

## REACTOR COOLANT SYSTEM

### BASES

#### 3/4.4.9 PRESSURE/TEMPERATURE LIMITS

The temperature and pressure changes during heatup and cooldown are limited to be consistent with the requirements given in the ASME Boiler and Pressure Vessel Code, Section III, Appendix G.

- 1) The reactor coolant temperature and pressure and system heatup and cooldown rates (with the exception of the pressurizer) shall be limited in accordance with Figures 3.4-2 and 3.4-3 for the first full-power service period.
  - a) Allowable combinations of pressure and temperature for specific temperature change rates are below and to the right of the limit lines shown. Limit lines for cooldown rates between those presented may be obtained by interpolation.
  - b) Figures 3.4-2 and 3.4-3 define limits to assure prevention of non-ductile failure only. For normal operation, other inherent plant characteristics, e.g., pump heat addition and pressurizer heater capacity, may limit the heatup and cooldown rates that can be achieved over certain pressure-temperature ranges.
- 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/hr and 200°F/hr respectively. The spray shall not be used if the temperature difference between the pressurizer and the spray fluid is greater than 560°F.
- 5) System preservice hydrotests and in-service leak and hydrotests shall be performed at pressures in accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section XI.

10 CFR Appendix G, addressed metal temperature of the closure head flange and vessel regions. Appendix G states that the minimum metal temperature of the closure flange region should be at least 120 degrees Fahrenheit (F) higher than the limiting RT<sub>NDT</sub> for this region when the pressure exceeds 20 percent of the preservice hydrostatic test pressure (561 pounds per square inch gauge (psig) for Westinghouse Electric Corporation plants). For SQN, Unit 1, the minimum temperature of the closure flange and vessel flange regions is 90 degrees F since the limiting initial RT<sub>NDT</sub> for the closure head flange is -40 degrees F (see Table B 3/4.4-1). These numbers (561 psig and 90 degrees F) include a margin for instrumentation error of 10 degrees F and 60 psig. The SQN Unit 1 heat up and cooldown curves shown in Figures 3.4-2 and 3.4-3 are not impacted by this regulation.

The fracture toughness properties of the ferritic materials in the reactor vessel are determined in accordance with the NRC Standard Review Plan, and ASTM E185-82, and in accordance with additional reactor vessel requirements. These properties are then evaluated in accordance with Appendix G to 10 CFR 50 and Appendix G of the 1986 ASME Boiler and Pressure Vessel Code, Section III, Division 1 and the calculation methods described in WCAP-7924-A, "Basis for Heatup and Cooldown Limit Curves, April 1975."

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CURVES APPLICABLE FOR HEATUP RATES UP TO 60°F/HR  
 FOR THE SERVICE PERIOD UP TO 16 EFPY. MARGINS OF 60 PSIG  
 AND 10°F ARE INCLUDED FOR POSSIBLE INSTRUMENT ERRORS.

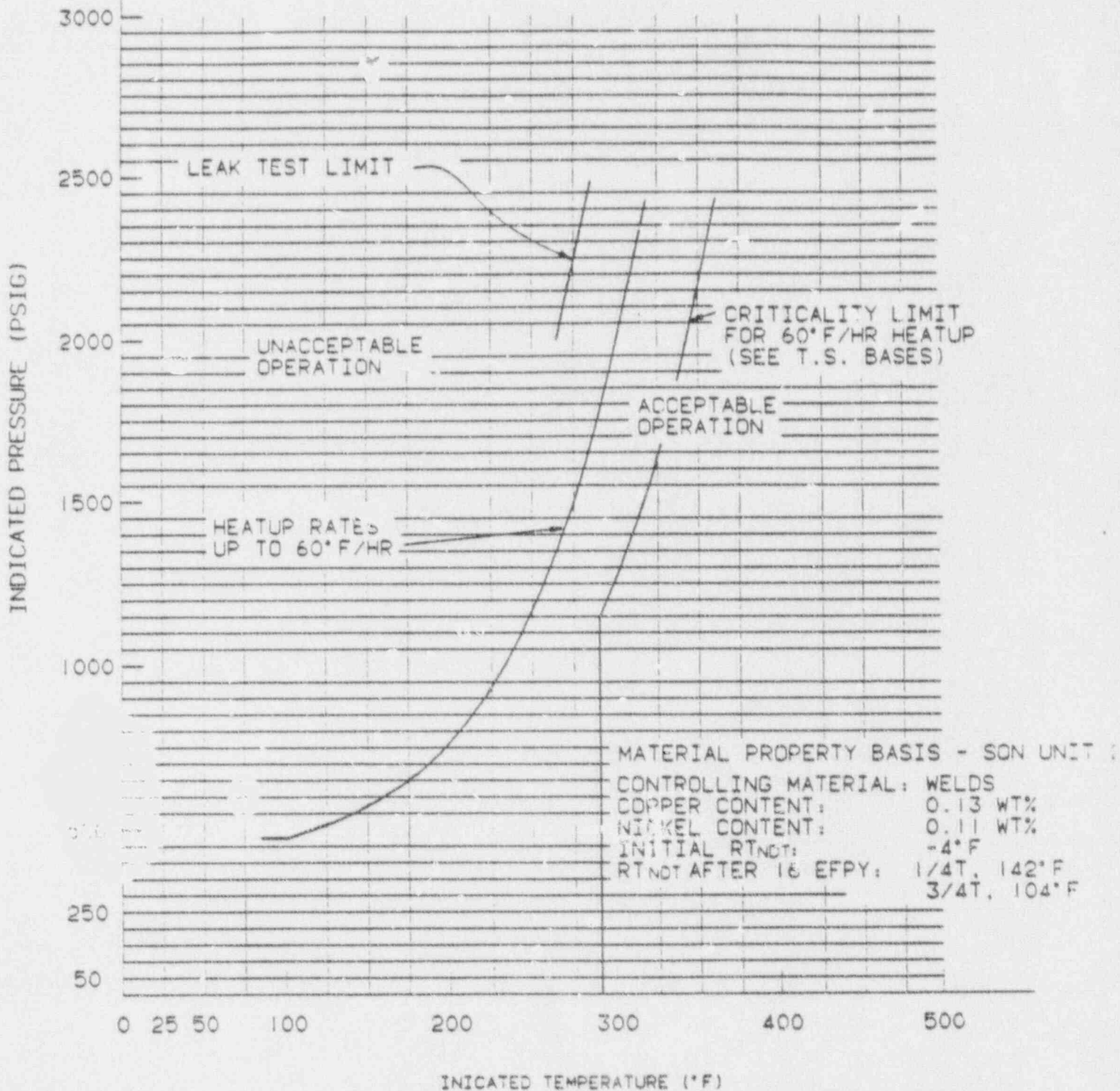


FIGURE 3.4-2 SEOUOYAH UNIT 2 REACTOR COOLANT SYSTEM HEATUP LIMITATIONS  
 APPLICABLE UP TO 16 EFPY

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CURVES APPLICABLE FOR COOLDOWN RATES UP TO 100°F/HP  
 FOR THE SERVICE PERIOD UP TO 16 EPY. MARGINS OF 60 PSIG  
 AND 10°F ARE INCLUDED FOR POSSIBLE INSTRUMENT ERRORS.

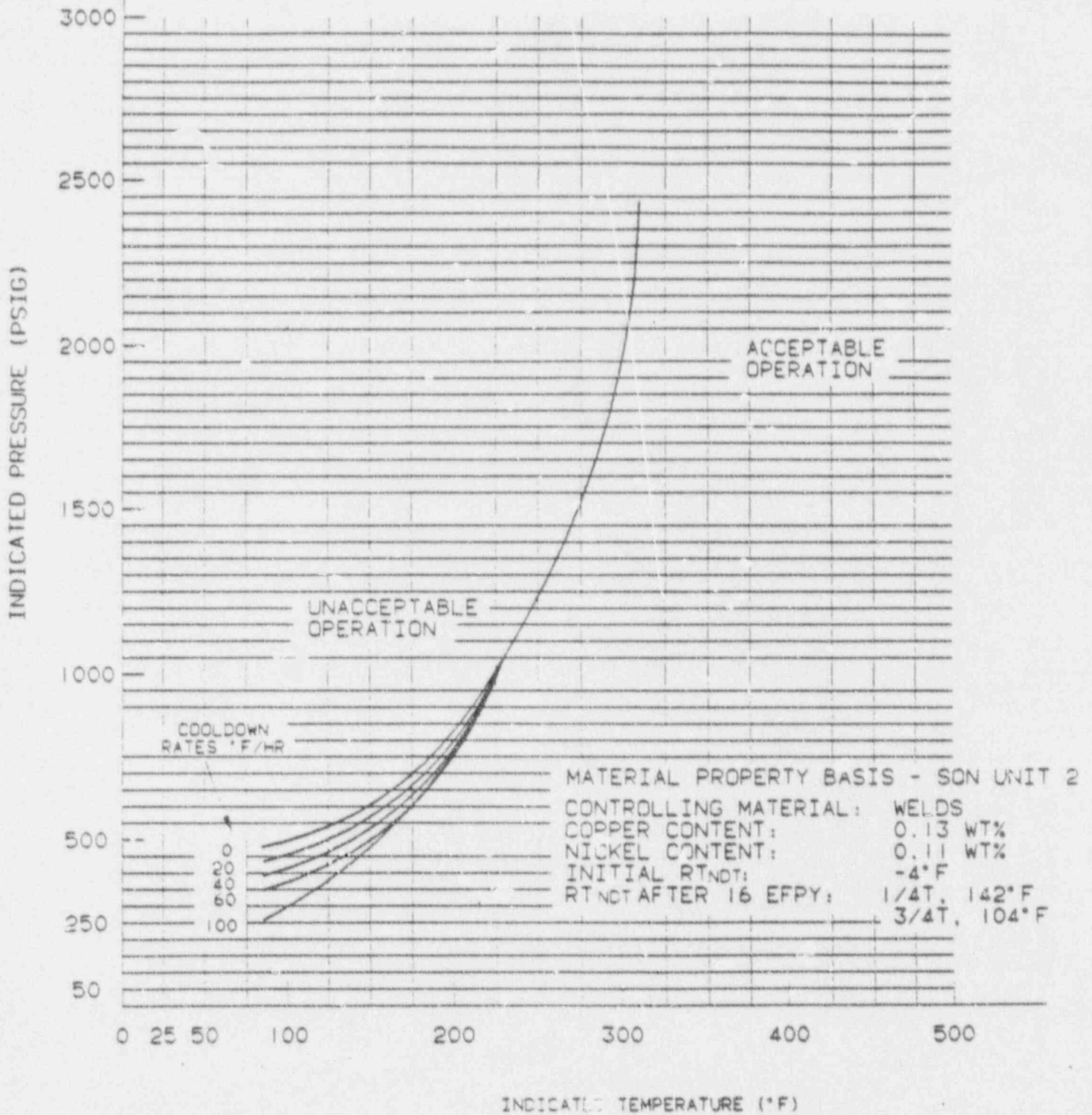


FIGURE 3.4-3 SEDUOYAH UNIT 2 REACTOR COOLANT SYSTEM COOLDOWN LIMITATIONS  
 APPLICABLE UP TO 16 EPY

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