ATTACHMENT B

MARKED UP PAGES FOR
PROPOSED CHANGES TO APPENDIX A
TECHNICAL SPECIFICATIONS OF
FACILITY OPERATING LICENSES
NPF-72 AND NPF-77

BRAIDWOOD STATION UNIT 1
REVISED PAGES:

VIII
3/4 4-39*
3/4 4-40
B 3/4 4-16

*NOTE: THIS PAGE HAS NO CHANGES BUT IS INCLUDED FOR CONTINUITY.

SECTION PAGE

OVERPRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 At least two overpressure protection devices shall be OPERABLE, and each device shall be either:

a. A residual heat removal (RHR) suction relief valve with a lift setting of less than or equal to 450 psig, or

b. A power operated relief valve (PORV) with a lift setpoint that varies with RCS temperature which does not exceed the limit established in Figure 3.4-4a for Unit 1 (Figure 3.4-4b for Unit 2).

APPLICABILITY: MODES 4, 5, and 6 with the reactor vessel head on.

ACTION:

a. With one of the two required overpressure protection devices inoperable in MODE 4, restore two overpressure protection devices to OPERABLE status within 7 days or depressurize and vent the RCS through at least a 2 square inch vent within the next 8 hours.

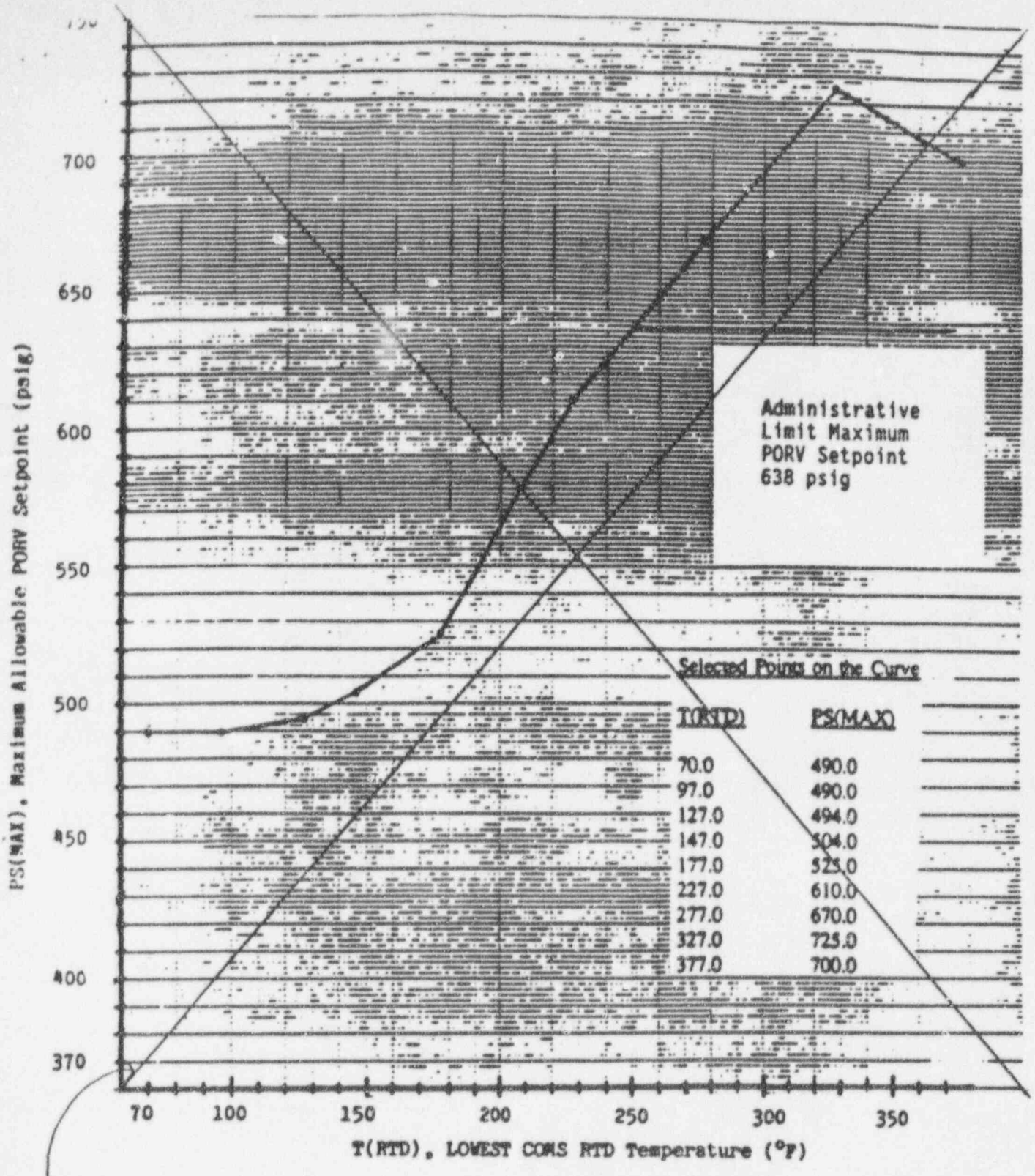
b. With one of the two required overpressure protection devices inoperable in MODES 5 or 6, restore two overpressure protection devices to OPERABLE status within 24 hours or vent the RCS through at least a 2 square inch vent within the next 8 hours.

c. With both of the required overpressure protection devices inoperable, depressurize and vent the RCS through at least a 2 square inch vent within 8 hours.

d. With the RCS vented per ACTIONS a, b, or c, verify the vent pathway at least once per 31 days when the pathway is provided by a valve(s) that is locked, sealed, or otherwise secured in the open position; otherwise, verify the vent pathway every 12 hours.

e. In the event either the PORVs, RHR suction relief valves, or the RCS vents are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs, RHR suction relief valves, or RCS vents on the transient, and any corrective action necessary to prevent recurrence.

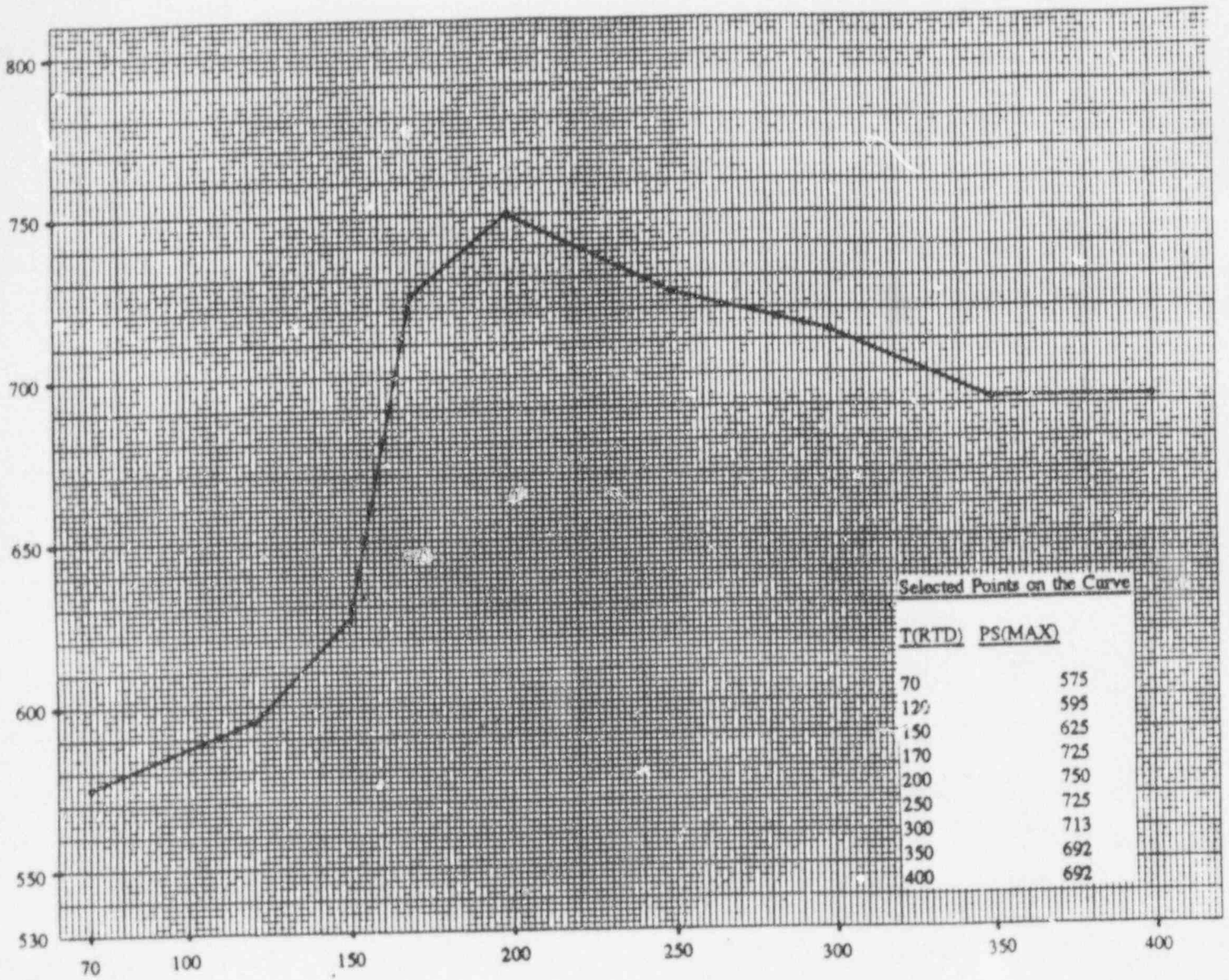
f. The provisions of Specification 3.0.4 are not applicable.



Replace curve with Insert A

FIGURE 3.4-4a
NOMINAL PORV PRESSURE RELIEF SETPOINT VERSUS
RCS TEMPERATURE FOR THE COLD OVERPRESSURE PROTECTION SYSTEM
APPLICABLE UP TO ~~5.37~~ 8.5 EFPY (UNIT 1)

INSERT A


800
750
700
650
600
550
530
70
100
150
200
250
300
350
400
Selected Points on the Curve
T(RTD) PS(MAX)
70 575
120 595
150 625
170 725
200 750
250 725
300 713
350 692
400 692

PRESSURE/TEMPERATURE LIMITS (Continued)

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.

Finally, 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.

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.

The OPERABILITY of two PORVs, or two RHR suction relief valves, or one PORV and one RHR suction relief valve, or an RCS vent opening of at least 2 square inches 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. Either PORV has 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 a centrifugal charging pump and its injection into a water solid RCS.

These two scenarios are analyzed to determine the resulting overshoots assuming a single PORV actuation with a stroke time of 2.0 seconds from full closed to full open. ~~Figure 3.4-4a (3.4-4b) are based upon this analysis and represents the maximum allowable PORV variable setpoint such that, for the two overpressurization transients noted, the resulting pressure will not exceed the Appendix G reactor vessel NDT limits.~~ Insert B

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).

INSERT B

Figure 3.4-4a and 3.4-4b are based on this analysis and represent the maximum allowable PORV variable setpoint such that for the overpressurization transients noted, Figure 3.4-4a limits the resulting pressure to 110% of the Appendix G vessel NDT limits, Figure 3.4-4b ensures the resulting pressure will not exceed the Appendix G vessel NDT limits.

Figure 3.4-4a does not contain allowances for random instrument uncertainties and was developed using the guidance contained in ASME Code Case N-514 in addition to the Appendix G requirements. Figure 3.4-4a also accounts for the flow induced pressure difference between the RCS pressure sensor and the Reactor Vessel beltline.

Figure 3.4-4b contains allowances for temperature instrument uncertainties and does not account for the flow induced pressure difference between the RCS pressure sensor and the Reactor Vessel beltline.

ATTACHMENT C

EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATIONS FOR
PROPOSED CHANGES TO APPENDIX A
TECHNICAL SPECIFICATIONS OF
FACILITY OPERATING LICENSES
NPF-72 AND NPF-77

Commonwealth Edison has evaluated this proposed amendment and determined that it involves no significant hazards considerations. According to Title 10 Code of Federal Regulations Section 50 Subsection 92 Paragraph c (10 CFR 50.92 (c)), a proposed amendment to an operating license involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or

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

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

A. INTRODUCTION

Commonwealth Edison (ComEd) proposes to revise Figure 3.4-4a, "Nominal PORV Pressure Relief Setpoint Versus RCS Temperature For The Cold Overpressure Protection System Applicable up to 5.37 EFPY (Unit 1)," of Technical Specification 3.4.9.3 and the bases associated with TS 3.4.9.3. The index page entry associated with Figure 3.4-4a will also be changed to reflect the changes in Figure 3.4-4a. Figure 3.4-4a describes the nominal Pressurizer Power Operated Relief Valve (PORV) setpoints for the Low Temperature Overpressure Protection System (LTOPS) as a function of reactor Coolant System (RCS) temperature.

Currently, Figure 3.4-4a is valid until Braidwood Unit 1 reaches 5.37 Effective Full Power Years (EFPY). In addition, the current Figure 3.4-4a contains an administrative limit line to protect PORV downstream piping from water hammer effects during pressurizer solid water conditions, and contains allowances for pressure and temperature instrument uncertainties. The current Figure 3.4-4a also contains allowances for a 50°F thermal transport effect associated with the postulated heat injection transient.

In order to extend the duration of applicability for Figure 3.4-4a to 8.5 EFPY, remove the pressure and temperature instrument uncertainties, and remove the administrative limit line it is necessary to revise the current Figure 3.4-4a. The revised Figure 3.4-4a will retain the 50°F thermal transport effect allowance. Additionally, the revised curve accounts for the flow induced pressure difference between the pressure transmitter in the RCS loop piping and the reactor vessel midplane, and takes advantage of a 10% relaxation of the maximum allowable RCS pressure in accordance with American Society of Mechanical Engineers (ASME) Code Case N-514. ComEd applied for permission to use the criteria of ASME Code Case N-514 in the determination of LTOPS setpoints via letter dated November 30, 1994.

In addition the index and bases pages will be revised to reflect the changes to Figure 3.4-4a.

The pressure and temperature instrument uncertainties are being removed as the regulations governing Pressure-Temperature (P-T) limits and LTOPS setpoints; 10 CFR 50 Appendix G, ASME Boiler and Pressure Vessel (BPV) Code Section XI Appendix G, and NUREG 0800 Branch Technical Position MTEB 5-2 (NUREG 0800 BTP 5-2), do not require margins for random instrument uncertainties. Further, compared with the margins inherent in the P-T limits and LTOPS setpoints developed in accordance with these regulations, random pressure and temperature instrument uncertainties are insignificant. With respect to the 800 psig limit employed to protect the PORV discharge piping from water hammer effects, conservatisms in the application of this limit also support removal of pressure and temperature instrument uncertainties and allowances while still providing adequate PORV discharge piping protection.

The imposition of margin in addition to that already shown to exist results in several negative effects with no concurrent increase in protection against nonductile failure of the Reactor Pressure Vessel (RPV). This unnecessary margin reduces operating flexibility by reducing the margin between the maximum allowed RCS pressure and the minimum RCS pressure for reactor coolant pump (RCP) operation. Excess margin increases the likelihood of LTOPS actuation at lower setpoints and reduces the amount of separation of the setpoints for the PORVs used in the LTOPS. This endangers RCP seals as LTOPS actuation at setpoints determined by the current methodology may cause RCS pressure to drop below the minimum needed to maintain proper RCP seal differential pressure.

The original Byron/Braidwood LTOPS setpoint development took credit for the fact that LTOPS events are most likely to occur with the RCS at isothermal conditions. Thus no temperature streaming effects would occur. Therefore, the temperature streaming allowance is being removed from the revised Figure 3.4-4a.

B. NO SIGNIFICANT HAZARDS ANALYSIS

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The new LTOPS curve will not change any postulated accident scenarios. The Appendix G limits, which is the bases for the revised curve was developed using industry standards and regulations which are recognized as being inherently conservative. The LTOPS curve provide RCS limits to protect the RPV from brittle fracture by clearly separating the region of normal operations from the region where the RPV is subject to brittle fracture.

Using the Regulatory Guide (RG) 1.99, "Radiation Embrittlement of Reactor Vessel Materials," Revision 2, Braidwood Unit 1 Surveillance Capsule U results, and the requirements of Appendix G to 10 CFR 50, as modified by the guidance in ASME Code Case N-514, a new LTOPS curve was prepared. This new curve, in conjunction with the P-T Limit curves, and the heatup and cooldown ranges provides the required assurance that the RPV is protected from brittle fracture. Removal of pressure and temperature instrument uncertainties and allowances still results in retention of adequate margin to P-T limits. No changes to the design of the facility have been made and no new equipment has been added or removed. The revised LTOPS curve provides assurance that the RPV is protected from brittle fracture.

The bases and index page changes are purely administrative in nature and are designed to reflect the changes in Figure 3.4-4a. These administrative changes will have no effect on any equipment, system, or operating mode.

Thus, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

The use of the new LTOPS curve does not change any postulated accident scenarios. The new curve does not represent any appreciable change in the current methodologies; it merely provides assurance that the RPV is protected from brittle fracture. Removal of pressure and temperature instrument uncertainties and allowances still results in retention of adequate margin to P-T limits. No new accident or malfunction mechanism is introduced by this amendment and no physical plant changes will result from this amendment.

The bases and index page changes are purely administrative in nature and are designed to reflect the changes in Figure 3.4-4a. These administrative changes will have no effect on any equipment, system, or operating mode.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **The proposed change does not involve a significant reduction in a margin of safety.**

The new LTOPS curve was generated using conservative methodology with capsule surveillance data. The Appendix G limits, which is the bases for the new LTOPS curve were developed using industry standards and regulations which are recognized as being inherently conservative. Removal of pressure and temperature instrument uncertainties and allowances still results in retention of adequate margin to P-T limits. The use of the new LTOPS limits would not change any postulated accident scenarios.

The bases and index page changes are purely administrative in nature and are designed to reflect the changes in Figure 3.4-4a. These administrative changes will have no effect on any equipment, system, or operating mode.

Thus, the proposed change does not involve a significant reduction in a margin of safety.

Therefore, based on the above evaluation, ComEd has concluded that these changes involve no significant hazards considerations.

ATTACHMENT D

ENVIRONMENTAL ASSESSMENT FOR
PROPOSED CHANGES TO APPENDIX A
TECHNICAL SPECIFICATIONS OF
FACILITY OPE[illegible]NG LICENSES
NPF-72 [illegible]PF-77

Commonwealth Edison Company (ComEd) has evaluated this proposed license amendment request against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with Title 10, Code of Federal Regulations, Part 51, Section 21 (10 CFR 51.21). ComEd has determined that this proposed license amendment request meets the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9). This determination is based upon the following:

1. The proposed licensing action involves the [illegible]suance of an amendment to a license for a reactor [illegible]nt to 10 CFR 50 which changes a requirement with [illegible]spect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or which changes an inspection or a surveillance requirement. This proposed license amendment request replaces Figure 3.4-4a, "Nominal PORV Pressure Relief Setpoint Versus RCS Temperature For The Cold Overpressure protection System Applicable up to 5.37 EFPY (Unit 1)," of Technical Specification 3.4.9.3 with a new Figure 3.4-4a, "Nominal PORV Pressure Relief Setpoint Versus RCS Temperature For The Cold Overpressure protection System Applicable up to 8.5 EFPY (Unit 1)," and makes administrative changes to the bases and index pages for Technical Specification 3.4.9.3 to support the revised Figure 3.4-4a.

2. this proposed license amendment request involves no significant hazards considerations;

3. there is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite; and

4. there is no significant increase in individual or cumulative occupational radiation exposure.

Therefore, pursuant to 10 CFR 51.22(b), neither an environmental impact statement nor an environmental assessment is necessary for this proposed license amendment request.

ATTACHMENT E

American Society of Mechanical Engineers
Boiler and Pressure Vessel Code
Section XI Appendix G
Figure G-2210-1

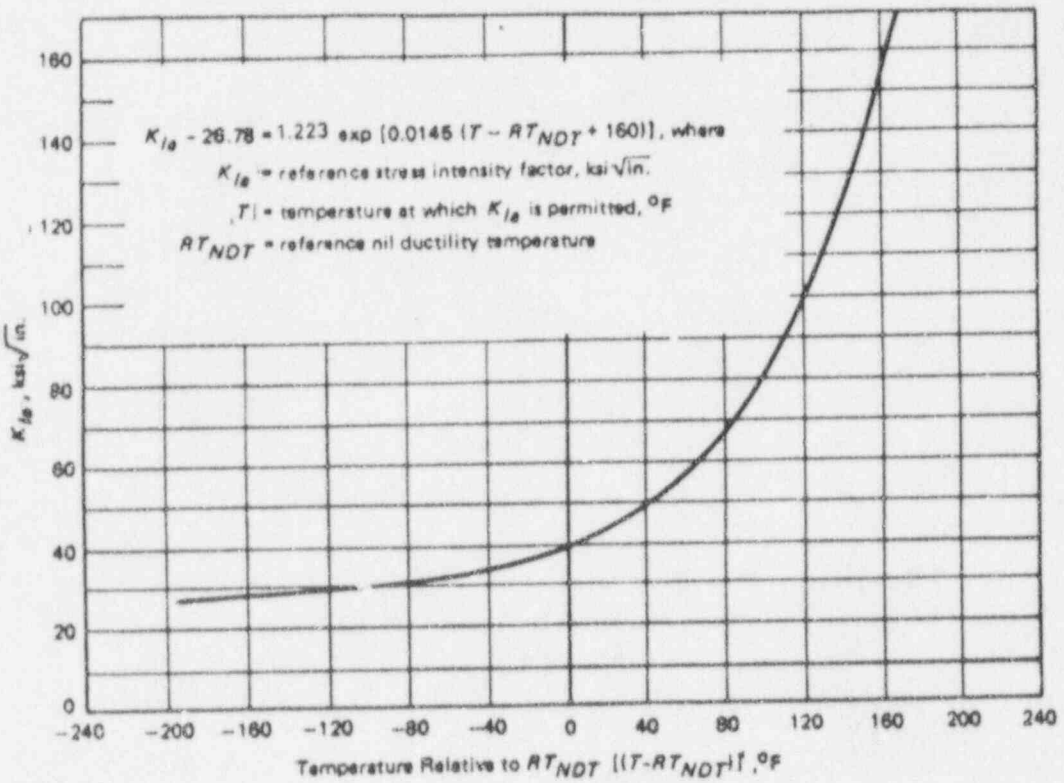
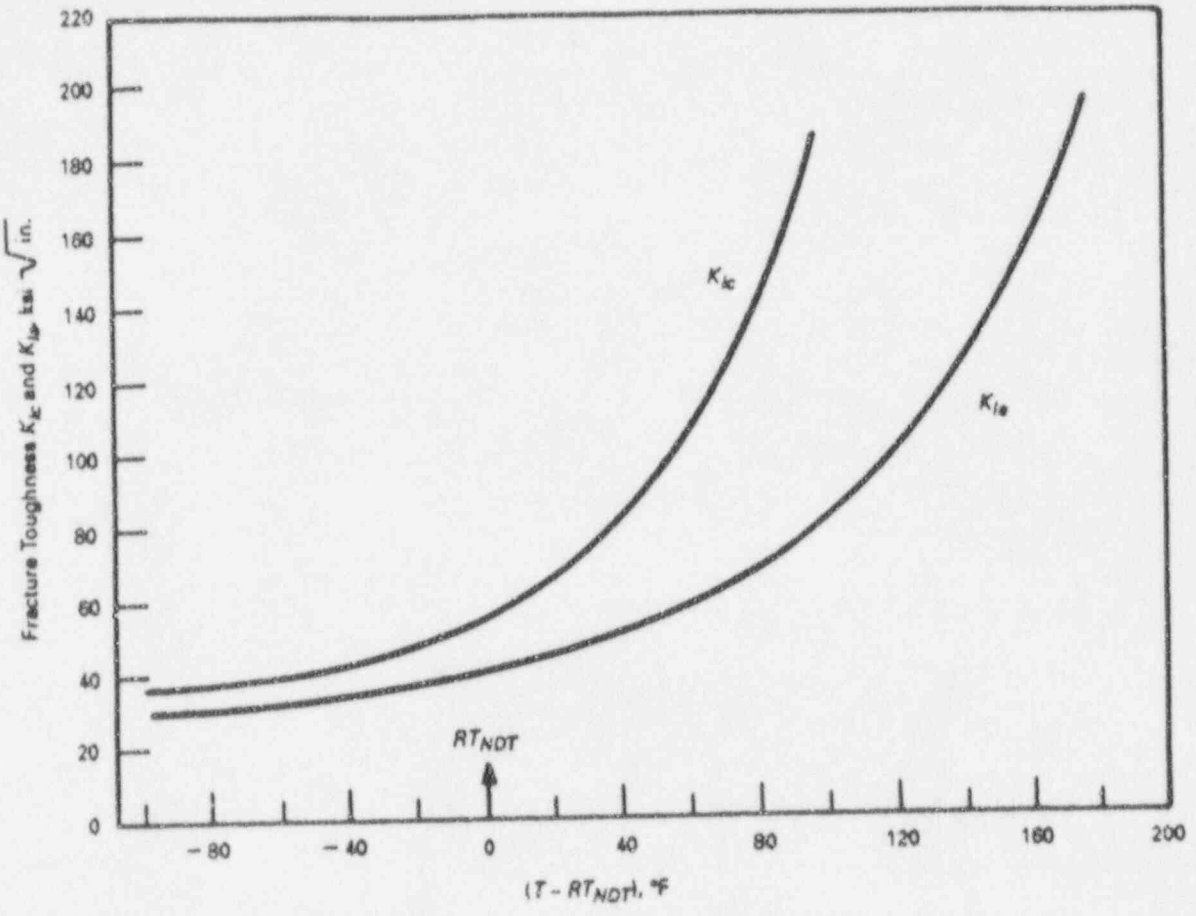

$K_{Ia} - 26.78 = 1.223 \exp [0.0145 (T - RT_{NDT} + 160)]$, where
K_{Ia} = reference stress intensity factor, ksi$\sqrt{\text{in.}}$
T = temperature at which K_{Ia} is permitted, °F
RT_{NDT} = reference nil ductility temperature
K_{Ia}, ksi$\sqrt{\text{in.}}$
160
140
120
100
80
60
40
20
0
−240 −200 −160 −120 −80 −40 0 40 80 120 160 200 240
Temperature Relative to RT_{NDT} $(T-RT_{NDT})$, °F

FIG. G-2210-1

ATTACHMENT F

American Society of Mechanical Engineers
Boiler and Pressure Vessel Code
Section XI Appendix A
Figure A-4200-1



A92 FIG. A-4200-1 LOWER BOUND K_{Ia} AND K_{Ic} TEST DATA FOR SA-533 GRADE B CLASS 1, SA-508 CLASS 2, AND SA-508 CLASS 3 STEELS

ATTACHMENT G

J.N. Chirigos and T. A. Meyer
"Influence of Material Property Variations on the
Assessment of Structural Integrity on Nuclear Components"
Journal of Testing and Evaluation
Volume 6, Number 5, September 1978
Figure 5

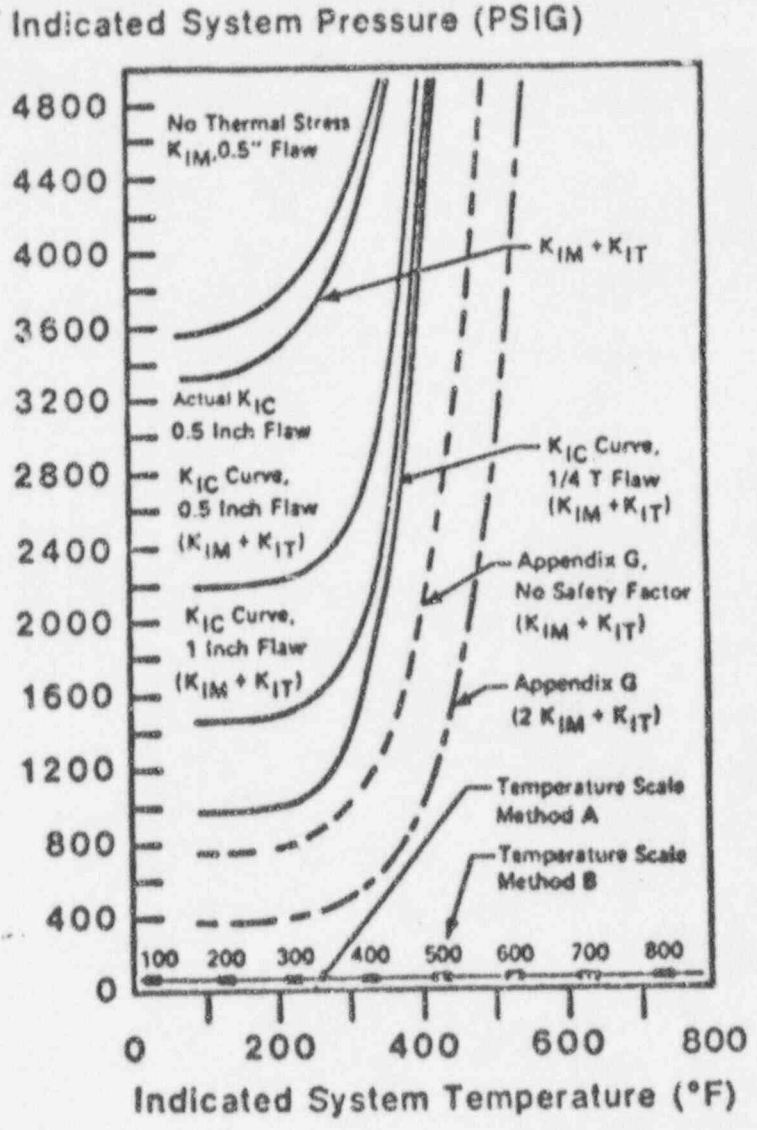


FIG. 5—*Reactor vessel cool-down limit curves.* $\Delta T/\Delta t$, *maximum* 33°C/h (60°F/h) [*1 psig* = 6.9 kPa; *1 in.* = 25.4 mm; °C = (°F − 32)/1.8].