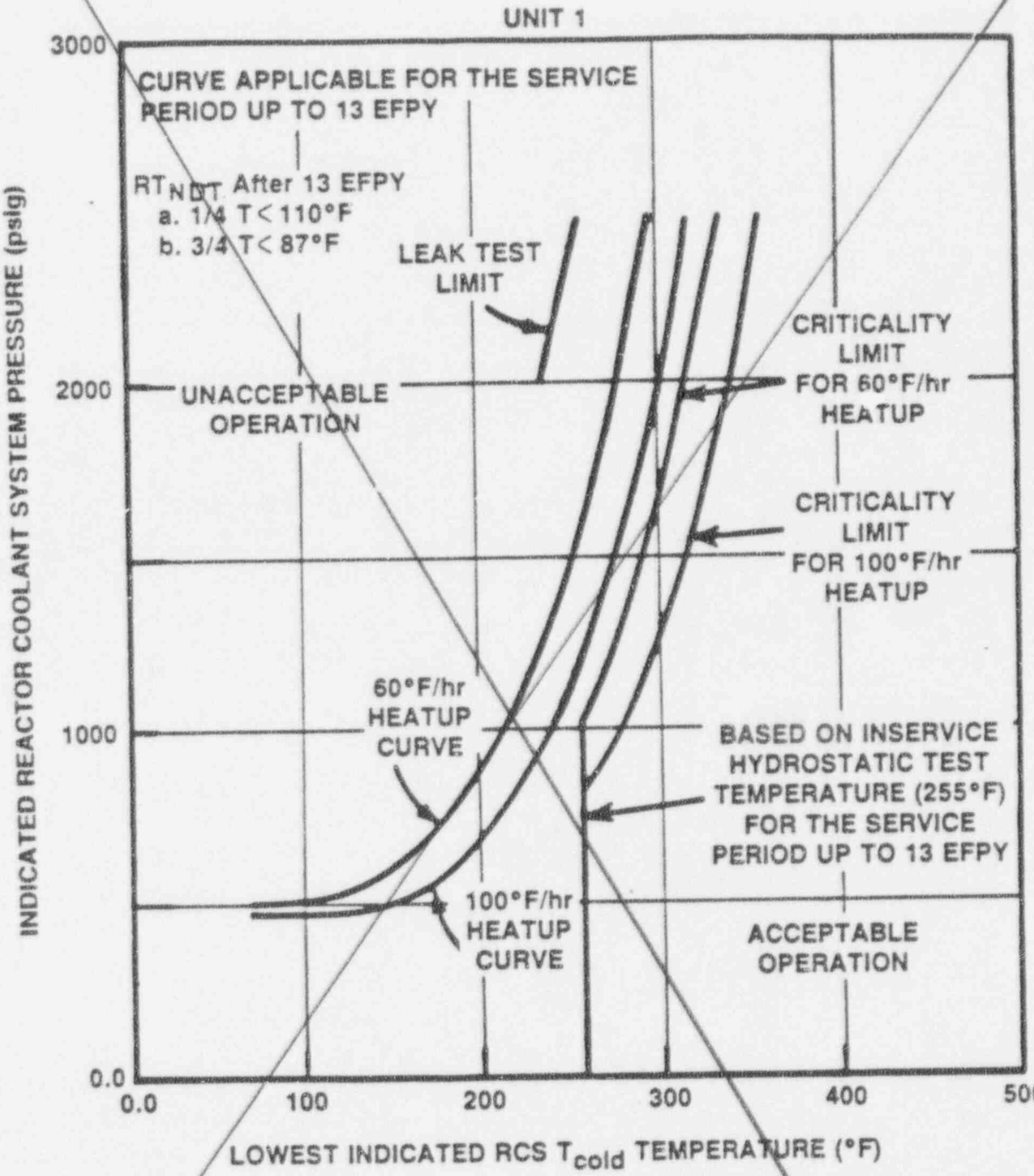
ENCLOSURE 3

VOGTLE ELECTRIC GENERATING PLANT
REQUEST TO REVISE TECHNICAL SPECIFICATIONS
REVISION TO REACTOR PRESSURE LIMITS

MARKED UP TECHNICAL SPECIFICATION PAGES

REPLACE WITH NEW PAGE 3/4 4-31



MATERIAL BASIS

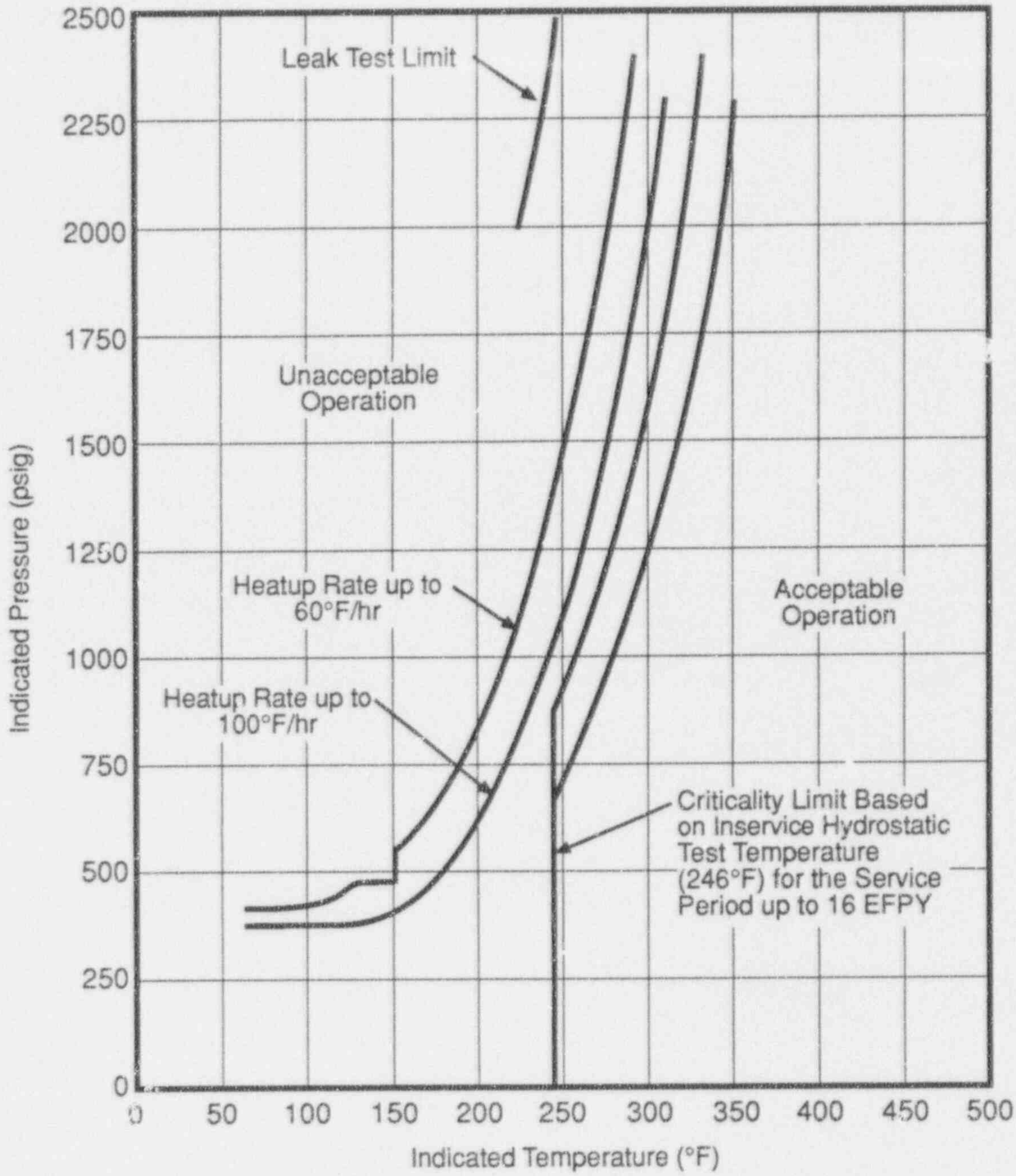
Copper Content: Assumed - 0.10 Wt %
(Actual - 0.06 Wt %)

RT$_{NDT}$ Initial: Assumed - 40°F
(Actual - 30°F)

RT$_{NDT}$ After 13 EFPY @ 1/4 T < 110°F
@ 3/4 T < 87°F

FIGURE 3.4-2a

UNIT 1 REACTOR COOLANT SYSTEM HEATUP LIMITATIONS - APPLICABLE UP TO 13 EFPY



MATERIAL BASIS

Copper Content:	Assumed - NA WT%
	(Actual - 0.083 WT%)
RT_{NDT} Initial:	Assumed - NA °F
	(Actual - 20°F)
RT_{NDT} At 16 EFPY:	@ 1/4T = 100.7°F
	@ 3/4T = 84.1°F

Figure 3.4-2a

Unit 1 Reactor Coolant System Heatup Limitations (Heatup rates up to 100°F/hr) Applicable for the First 16 EFPY (With Margins of 10°F and 60 psig for Instrumentation Errors and Margin of 74 psig for Pressure Difference Between Pressure Instrumentation and Reactor Vessel Beltline Region).

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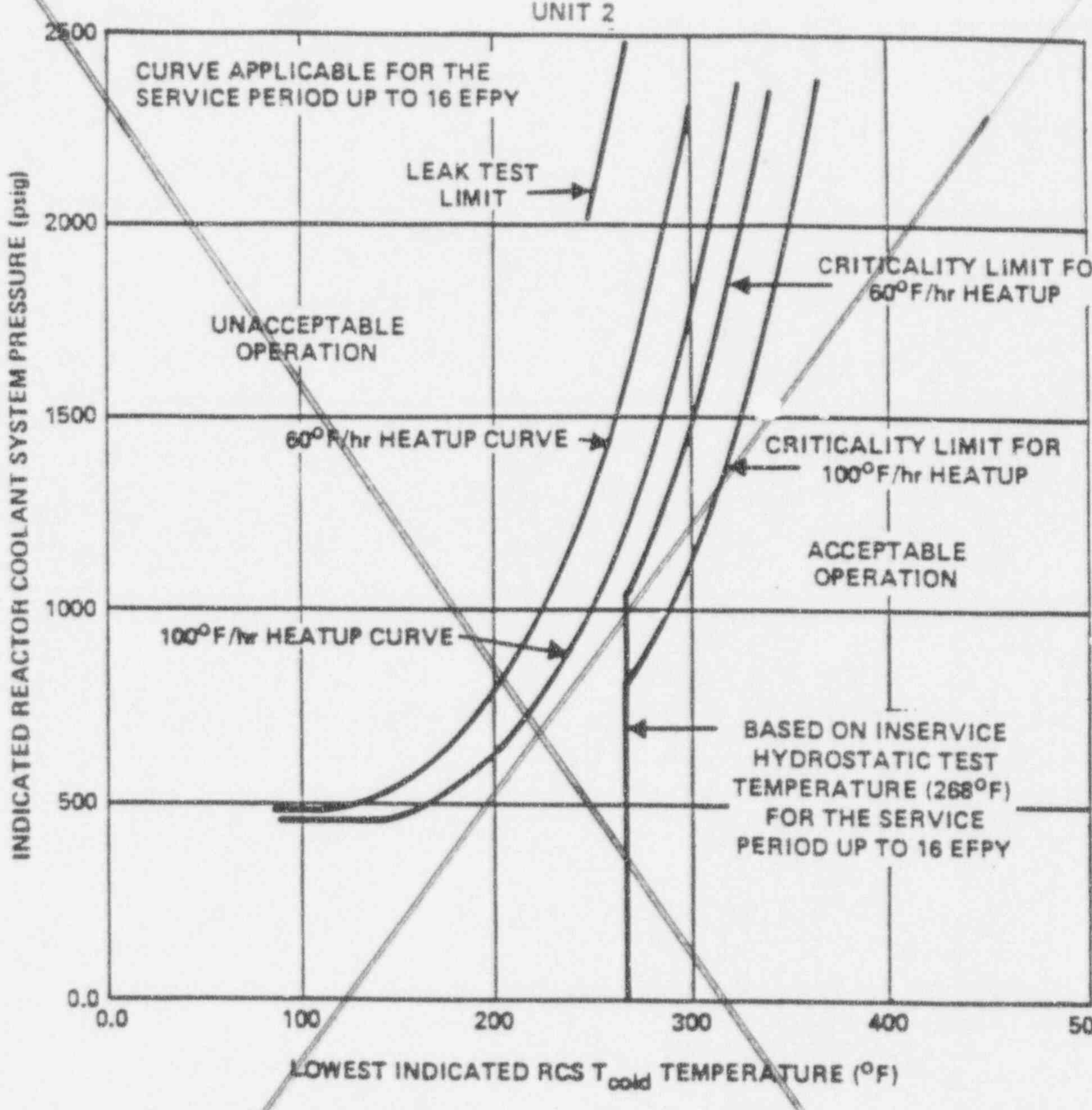


MATERIAL BASIS

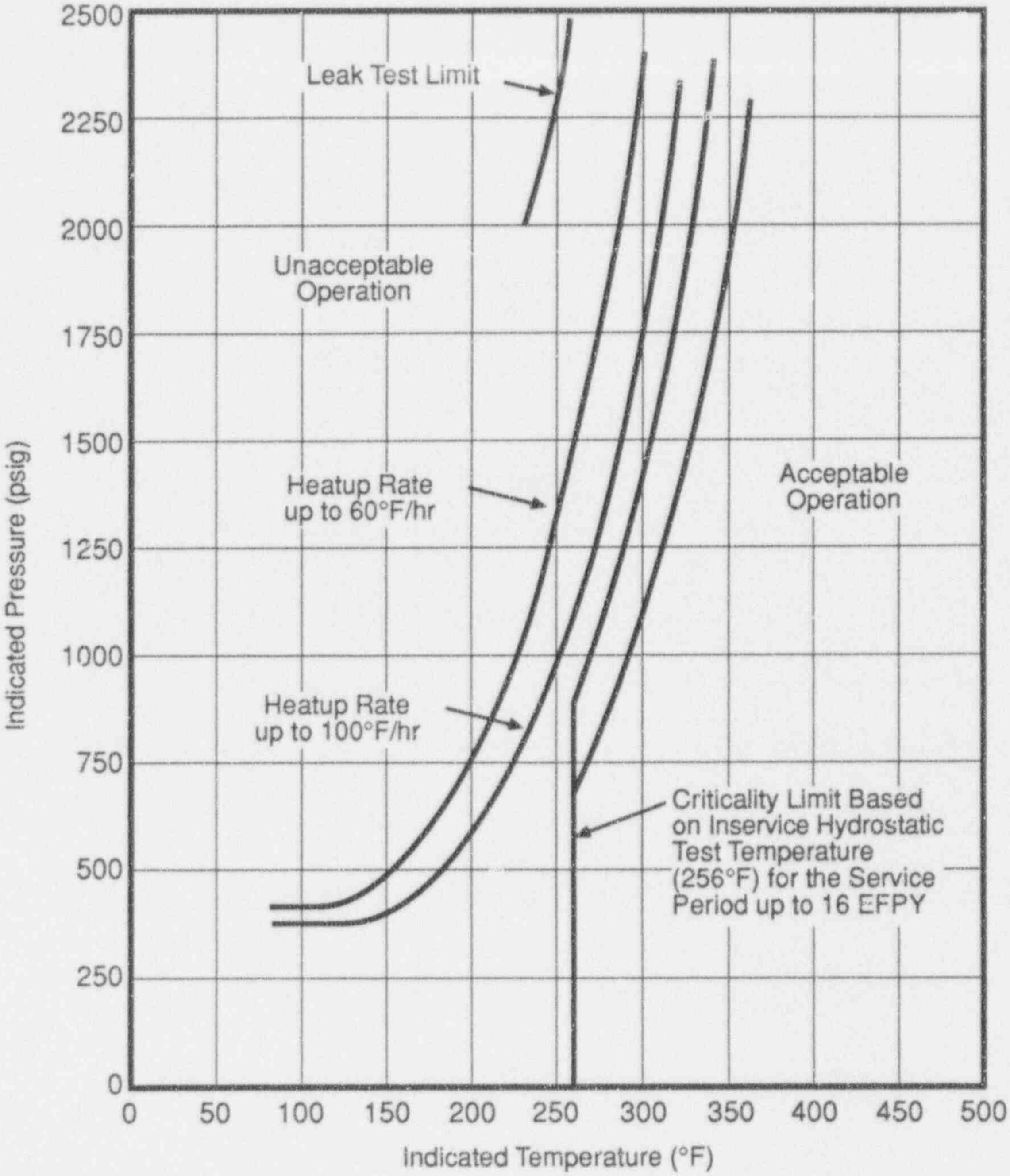
Copper Content: Assumed - 0.10 Wt %
(Actual - 0.05 Wt %)

RT_{NDT} Initial: Assumed - NA°F
(Actual - 50°F)

RT_{NDT} After 16 EFPY @ 1/4 T = 123°F
@ 3/4 T = 97°F

FIGURE 3.4-2b

UNIT 2 REACTOR COOLANT SYSTEM HEATUP LIMITATIONS - APPLICABLE UP TO 16 EFPY



MATERIAL BASIS

Copper Content:	Assumed - NA WT% (Actual - 0.05 WT%)
RT_{NDT} Initial:	Assumed - NA °F (Actual - 50°F)
RT_{NDT} At 16 EFPY:	@ 1/4T = 112°F @ 3/4T = 94°F

Figure 3.4-2b
Unit 2 Reactor Coolant System Heatup Limitations (Heatup rates up to 100°F/hr) Applicable for the First 16 EFPY (With Margins of 10°F and 60 psig for Instrumentation Errors and Margin of 74 psig for Pressure Difference Between Pressure Instrumentation and Reactor Vessel Beltline Region).

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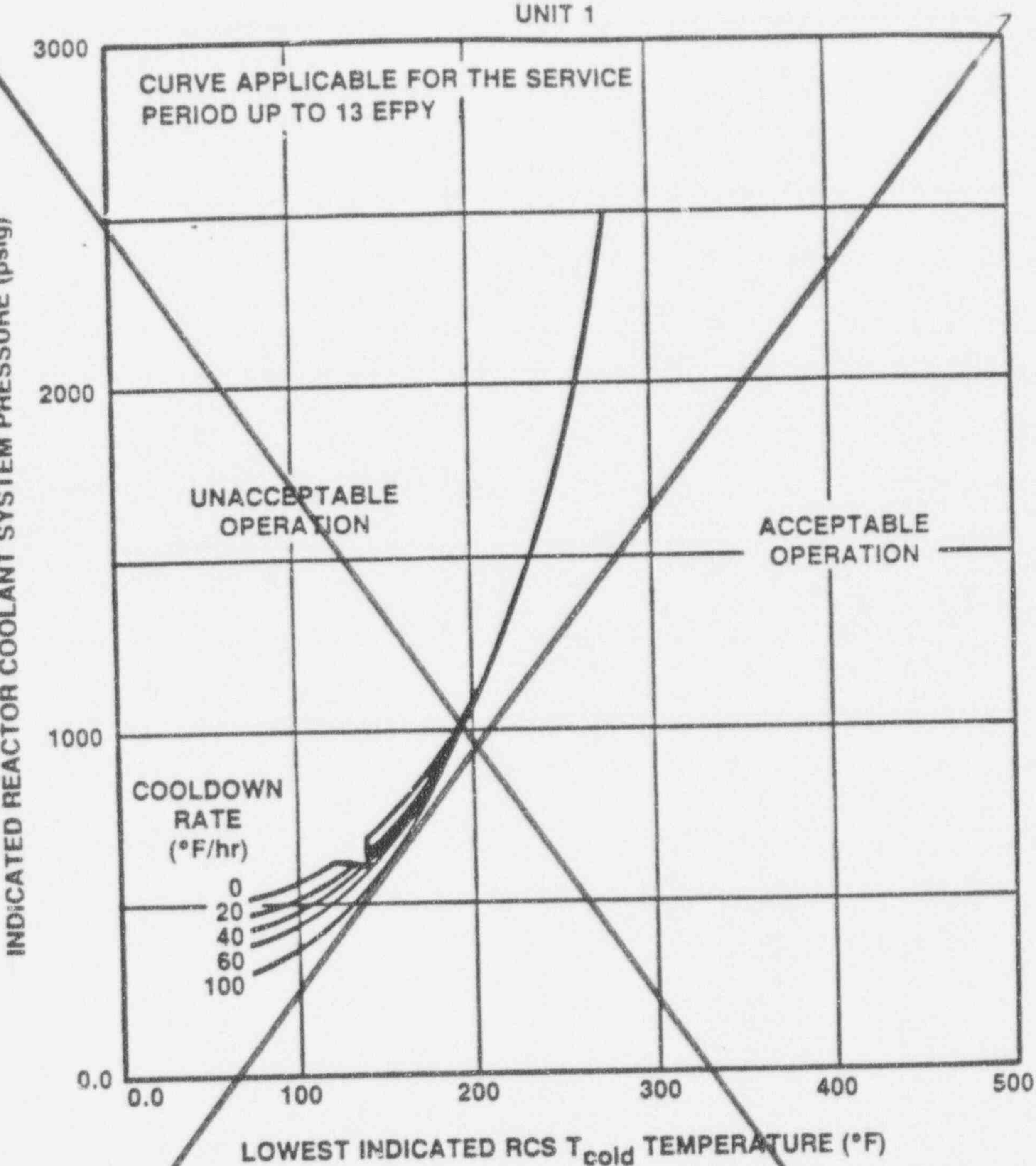


MATERIAL BASIS

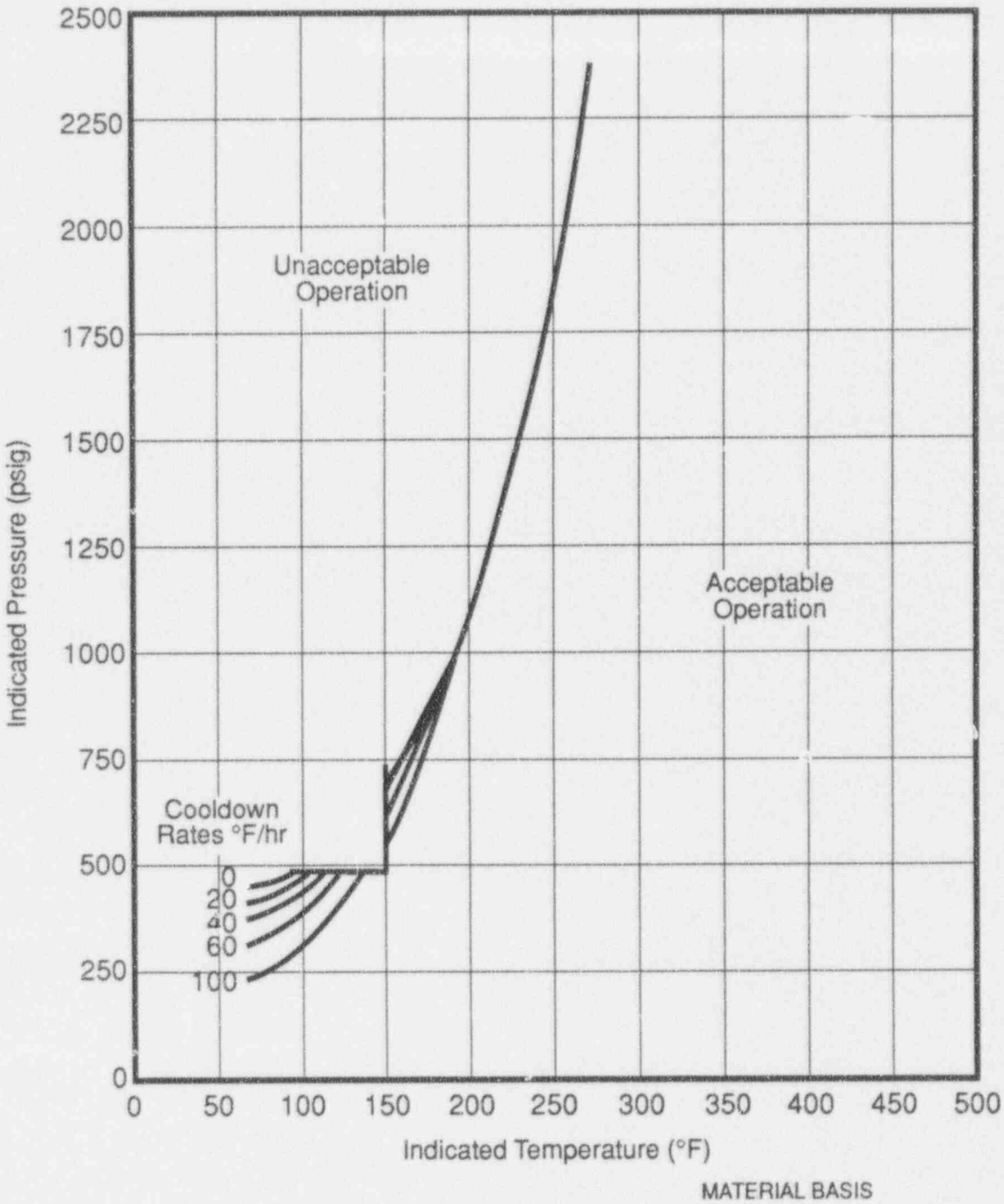
Copper Content: Assumed - 0.10 Wt %
(Actual - 0.06 Wt %)

RT_{NDT} Initial: Assumed - 40°F
(Actual - [illegible]°F)

RT_{NDT} After 13 EFPY @ 1/4 T ≈ 110°F
@ 3/4 T < [illegible]°F

FIGURE 3.4-3a

UNIT 1 REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS - APPLICABLE UP TO 13 EFPY



MATERIAL BASIS

Copper Content:	Assumed - NA WT% (Actual - 0.083 WT%)
RT_{NDT} Initial:	Assumed - NA °F (Actual - 20°F)
RT_{NDT} At 16 EFPY:	@ 1/4T = 100.7°F @ 3/4T = 84.1°F

Figure 3.4-3a
Unit 1 Reactor Coolant System Cooldown Limitations (Cooldown rates up to 100°F/hr) Applicable for the First 16 EFPY (With Margins of 10°F and 60 psig for Instrumentation Errors and Margin of 74 psig for Pressure Difference Between Pressure Instrumentation and Reactor Vessel Beltline Region).

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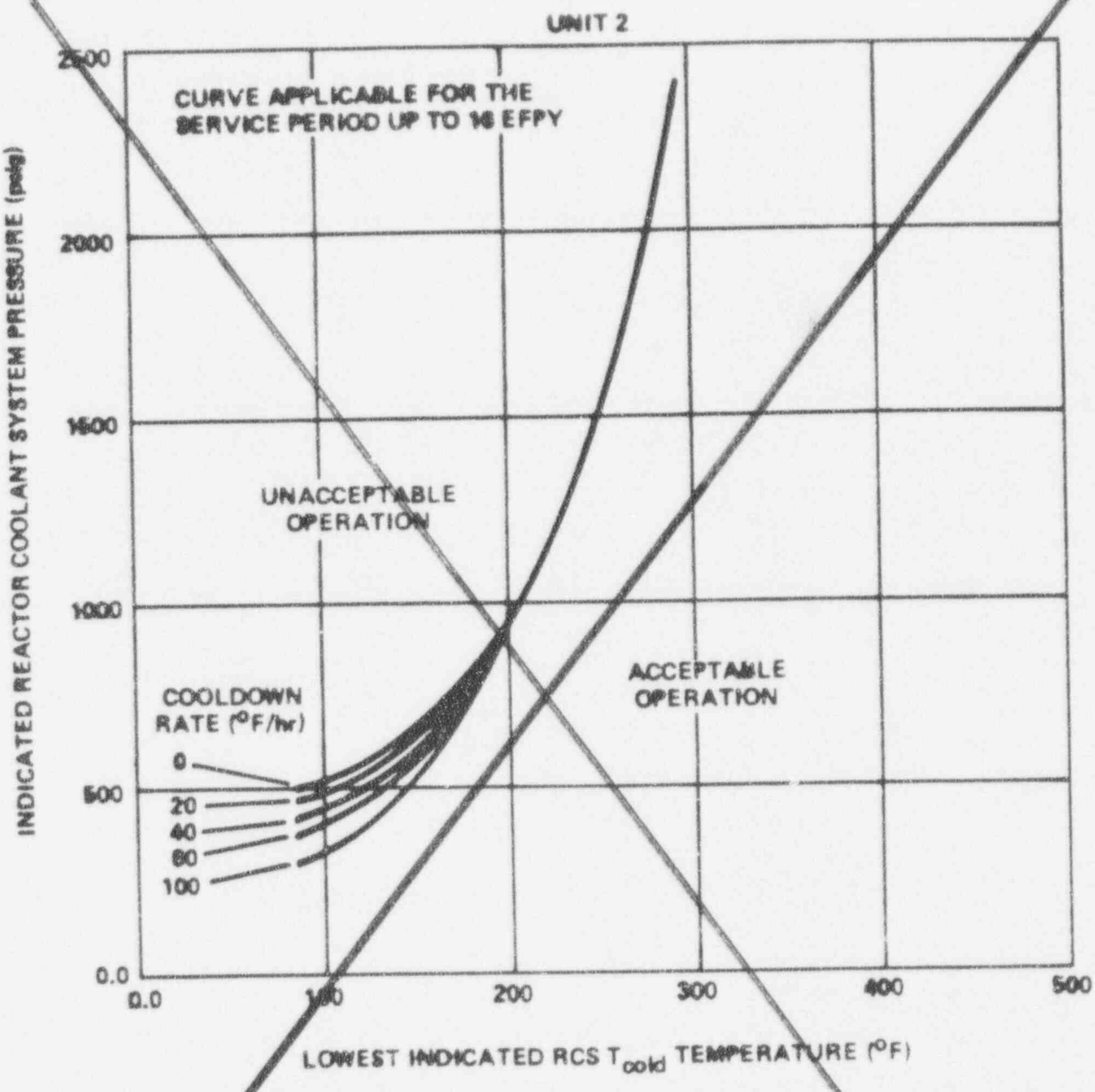


MATERIAL BASIS

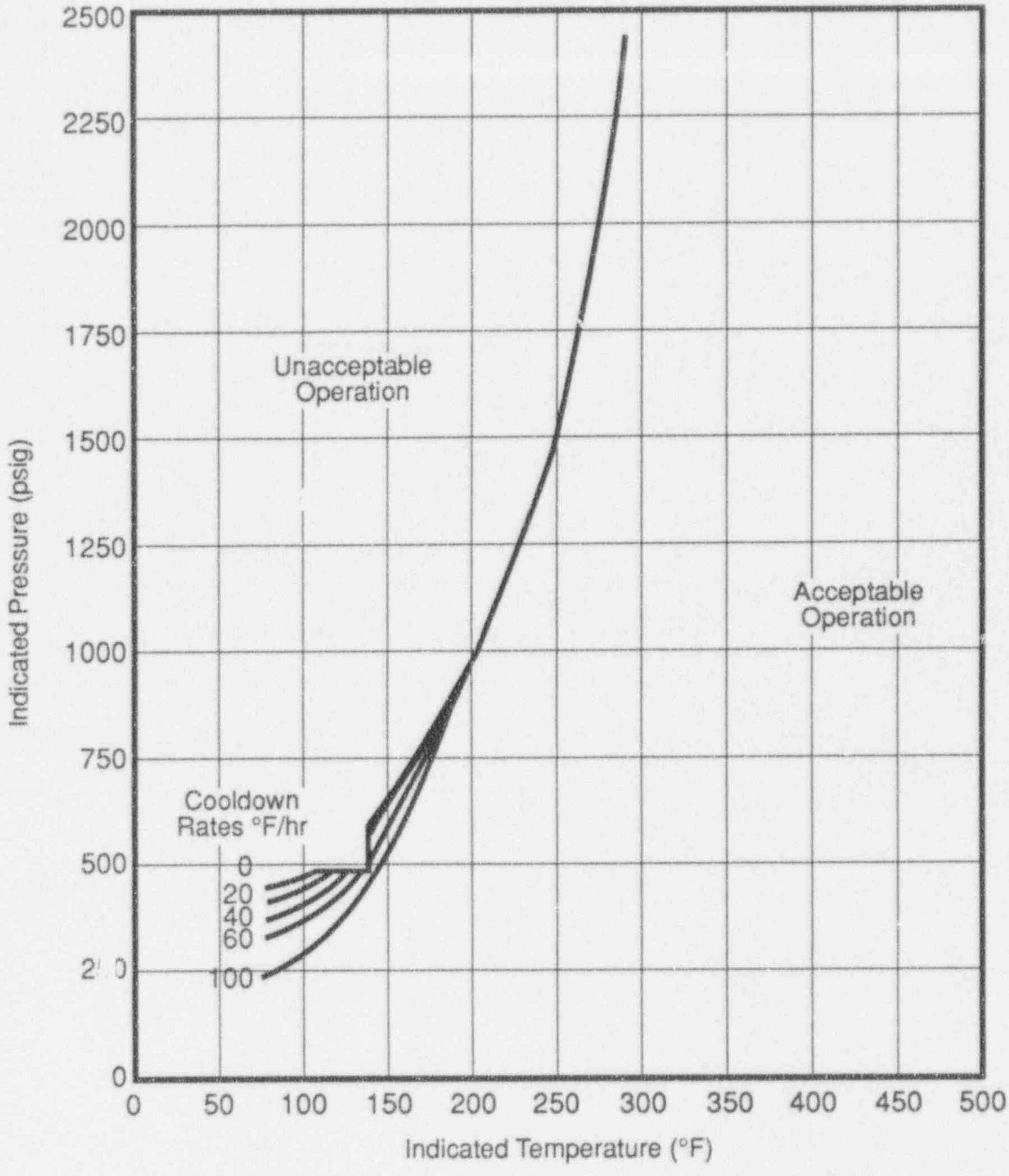
Copper Content: Assumed - 0.10 Wt %
(Actual - 0.05 Wt %)

RT_{NDT} Initial: Assumed - NA °F
(Actual - 50°F)

RT_{NDT} After 16 EFPY @ 1/4 T = 123°F
@ 3/4 T = 97°F

FIGURE 3.4-3b

UNIT 2 REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS - APPLICABLE UP TO 16 EFPY



MATERIAL BASIS

Copper Content:	Assumed - NA WT% (Actual - 0.05 WT%)
RT_{NDT} Initial:	Assumed - NA °F (Actual - 50°F)
RT_{NDT} At 16 EFPY:	@ 1/4T = 112°F @ 3/4T = 94°F

Figure 3.4-3b
Unit 2 Reactor Coolant System Cooldown Limitations (Cooldown rates up to 100°F/hr) Applicable for the First 16 EFPY (With Margins of 10°F and 60 psig for Instrumentation Errors and Margin of 74 psig for Pressure Difference Between Pressure Instrumentation and Reactor Vessel Beltline Region).

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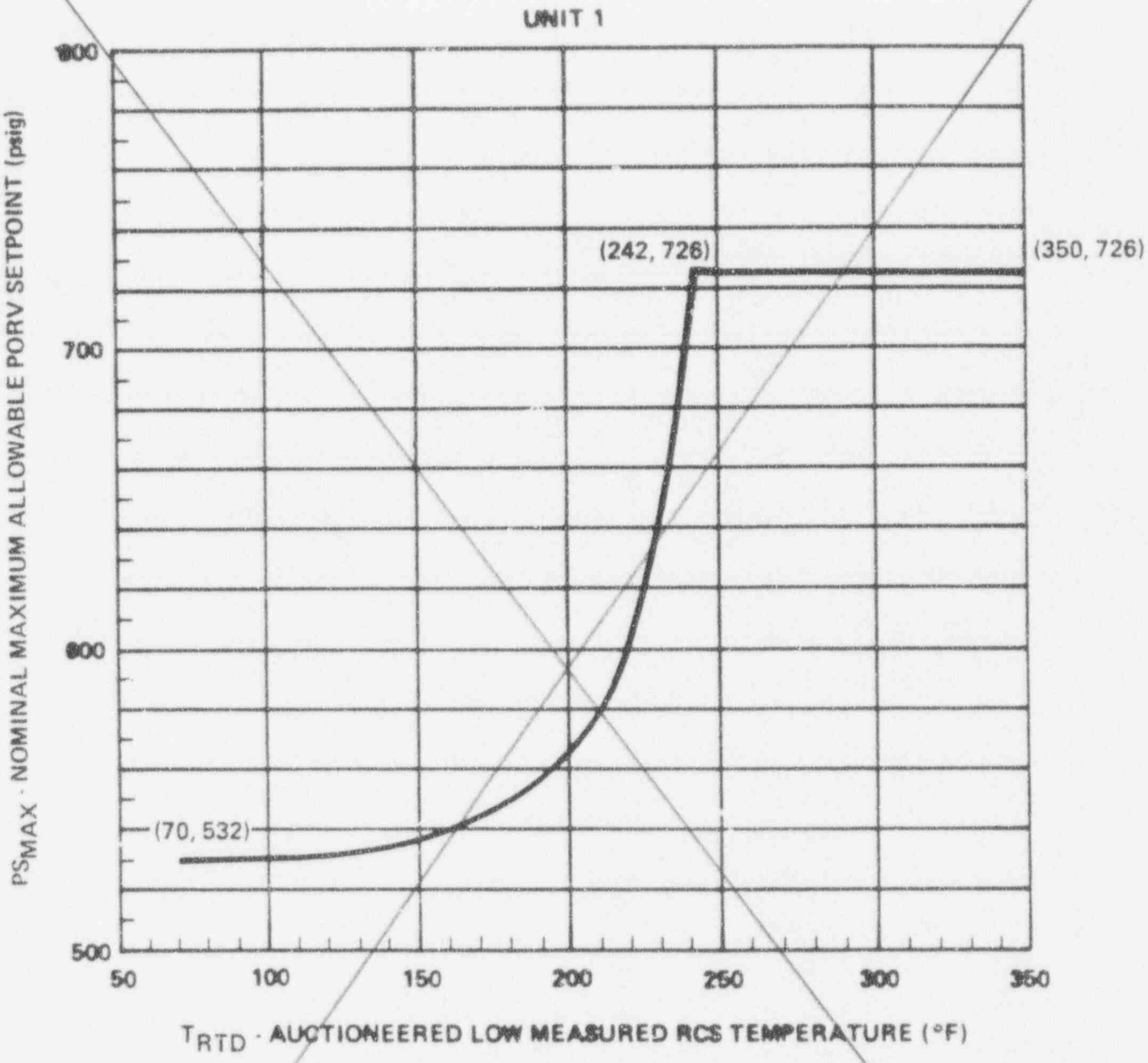

FIGURE 3.4-4a

UNIT 1 MAXIMUM ALLOWABLE NOMINAL PORV SETPOINT
FOR THE COLD OVERPRESSURE PROTECTION SYSTEM

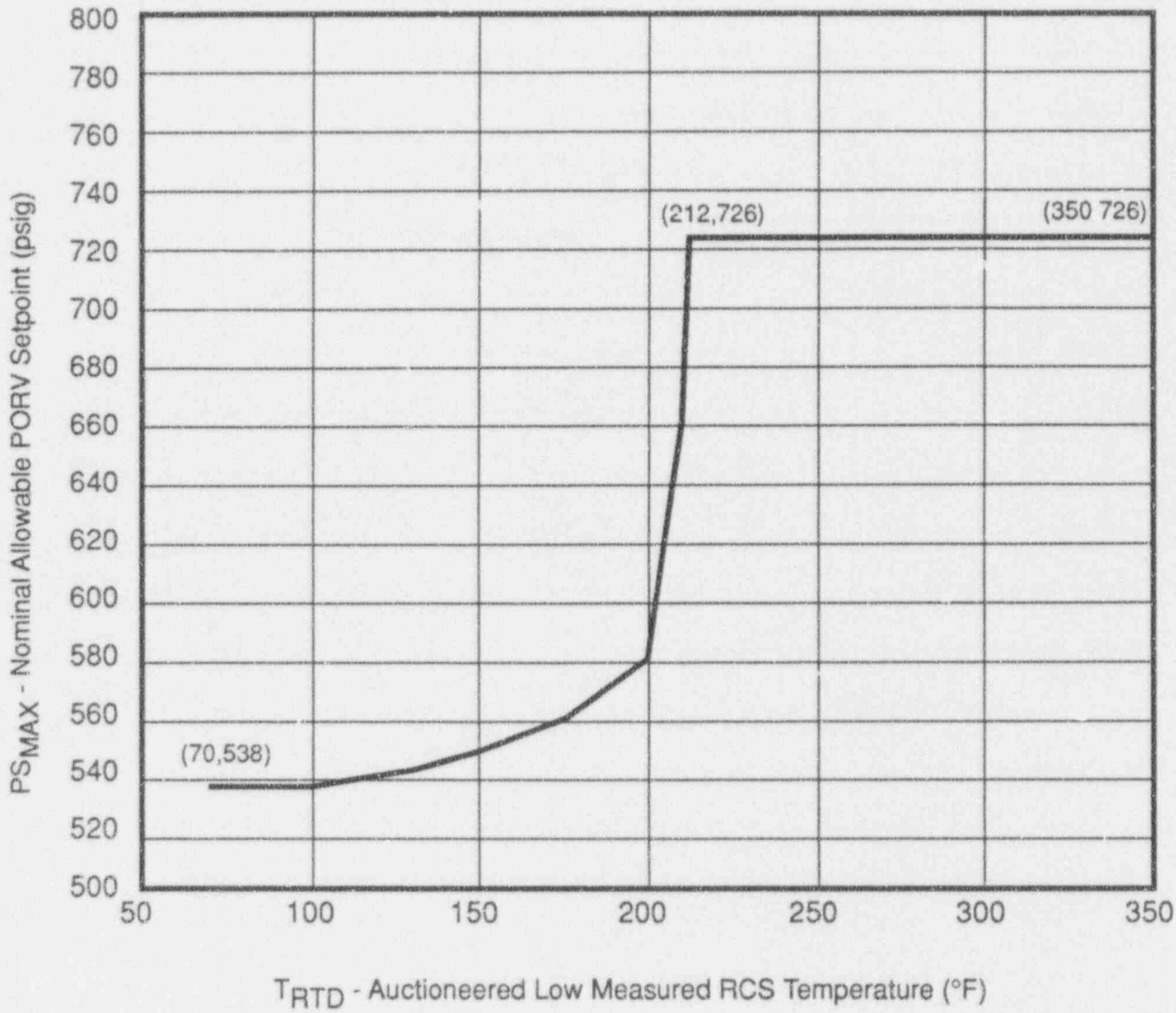

Figure 3.4-4a
Unit 1 Maximum Allowable Nominal PORV Setpoint for the Cold Overpressure Protection System

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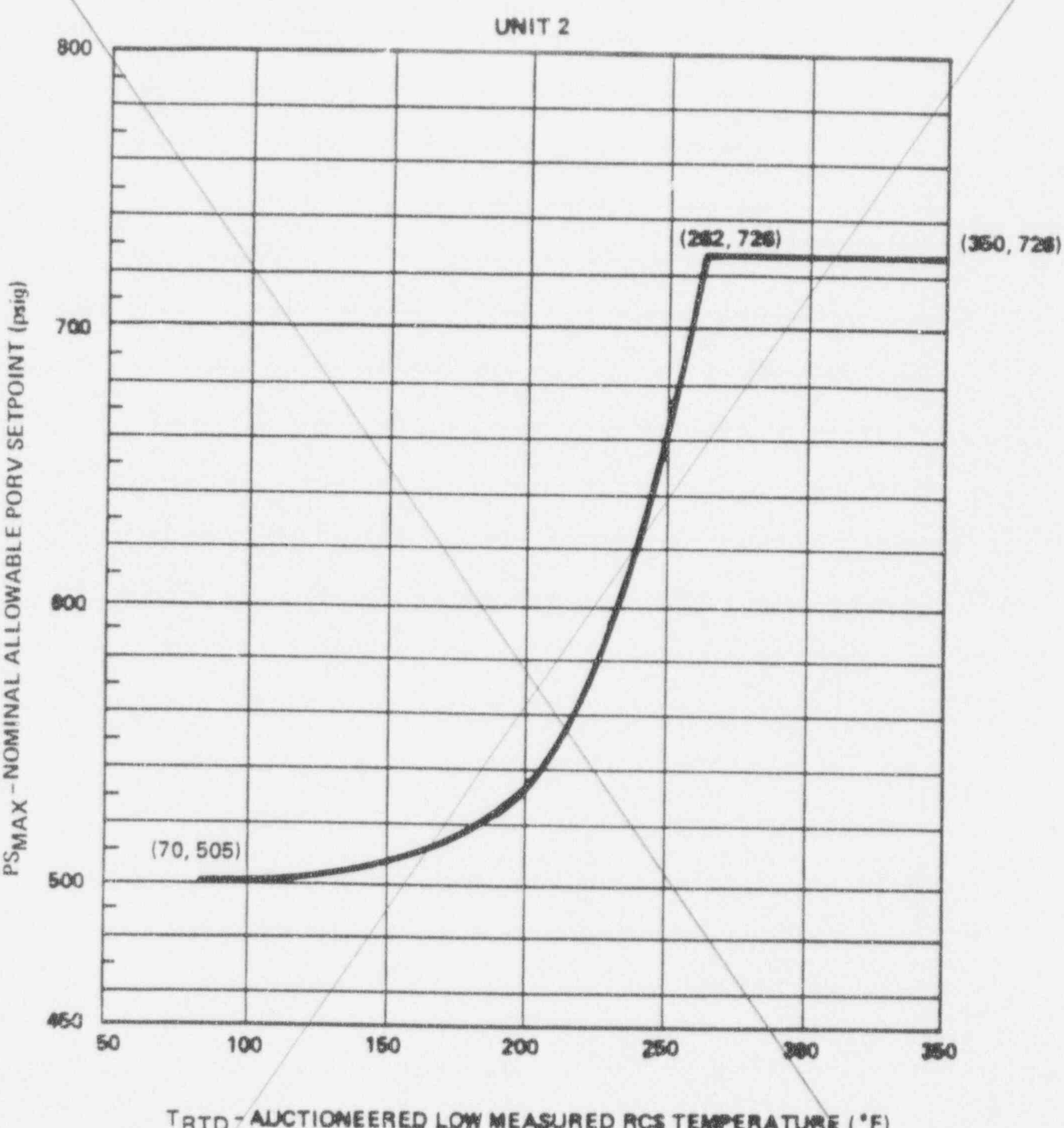

FIGURE 3.4-4b

UNIT 2 MAXIMUM ALLOWABLE NOMINAL PORV SETPOINT FOR THE COLD OVERPRESSURE PROTECTION SYSTEM

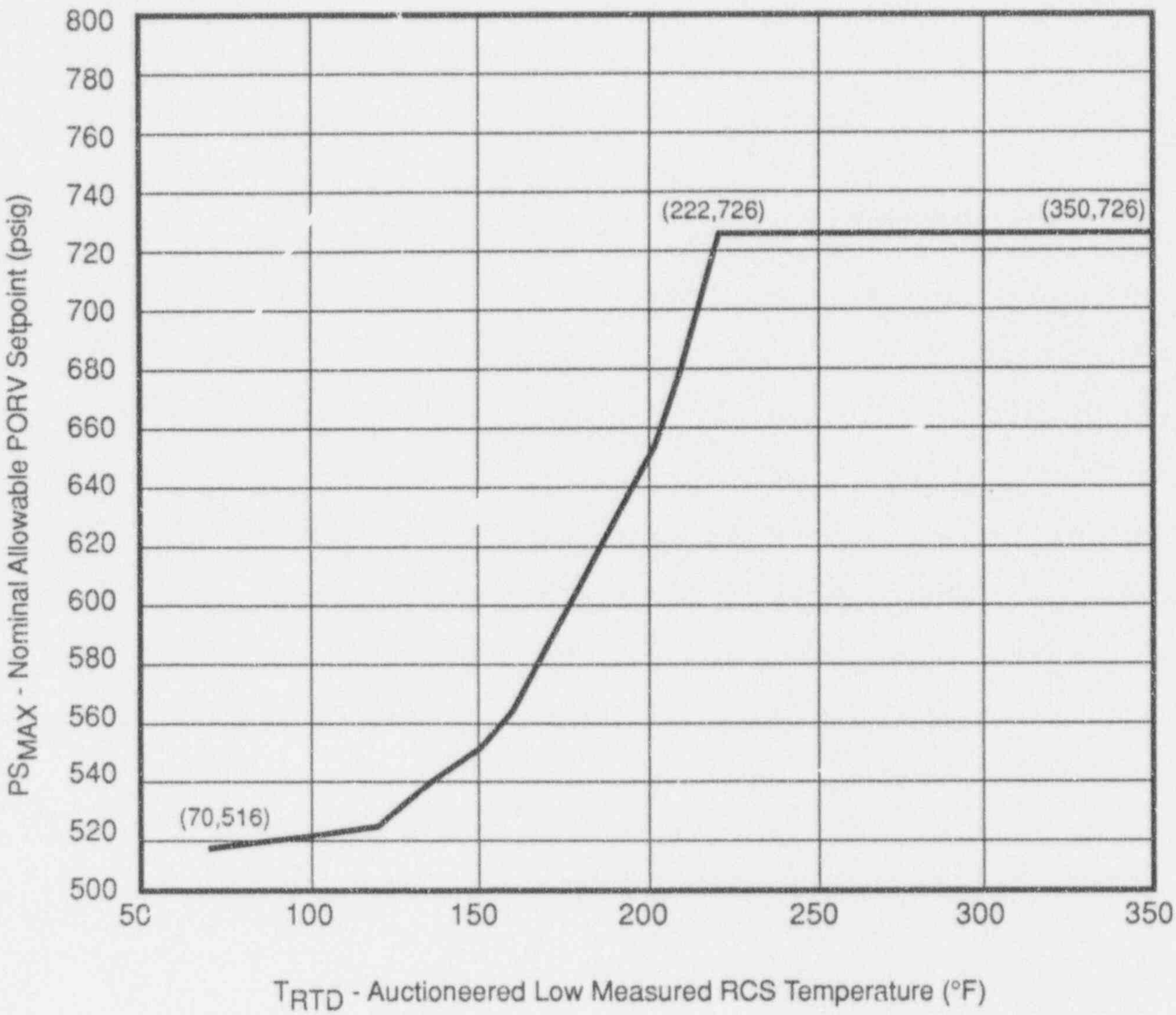

Figure 3.4-4b
Unit 2 Maximum Allowable Nominal PORV Setpoint for the Cold Overpressure Protection System

PRESSURE/TEMPERATURE LIMITS (Continued)

2. These limit lines shall be calculated periodically using methods provided below,

3. The secondary side of the steam generator must not be pressurized above 200 psig if the temperature of the steam generator is below 70°F,

4. The pressurizer heatup and cooldown rates shall not exceed 100°F/h and 200°F/h, respectively. The auxiliary spray shall not be used if the temperature difference between the pressurizer and the auxiliary spray fluid is greater than 625°F, and

5. System preservice hydrotests and inservice leak and hydrotests shall be performed at pressures in accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section XI.

INSERT A HERE

The fracture toughness properties of the ferritic materials in the reactor vessel are determined in accordance with the NRC Standard Review Plan, ASTM E185-82, and in accordance with additional reactor vessel requirements. ~~These properties are then evaluated in accordance with Appendix G of the 1972 Summer Addenda to Section III of the ASME Boiler and Pressure Vessel Code and~~ the calculation methods described in WCAP-7924-A, "Basis for Heatup and Cooldown Limit Curves," April 1975.

INSERT B HERE

~~The heatup and cooldown limit curves shown in Figures 3.4-2a and 3.4-3a are applicable to Unit 1 for up to 13 EFPY and are based on Westinghouse-developed generic curves which were developed assuming a 40°F initial RT_{NDT} and a copper content of 0.10 WT% for the most limiting material. These curves are applicable to Unit 1 since its most limiting material (Table B 3/4.4-1a) has both a lower initial RT_{NDT} (30°F) and a lower copper content (0.06 WT%). These curves, however, are not applicable to Unit 2, since its most limiting material (Table B 3/4.4-1b) has a higher initial RT_{NDT} (50 compared to 40°F). Separate heatup and cooldown limit curves were developed based on the actual material properties of the most limiting material for Unit 2 up to 16 EFPY. The Unit 2 curves are shown in Figures 3.4-2b and 3.4-3b.~~

Heatup and cooldown limit curves are calculated using the most limiting value of the nil-ductility reference temperature, RT_{NDT}, at the end of the Effective Full Power Years (EFPY) of service life. The EFPY service life period is chosen such that the limiting RT_{NDT} at the 1/4T location in the core region is greater than the RT_{NDT} of the limiting unirradiated material. The selection of such a limiting RT_{NDT} assures that all components in the Reactor Coolant System will be operated conservatively in accordance with applicable Code requirements.

INSERT A

These properties are then evaluated in accordance with Appendix G of ASME Boiler and Pressure Vessel Code, Section III, Division 1 - Appendices, "Rules for Construction of Nuclear Power Plant Components, Appendix G, Protection Against Nonductile Failure," 1986 Edition and

INSERT B

The heatup and cooldown limit curves shown in Figures 3.4-2a and 3.4-3a for Unit 1 and Figures 3.4-2b and 3.4-3b for Unit 2 are applicable for up to 16 EFPY and were developed based on the actual material properties of the most limiting material. The most limiting material are shown in Table B 3/4.4-1a for Unit 1 and Tables B 3/4.4-1b for Unit 2.

TABLE B 3/4.4-1a

UNIT 1 REACTOR VESSEL TOUGHNESS

COMPONENT	COMP CODE	ASME MATERIAL TYPE	CU (%)	Ni (%)	P (%)	T_{NDT} (°F)	50 FT-LB 35 MIL TEMP (°F)	RT_{NDT} (°F)	AVERAGE NMWD* (FT-LB)
Closure Head Dome	B8807-1	A533BCL.1	.16	.67	.008	-50	75	15	88
Closure Head Torus	B8808-1	A533BCL.1	.14	.56	.010	-30	68	8	85
Closure Head Flange	B8801-1	A508CL.2	-	.70	.011	20	<40	20	132
Vessel Flange	B8802-1	A508CL.2	-	.71	.014	0	<60	0	119
Inlet Nozzle	B8809-1	A508CL.2	-	.86	.011	-20	<10	-20	107
Inlet Nozzle	B8809-2	A508CL.2	-	.84	.014	-10	<50	-10	95
Inlet Nozzle	B8809-3	A508CL.2	-	.82	.013	-10	<10	-10	117
Inlet Nozzle	B8809-4	A508CL.2	-	.87	.014	-20	<10	-20	105
Outlet Nozzle	B8810-1	A508CL.2	-	.82	.006	-10	<50	-10	>124
Outlet Nozzle	B8810-2	A508CL.2	-	.79	.006	-10	<50	-10	>100
Outlet Nozzle	B8810-3	A508CL.2	-	.77	.006	-10	<50	-10	>102
Outlet Nozzle	B8810-4	A508CL.2	-	.80	.006	-10	<10	-10	>75
Nozzle Shell	B8804-1	A533BCL.1	.14	.62	.011	-10	88	28	94
Nozzle Shell	B8804-2	A533BCL.1	.10	.58	.006	-40	75	15	104
Nozzle Shell	B8804-3	A533BCL.1	.14	.69	.013	-30	100	40	92
Inter. Shell	B8805-1	A533BCL.1	.08	.59	.004	0	60	0	90
Inter. Shell	B8805-2	A533BCL.1	.08	.59	.004	-10	80	20	100
Inter. Shell	B8805-3	A533BCL.1	.06	.60	.003	-20	90	30	107
Lower Shell	B8606-1	A533BCL.1	.05	.59	.005	-50	80	20	116
Lower Shell	B8606-2	A533BCL.1	.05	.58	.009	-10	80	20	113
Lower Shell	B8606-3	A533BCL.1	.06	.64	.007	-20	70	10	118
Bottom Head Torus	B8813-1	A533BCL.1	.13	.50	.009	-40	50	-10	88
Bottom Head Dome	B8812-1	A533BCL.1	.10	.53	.009	-40	32	-28	122
Inter & Lower Shell Vertical Weld Seams and Girth Seam	G1.43	SAW	.03	.10	.007	-80	<-20	-80	>129

*Upper Shelf energy, normal to major working directions

INSERT C HERE

INSERT C

TABLE B 3/4.4-1a

UNIT 1 REACTOR VESSEL TOUGHNESS

COMPONENT	COMP CODE	CU (%)	NI (%)	INITIAL RT_{NDT}(°F)	16 EFPY RTNDT 1/4-t (°F)	16 EFPY RTNDT 3/4-t (°F)
Closure Head Flange	--	--	0.70	20	---	---
Vessel Flange	--	--	0.71	0	---	---
Intermediate Shell	B8805-1	0.083	0.597	0	80.7	64.1
Intermediate Shell*	B8805-2	0.083	0.610	20	100.7	84.1
Intermediate Shell	B8805-3	0.062	0.598	30	97.5	76.4
Lower Shell	B8606-1	0.053	0.593	20	77.6	57.6
Lower Shell	B8606-2	0.057	0.600	20	81.9	62.5
Lower Shell	B8606-3	0.067	0.623	10	80.8	60.6
Circ. Weld	101-171	0.039	0.102	-80	-21.7	-39.9
Long. Weld	101-124A	0.039	0.102	-80	-31.8	-48.5
Long. Weld	101-124B	0.039	0.102	-80	-30.0	-47.0
Long. Weld	101-124C	0.039	0.102	-80	-30.0	-47.0
Long. Weld	101-142A	0.039	0.102	-80	-30.0	-47.0
Long. Weld	101-142B	0.039	0.102	-80	-31.8	-48.5
Long. Weld	101-142C	0.039	0.102	-80	-30.0	-47.0

* Limiting material

TABLE B 3/4.4-1b

UNIT 2 REACTOR VESSEL TOUGHNESS

COMPONENT	COMP CODE	ASME MATERIAL TYPE	CU (%)	Ni (%)	P (%)	T_{NDT} (°F)	RT_{NDT} (°F)	AVERAGE NMWD* (FT-LB)
Closure Head Dome	R9-1	A533B CL. 1	0.07	0.61	0.008	-40	-30	123
Closure Head Torus	R10-1	A533B CL. 1	0.07	0.64	0.010	-30	0	84
Closure Head Flange	R7-1	A508 CL. 2	-	0.72	0.011	10	10	110
Vessel Flange	R1-1	A508 CL. 2	-	0.87	0.011	-60	-60	115
Inlet Nozzle	B9806-1	A508 CL. 2	0.07	0.84	0.010	-50	-50	119
Inlet Nozzle	B9806-2	A508 CL. 2	0.06	0.83	0.009	-40	-40	128
Inlet Nozzle	R5-1	A508 CL. 2	0.09	0.87	0.008	-20	-20	147
Inlet Nozzle	R5-2	A508 CL. 2	0.08	0.85	0.009	-20	-20	134
Outlet Nozzle	R6-3	A508 CL. 2	-	0.69	0.011	-10	-10	122
Outlet Nozzle	R6-4	A508 CL. 2	-	0.66	0.010	-10	-10	140
Outlet Nozzle	B9807-3	A508 CL. 2	-	0.66	0.005	-30	-30	116
Outlet Nozzle	B9807-4	A508 CL. 2	-	0.64	0.010	10	10	132
Nozzle Shell	R3-1	A533B CL. 1	0.20	0.67	0.015	0	20	79
Nozzle Shell	R3-2	A533B CL. 1	0.20	0.67	0.015	0	40	79
Nozzle Shell	R3-3	A533B CL. 1	0.15	0.62	0.010	-10	60	84
Intermediate Shell	R4-1	A533B CL. 1	0.06	0.64	0.009	-20	10	95
Intermediate Shell	R4-2	A533B CL. 1	0.05	0.62	0.009	-10	10	104
Intermediate Shell	R4-3	A533B CL. 1	0.05	0.59	0.009	0	30	84
Lower Shell	B8825-1	A533B CL. 1	0.05	0.59	0.006	-20	40	83
Lower Shell	R8-1	A533B CL. 1	0.06	0.62	0.007	-20	40	87
Lower Shell**	R8628-1	A533B CL. 1	0.05	0.59	0.007	-20	50	85
Bottom Head Torus	R12-1	A533B CL. 1	0.17	0.64	0.012	-20	-20	89
Bottom Head Dome	R11-1	A533B CL. 1	0.10	0.62	0.008	-30	-30	115
Intermediate & Lower Shell Vertical Weld Seams	G1.60	SAW	0.07	0.13	0.007	-10	-10	147
Intermediate to Lower Shell Girth Weld Seam	E3.23	SAW	0.06	0.12	0.007	-50	-30	90

*Upper Shelf energy, normal to major working direction.

**Limiting material.

INSERT D HERE

TABLE B 3/4.4-1B

UNIT 2 REACTOR VESSEL TOUGHNESS

COMPONENT	COMP CODE	CU (%)	NI (%)	INITIAL RTndt (°F)	16 EFPY RTNDT 1/4-t (°F)	16 EFPY RTNDT 3/4-t(°F)
Closure Head Flange	--	--	0.72	10	--	--
Vessel Flange	--	--	0.87	-60	--	--
Intermediate Shell	R4-1	0.06	0.64	10	81	62
Intermediate Shell	R4-2	0.05	0.62	10	72	54
Intermediate Shell	R4-3	0.05	0.59	30	92	74
Lower Sell	B8825-1	0.05	0.59	40	102	84
Lower Shell	R8-1	0.06	0.62	40	111	92
Lower Shell*	B8628-1	0.05	0.59	50	112	94
Circ. Weld	--	0.06	0.12	-30	55	31
Long. Weld	--	0.07	0.13	-10	83	56

*Limiting Material

INSERT D

PRESSURE/TEMPERATURE LIMITS (Continued)

The reactor vessel materials have been tested to determine their initial RT_{NDT}; the results of these tests are shown for Units 1 and 2 in Table B 3/4.4-1a and b, respectively. Reactor operation and resultant fast neutron (E greater than 1 MeV) irradiation can cause an increase in the RT_{NDT}. Therefore, an adjusted reference temperature, based upon the fluence, copper content, and ~~phosphorus~~ nickel content of the material in question, can be predicted using ~~Figure B 3/4.4-1 and the largest value of ΔRT_{NDT} computed by either~~ Regulatory Guide 1.99, Revision 2, "Effects of Residual Elements on Predicted Radiation Damage to Reactor Vessel Materials," ~~or the Westinghouse Copper Trend Curves shown in Figure B 3/4.4-2.~~ The heatup and cooldown limit curves of Figures 3.4-2a and 3.4-3a (Unit 1), Figures 3.4-2b and 3.4-3b (Unit 2) include predicted adjustments for this shift in RT_{NDT} at the end of ~~13 (Unit 1) and 16 (Unit 2)~~ 16 EFPY as well as adjustments for possible errors in the pressure and temperature sensing instruments of 60 psig and 10°F, respectively.

INSERT E HERE

Values of ΔRT_{NDT} determined in this manner may be used until the results from the material surveillance program, evaluated according to ASTM E185, are available. Capsules will be removed in accordance with the requirements of ASTM E185-82 and 10 CFR Part 50, Appendix H. The surveillance specimen withdrawal schedule is shown in Table 16.3-3 of the VEGP FSAR. The lead factor represents the relationship between the fast neutron flux density at the location of the capsule and the inner wall of the reactor vessel. Therefore, the results obtained from the surveillance specimens can be used to predict future radiation damage to the reactor vessel material by using the lead factor and the withdrawal time of the capsule. The heatup and cooldown curves must be recalculated when the ΔRT_{NDT} determined from the surveillance capsule exceeds the calculated ΔRT_{NDT} for the equivalent capsule radiation exposure.

Allowable pressure-temperature relationships for various heatup and cooldown rates are calculated using methods derived from Appendix G in Section III of the ASME Boiler and Pressure Vessel Code as required by Appendix G to 10 CFR Part 50, and these methods are discussed in detail in the following paragraphs.

The general method for calculating heatup and cooldown limit curves is based upon the principles of the linear elastic fracture mechanics (LEFM) technology. In the calculation procedures a semielliptical surface defect with a depth of one-quarter of the wall thickness, T, and a length of 3/2T is assumed to exist at the inside of the vessel wall as well as at the outside of the vessel wall. The dimensions of this postulated crack, referred to in Appendix G of ASME Section III as the reference flaw, amply exceed the current capabilities of inservice inspection techniques. Therefore, the reactor operation limit curves developed for this reference crack are conservative and provide sufficient safety margins for protection against nonductile failure. To assure that the radiation embrittlement effects are accounted for in the calculation of the

INSERT E

In addition, these curves include a pressure adjustment of 74 psig to account for the pressure differential between the wide range pressure transmitter and the belt line region.

PRESSURE/TEMPERATURE LIMITS (Continued)

be analyzed in order to assure that at any coolant temperature the lower value of the allowable pressure calculated for steady-state and finite heatup rates is obtained.

The second portion of the heatup analysis concerns the calculation of pressure-temperature limitations for the case in which a 1/4T deep outside surface flaw is assumed. Unlike the situation at the vessel inside surface, the thermal gradients established at the outside surface during heatup produce stresses which are tensile in nature and thus tend to reinforce any pressure stresses present. These thermal stresses, of course, are dependent on both the rate of heatup and the time (or coolant temperature) along the heatup ramp. Furthermore, since the thermal stresses at the outside are tensile and increase with increasing heatup rate, a lower bound curve cannot be defined. Rather, each heatup rate of interest must be analyzed on an individual basis.

Following the generation of pressure-temperature curves for both the steady-state and finite heatup rate situations, the final limit curves are produced as follows. A composite curve is constructed based on a point-by-point comparison of the steady-state and finite heatup rate data. At any given temperature, the allowable pressure is taken to be the lesser of the three values taken from the curves under consideration.

The use of the composite curve is necessary to set conservative heatup limitations because it is possible for conditions to exist such that over the course of the heatup ramp the controlling condition switches from the inside to the outside and the pressure limit must at all times be based on analysis of the most critical criterion.

Next, the composite curves for the heatup rate data and the cooldown rate data are adjusted for possible errors in the pressure and temperature sensing instruments by the values indicated on the respective curves.

Unit 1

Finally, the new 10CFR50 Appendix G Rule which addresses the metal temperature of the closure head flange and vessel flange regions is considered. This rule states that the minimum metal temperature of the closure flange regions should be at least 120°F higher than the limiting RT_{NDT} for these regions when the pressure exceeds 2[illegible] percent of the preservice hydrostatic test pressure (621 psig for ~~Westingh[illegible] Plants~~). For Unit 1 the minimum temperature of the closure flange and vess[illegible] flange regions is 140°F, since the limiting RT_{NDT} is 20°F (see Table B 3/4-4.1a). ~~The Vogtle Unit 1 heatup curve shown on Figure 3-4.2a is not impacted by the new 10CFR50 rule. However, the Vogtle Unit 1 cooldown curve shown in Figure 3-4.3a is impacted by the new 10CFR50 rule.~~ For Unit 2, the minimum temperature of the closure flange and vessel flange regions is 130°F, since the limiting RT_{NDT} is 10°F (Table B 3/4-1b). ~~The Unit 2 heatup curve shown in Figure 3.4-2b and the cooldown curve shown in Figure 3.4-3b are not impacted by the new 10 CFR 50 rule.~~

INSERT F HERE

INSERT F

These values include margin of 10°F and 60 psig for instrumentation errors. The heatup and cooldown curves as shown in Figures 3-4.2a and 3-4.3a for Unit 1 and the heatup and cooldown curves as shown in figures 3-4.2b and 3-4.3b for Unit 2 are impacted by the new 10 CFR 50 rule.

PRESSURE/TEMPERATURE LIMITS (Continued)

Although the pressurizer operates in temperature ranges above those for which there is reason for concern of nonductile failure, operating limits are provided to assure compatibility of operation with the fatigue analysis performed in accordance with the ASME Code requirements.

COLD OVERPRESSURE PROTECTION SYSTEMS

The OPERABILITY of two PORVs, two RHR suction relief valves, a PORV and RHR SRV, or an RCS vent capable of relieving at least 670 gpm water flow at 470 psig ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR Part 50 when one or more of the RCS cold legs are less than or equal to 350°F. The PORVs have adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either: (1) the start of an idle RCP with the secondary water temperature of the steam generator less than or equal to 50°F above the RCS cold leg temperatures, or (2) the start of all three charging pumps and subsequent injection into a water-solid RCS. The RHR SRVs have adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either: (1) the start of an idle RCP with the secondary to primary water temperature difference of the steam generator less than or equal to 25°F at an RCS temperature of 350°F and varies linearly to 50°F at an RCS temperature of 200°F or less, or (2) the start of all three charging pumps and subsequent injection into a water-solid RCS. A combination of a PORV and an RHR SRV also provides overpressure protection for the RCS.

The Maximum Allowed PORV Setpoint for the Cold Overpressure Protection System (COPS) is derived by analysis which models the performance of the COPS assuming various mass input and heat input transients. Operation with a PORV Setpoint less than or equal to the maximum Setpoint ensures that the nominal ~~10 EFPY for Unit 1 and~~ 16 EFPY ~~for Unit 2~~ Appendix G reactor vessel NDT limits criteria will not be violated with consideration for a maximum pressure overshoot beyond the PORV setpoint which can occur as a result of time delays in signal processing and valve opening, instrument uncertainties, and single failure. To ensure that mass and heat input transients more severe than those assumed cannot occur, Technical Specifications require lockout of all safety injection pumps while in MODES 4, 5, and 6 with the reactor vessel head installed and disallow start of an RCP if secondary temperature is more than 50°F above primary temperature. Additional temperature limitations are placed on the starting of a Reactor Coolant Pump in Specification 3.4.1.3. These limitations assure that the RHR system remains within its ASME design limits when the RHR relief valves are used to prevent RCS overpressurization.

The Maximum Allowed PORV Setpoint for the COPS will be updated based on the results of examinations of reactor vessel material irradiation surveillance specimens performed as required by 10 CFR Part 50, Appendix H, and in accordance with the schedule in Table 16.3-3 of the VEGP FSAR.

3/4.4.10 STRUCTURAL INTEGRITY

The inservice inspection and testing programs for ASME Code Class 1, 2, and 3 components ensure that the structural integrity and operational readiness of these components will be maintained at an acceptable level throughout the life of the plant. These programs are in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

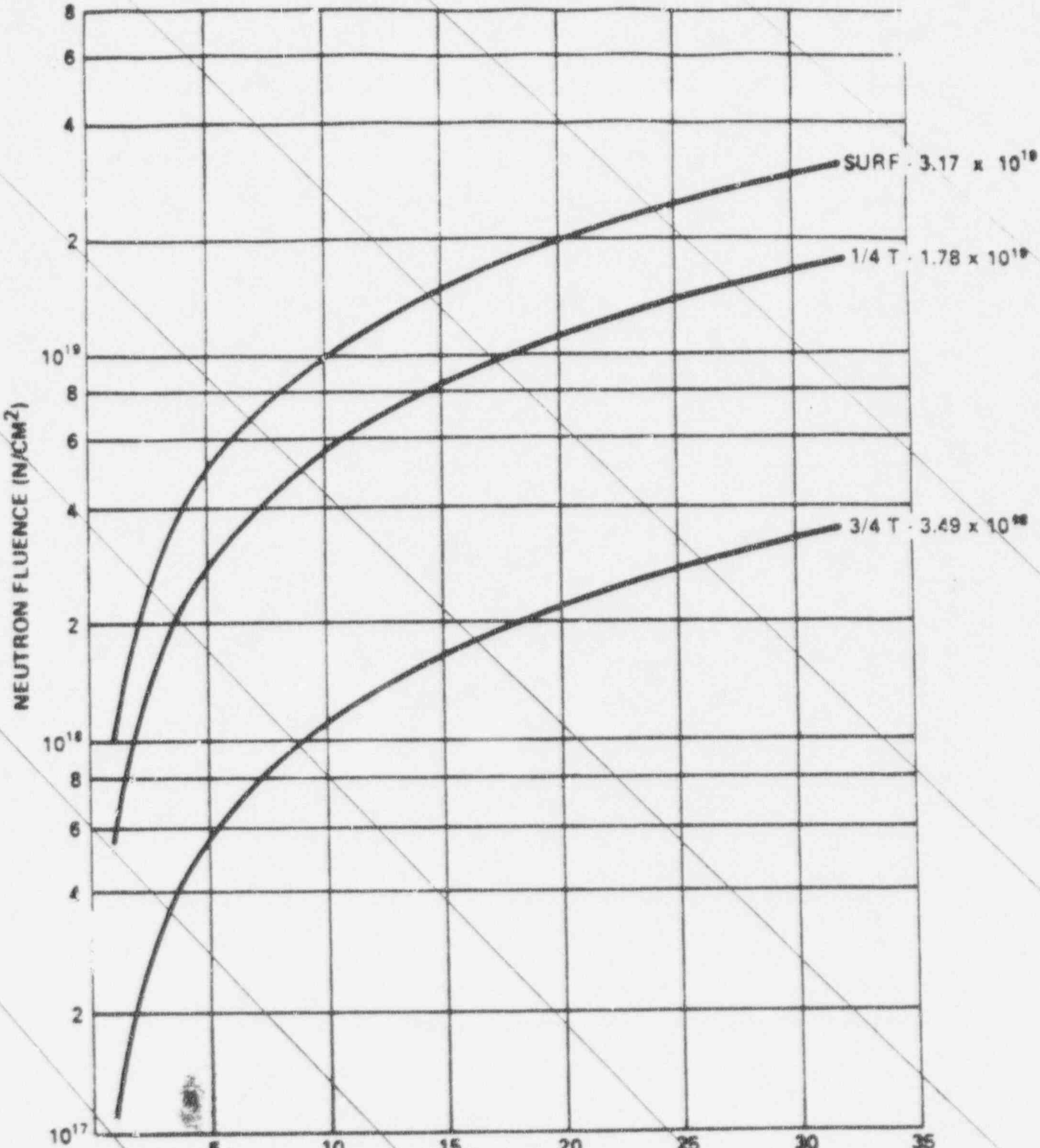

FIGURE B 3/4.4-1

FAST NEUTRON FLUENCE (E>1MeV) AS A FUNCTION OF FULL POWER SERVICE LIFE

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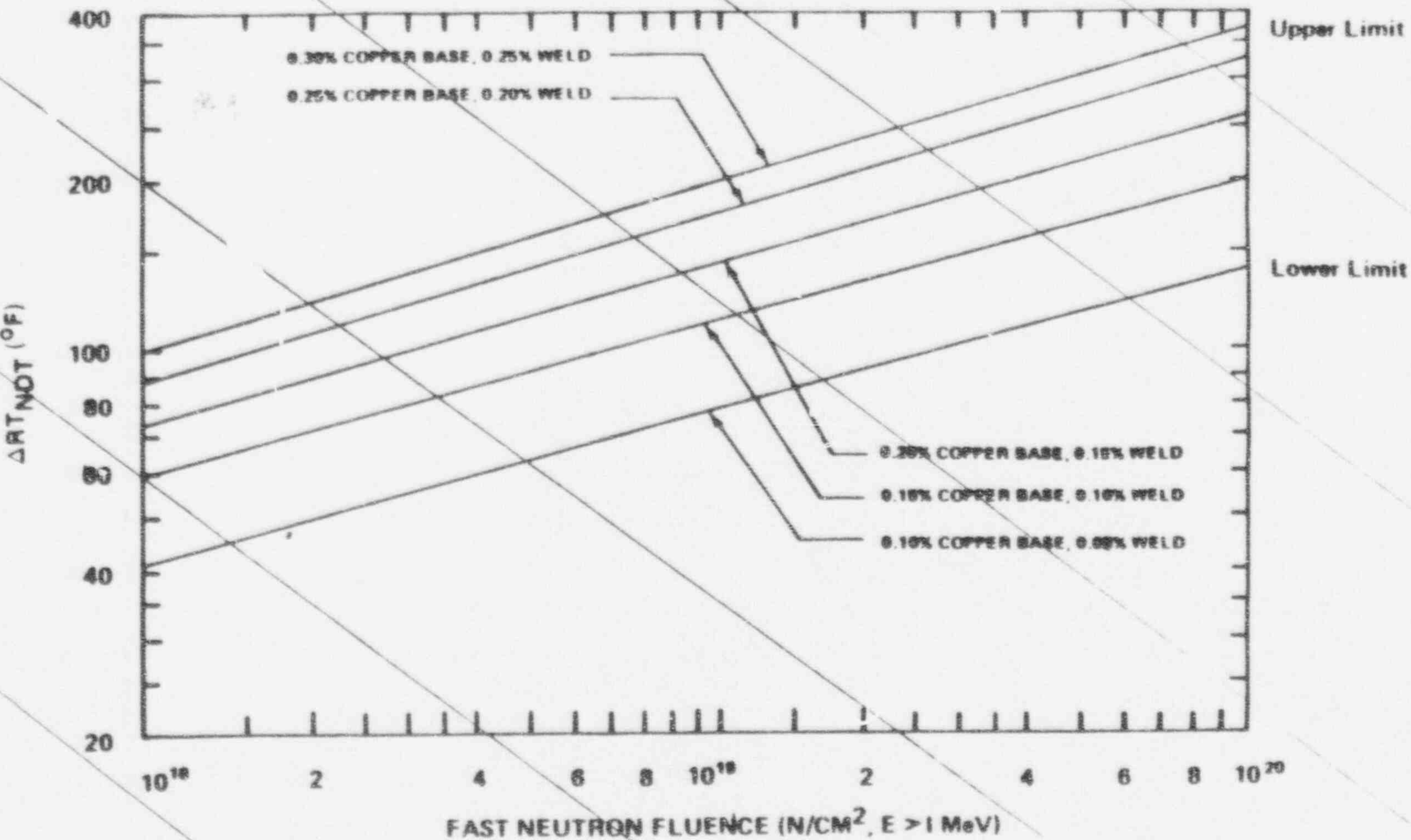

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FIGURE B 3/4.4-2

EFFECT OF FLUENCE AND COPPER CONTENT ON SHIFT OF RT_{NDT}
FOR REACTOR VESSELS EXPOSED TO RADIATION AT 550°F

ENCLOSURE 4

VOGTLE ELECTRIC GENERATING PLANT
REQUEST TO REVISE TECHNICAL SPECIFICATIONS
REVISION TO REACTOR PRESSURE VESSEL LIMITS

EXEMPTION REQUEST

This enclosure requests, in accordance with the provisions of 10 CFR 50.12, an exemption from certain requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Light Water Nuclear Power Reactors for Normal Operation." As stated in 10 CFR 50.60, "Proposed Alternatives to the Described Requirements in Appendices G and H of this part or portions thereof may be used when an exemption is granted by the Commission under 50.12." This exemption is requested to allow the application of the American Society of Mechanical Engineers (ASME) Code Case N-514, "Low Temperature Overpressure Protection," in determining acceptable setpoints for VEGP Units 1 and 2.

Pressure/temperature (P/T) limits for low temperature overpressure protection are characterized by the system enabling temperature and the setpoint pressure for the pressure relieving device. Current regulatory guidelines require that the low temperature overpressure protection (LTOP) system must be enabled at temperatures less than or equal to RT_{NDT} + 90°F, where RT_{NDT} is the adjusted reference temperature including margin, at the quarter thickness location. At temperature greater than RT_{NDT} + 90°F LTOP protection need not be provided. The maximum LTOP system pressure is determined based on system-specific considerations, but is chosen so that the maximum pressure attained in the vessel will not exceed the P/T limit curve defined by Appendix G to ASME Section III and Appendix G to 10 CFR 50.

The LTOP limits caused operational constraints by limiting the range available to the operator to heat up and cool down the plant. The operating window through which the reactor coolant system is heated up and cooled down is determined by the difference between the maximum allowable pressure determined from ASME Section III, Appendix G, and the minimum allowable pressure determined by the differential pressure between reactor coolant system pressure and atmospheric pressure for the RCP seals. As previously discussed, the Westinghouse methodology used to calculate LTOP setpoints did not account for the differential pressure across the reactor core during RCP operation.

VOGTLE ELECTRIC GENERATING PLANT
REQUEST TO REVISE TECHNICAL SPECIFICATIONS
REVISION TO REACTOR PRESSURE VESSEL LIMITS

EXEMPTION REQUEST

The existing LTOP setpoint curve is based on a plant-specific evaluation with PORV setpoints selected within a range of allowable pressures at various temperatures. For the existing curves, the 74 psi nonconservatism depletes the existing margin at approximately 120°F for Unit 1 and 145°F for Unit 2.

ASME Code Case N-514 requires that the LTOP systems limit the maximum pressure in the vessel to 110 percent of the pressure determined to satisfy Appendix G limits.

The ASME Working Group on Operating Plant Criteria developed code guidelines to define LTOP limits that will avoid unnecessary operational restrictions, provide adequate margins against failure, and reduce the potential for unnecessary activation of pressure-relieving devices used for LTOP. The LTOP limits allow the pressure that may occur with activation of pressure-relieving devices at temperature less than 200°F to exceed the P/T limits, however, acceptable margins to vessel fracture are maintained during these events. The pressure vessel is protected both from LTOP events and the P/T limits in Technical Specifications applicable for normal heatup and cooldown in accordance with Appendix G to 10 CFR 50 and Sections III and XI of the ASME code.

Some conservatism in Appendix G pressure and/or temperature curve calculations are:

1. Safety factor of 2 on the principal membrane (pressure) stresses.

2. The disregarding of increased mechanical properties of the vessel that accompany material embrittlement (element yield strength and flow stress).

3. The limiting toughness is based upon a reference value (K_{IR}), which is a lower bound of the dynamic crack initiation or arrest toughness.

EXEMPTION REQUEST

4. A margin factor of 2σ (sigma) applied in determining the adjusted reference temperature (ART).

5. An assumed flaw in the wall of the reactor vessel with a depth equal to 1/4 of the thickness of the vessel wall and a length equal to 1 1/2 times the vessel wall thickness.

Bases for Exemption

The requested exemption to the regulations is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security.

Georgia Power Company believes that the requested exemption meets the criteria in 10 CFR 50.12 (a)(2) in that special circumstances are present. These includes:

- 10 CFR 50.12 (a)(2)(ii)

  The application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

  The basis for the LTOP setpoints is to preclude the potential for brittle failure of reactor vessel material. ASME Code Case N-514 recognizes the conservatism of the Appendix G curves and allows establishing a setpoint that preserves the acceptable margin of safety while maintaining operational margins for RCP operation at low temperatures and pressures. Setpoints established in accordance with Code Case N-514 will also minimize the unnecessary activation of protection system pressure relieving devices. Therefore, establishing LTOP setpoints using Code Case N-514 criteria satisfies the underlying purpose of the ASME code and regulations that nuclear power plant systems and components are operated to ensure an acceptable level of safety and environment impact.

EXEMPTION REQUEST

Based on the above, the application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.

- 10 CFR 50.12 (1)(2)(iii)

  Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated.

  Administrative restrictions on RCP operations while at low RCS temperatures would result in an unnecessary burden in that a long delay would be required to ensure minimum RCS temperature before starting the RCPs. The application of the code case will minimize any delays in starting the plant. The proposed LTOP P/T limits provide an acceptable margin against crack initiation and failure in reactor vessels. The P/T limits do not significantly change the likelihood of vessel failure associated with normal heatup and cooldown limits. The LTOP limits also reduce the potential for unnecessary activation of pressure-relieving devices. The new LTOP limits provide both economic and safety benefit.

  Therefore, compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted.

Conclusion

ASME Code Case N-514 allows setting the LTOP setpoints such that the Appendix G curves are not exceeded by more than 10 percent. At this time, GPC only wants to use this code case at temperature less than 200°F. The ASME code committee has concluded the LTOP guidelines provide acceptable margin against crack initiation and failure in reactor vessel and will reduce the potential for unnecessary activation of protection system pressure-relieving devices. Consequently, the proposed LTOP setpoints provide both operational and safety benefits with no adverse safety or environmental impact. GPC believes that use of Code Case N-514 provides an acceptable level of quality and safety.

ENCLOSURE 4 (CONTINUED)

VOGTLE ELECTRIC GENERATING PLANT
REQUEST TO REVISE TECHNICAL SPECIFICATIONS
REVISION TO REACTOR PRESSURE VESSEL LIMITS

EXEMPTION REQUEST

Compliance with the current approved P/T limits would result in economic hardship to GPC without a compensating increase in the level of quality or safety. Georgia Power Company requests that this exemption from certain requirement of 10 CFR 50.60 be processed by March 31, 1995.