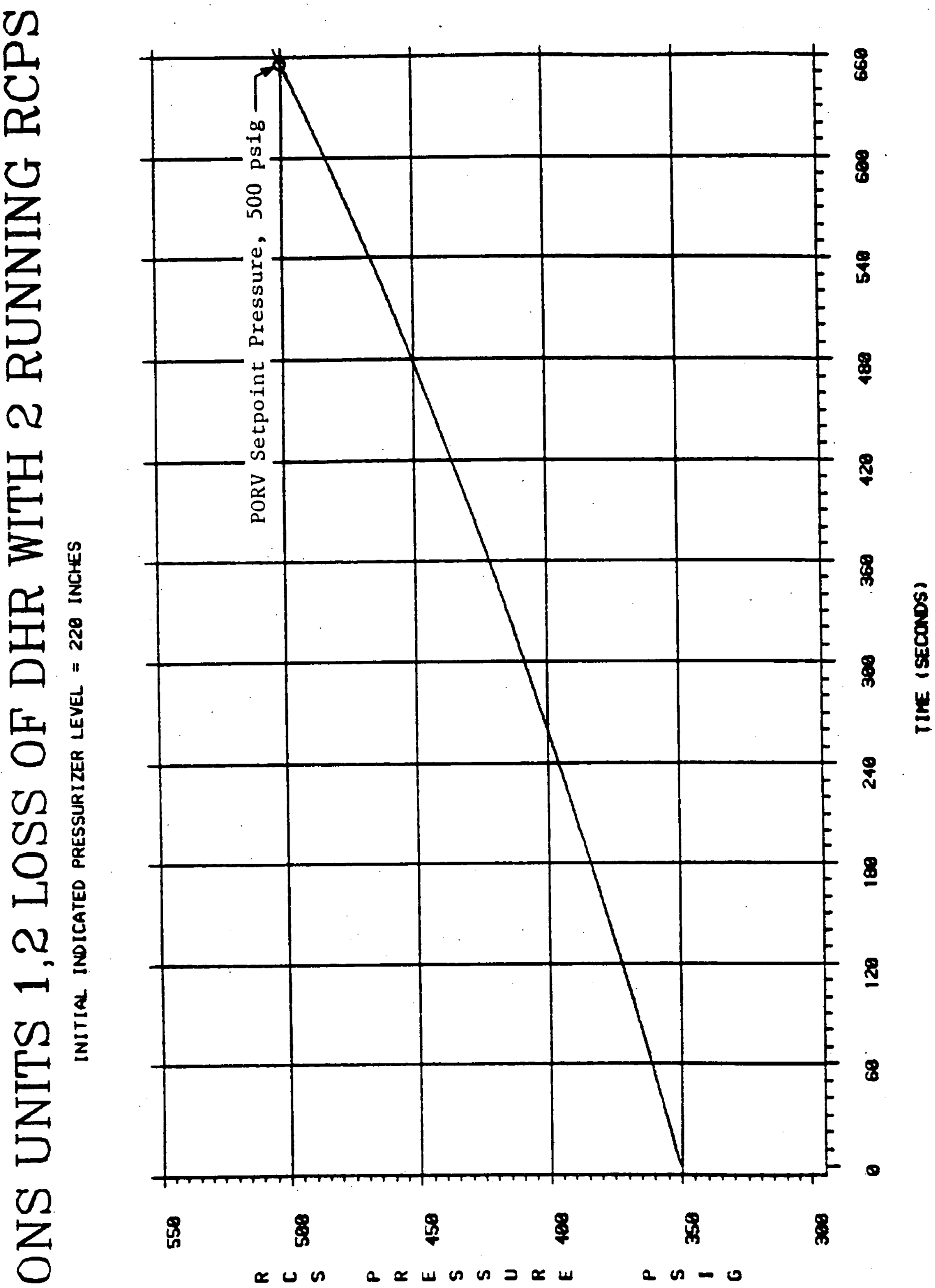

ONS UNITS 1,2 LOSS OF DHR WITH 2 RUNNING RCPS
INITIAL INDICATED PRESSURIZER LEVEL = 220 INCHES
PORV Setpoint Pressure, 500 psig
RCS PRESSURE PSIG
550
500
450
400
350
300
TIME (SECONDS)
0
60
120
180
240
300
360
420
480
540
600
660

Figure 1

ONS UNITS 1,2 HPI MAKEUP FLOW SCENARIO

INITIAL INDICATED PRESSURIZER LEVEL = 220 INCHES

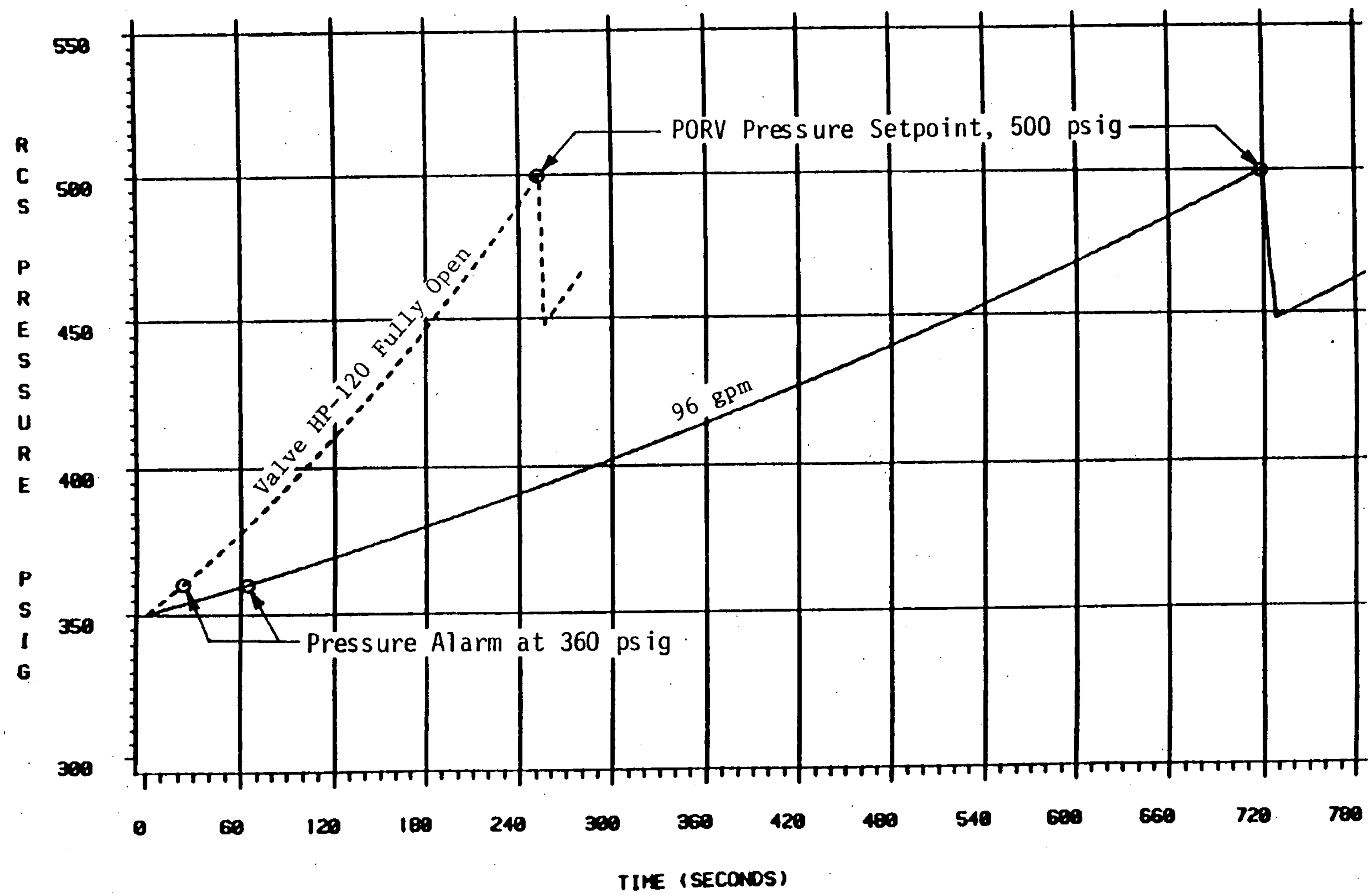


Figure 2

ONS UNITS 1,2 PRESSURIZER HEATER SCENARIO

INITIAL INDICATED PRESSURIZER LEVEL = 102 INCHES

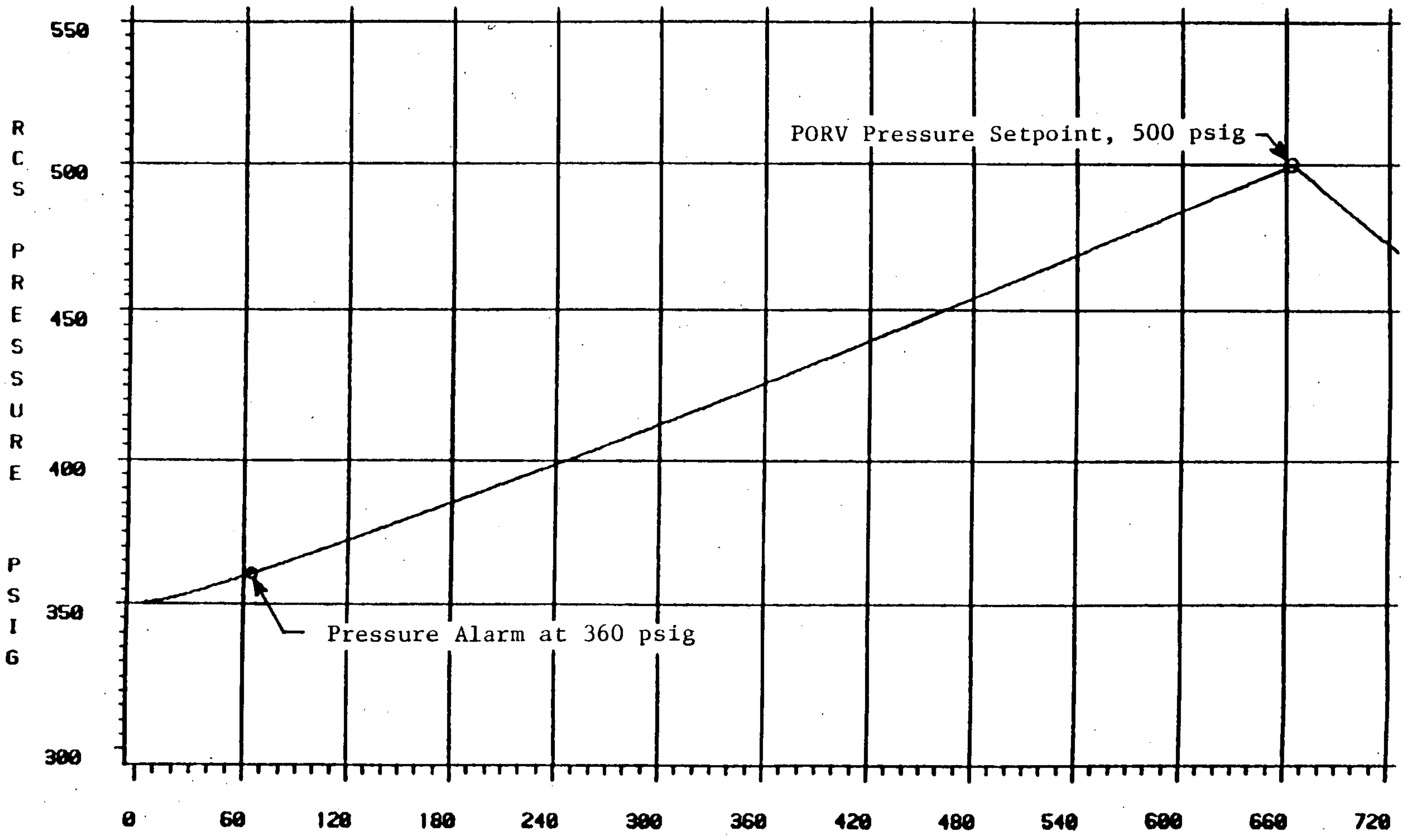


Figure 3

IV. REFERENCES

1. Letter from William O. Parker, Jr. (DPC--Steam Production) to Benard C. Rusche (NRC--Office of Nuclear Reactor Regulation); Oconee Nuclear Station Docket Nos. 50-269, -270, -287; dated October 14, 1976.

2. Letter from William O. Parker, Jr. (DPC--Steam Production) to Benard C. Rusche (NRC--Office of Nuclear Reactor Regulation); Oconee Nuclear Station Docket Nos. 50-269, -270, -287; dated April 1, 1977.

3. Letter from A. Schwencer (NRC--Division of Operating Reactors) to William O. Parker, Jr. (DPC--Steam Production); Oconee Nuclear Station Units 1, 2, and 3; dated August 11, 1976.

4. United States Nuclear Regulatory Commision Generic Letter 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations."

5. United States Nuclear Regulatory Commission Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.

6. NUREG-800, Revision 2, United States Nuclear Regulatory Commission Standard Review Plan 5.2.2, "Overpressure Protection," November 1988.

7. United States Nuclear Regulatory Commission Branch Position RSB 5-2, "Overpressurization Protection of Pressurized Water Reactors While Operating at Low Temperatures," Revision 1, November 1988.

8. 77-1174373-00, "ISLH Evaluation for Oconee Units 1, 2 & 3," Babcock & Wilcox, March 1989.

9. Oconee Nuclear Station LTOP Setpoints Duke - NRC Conference Call on 2/2/89.

10. 77-1174121-00, "NRC Generic Letter 88-11 P/T Limits Evaluation for Oconee 1, 2, 3 Nuclear Plants," Babcock & Wilcox, January 1989.

11. Letter from Cecil O. Thomas (NRC--Division of Licensing) to Dr. Thomas W. Schnatz (Utility Group for Regulatory Application); Acceptance for Referencing of Licensing Topical Reports EPRI CCM-5, "RETRAN--A Program for One Dimensional Transient Thermal-Hydraulic Analysis of Complex Fluid Flow Systems," and EPRI NP-1850-CCM, "RETRAN-02--Aprogram for Transient Thermal-Hydraulic Analysis of Complex Fluid Flow Systems," dated September 4, 1984.

Duke Power Company
Oconee Nuclear Station
Attachment 4

No Significant Hazards Consideration Evaluation

No Significant Hazards Consideration Evaluation

Duke Power Company (Duke) has made the determination that this amendment request involves a no significant hazards consideration by applying the standards established by NRC regulations in 10CFR50.92. This ensures that operation of the facility in accordance with the proposed amendment would not:

1) <u>Involve a significant increase in the probability or consequences of an accident previously evaluated.</u>

   Each accident analysis addressed within the Oconee FSAR has been examined with respect to changes proposed within this amendment request. Changes included within this request have been provided in response to Generic Letter (GL) 88-11.

   - As discussed in Attachment 2, revised P/T limits and heatup and cooldown constraints provided in Attachment 1 were developed using NRC approved topical report BAW-10046A. Operation of Oconee in accordance with the Technical Specifications will assure that the appropriate brittle fracture pressure limits are protected during normal operation. Therefore, this change will not involve a significant increase in the probability or consequences of previously analyzed accidents.

   - As discussed in Attachment 3, revised LTOP system operability requirements have been developed in accordance with NRC recommended criteria and methodology. Analyses performed in support of the revised LTOP system operability requirements utilize a NRC approved computer code. Operation of Oconee in accordance with these Technical Specifications will assure that the appropriate brittle fracture pressure limits are protected during postulated overpressurization scenarios at low temperatures. Therefore, this change will not involve a significant increase in the probability or consequences of previously analyzed accidents.

   - Administrative changes in support of this amendment request include: 1) Deletion of reporting requirements (redundant to 10CFR50.72 and 50.73) from existing Specification 3.1.2.9.c; 2) Correction of typographical errors on Bases page 3.1-3b; 3) Update of references on Bases page 3.1-46; and 4) reformatting and clarification of heatup and cooldown constraints. As these changes are purely administrative in nature, they will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2) Create the possibility of a new or different kind of accident from any accident previously evaluated.

As discussed in Attachment 2, revised P/T limits and heatup and cooldown constraints provided in Attachment 1 were developed using NRC approved topical report BAW-10046A. Operation of Oconee in accordance with these specifications will not create any failure modes not bounded by previously evaluated accidents. As such, this change will not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

As discussed in Attachment 3, revised LTOP system operability requirements have been developed in accordance with NRC recommended criteria and methodology. Operation of Oconee in accordance with these specifications will not create any failure modes not bounded by previously analyzed accidents. As such this change will not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

Changes included within this amendment request which are purely administrative in nature will not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

3) Involve a significant reduction in a margin of safety.

Changes included in this amendment request will assure that the appropriate brittle fracture pressure limits are protected during normal operation and postulated overpressurization scenarios at low temperature, thus preserving existing margins of safety. Change which are administrative in nature will impact no margins of safety. Therefore, there will be no reduction in any margin of safety.

Duke has concluded based on the above and the technical justification in Attachments 2 and 3 that there are no significant hazards considerations involved in this amendment request.