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SEP 2 2 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 235 TO LICENSE
NFP-22: CHANGES TO REACTOR PRESSURE VESSEL
PRESSURE-TEMPERATURE (P-T) LIMITS
PLA-5811 **Docket No. 50-388**

Reference: 1) PLA-5341, R. G. Byram (PPL) to USNRC, "Proposed Amendment to License NPF-14 and to License NPF-22: Changes to Reactor Pressure Vessel Pressure-Temperature (P-T) Limits and Request or Exemption from the Requirements of 10 CFR 50 Section 50.60(a)," dated July 17, 2001.

2) Letter from D. S. Collins (USNRC) to R. G. Byram (PPL), "Susquehanna Steam Electric Station, Units 1 and 2 – Issuance of Amendment Re: Reactor Pressure Vessel Pressure-Temperature Limit Curves (TAC Nos. MB2516 and MB2518)," dated February 7, 2002.

The purpose of this letter is to propose revisions to the PPL Susquehanna Unit 2 Technical Specification (TS) Figures 3.4.10-1 "System Hydrotest Limit with Fuel in Vessel (Curve A)," 3.4.10-2 "Non-Nuclear Heating Limit (Curve B)" and 3.4.10-3 "Nuclear (Core Critical) Limit (Curve C)." The proposed changes consist of extending the validity of the curves for one year – from May 1, 2005 to May 1, 2006. These curves were approved for use based on PPL's license amendment request documented in Reference 1 and approved by the NRC as Amendment 174 in Reference 2.

These curves are currently approved for use until May 1, 2005. At that time, they will no longer be considered valid because the limitation on their use (per Unit 2 License Amendment 174) will have expired.

A new RPV fluence evaluation is necessary to recalculate new P-T limits, resulting in any necessary revisions to the curves. PPL is in the process of recalculating the Unit 2 RPV fluence with a code that utilizes the requirements of Reg. Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence." The completion of these recalculated P-T limits values is not expected until the fourth quarter of 2004, and it would follow the anticipated NRC approval of the new fluence calculational methodology. Since this would be within six months of the curves' expiration date in TS, an extension to the valid date of the existing curves is requested.

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The attachment to this letter contains the Technical Specification marked-up showing the proposed changes.

There are no regulatory commitments or changes to any existing regulatory commitments associated with the proposed changes. The need for this amendment request has been discussed with the NRC Project Manager for SSES.

The proposed changes have been approved by the Susquehanna SES Plant Operations Review Committee and reviewed by the Susquehanna Review Committee. In accordance with 10 CFR 50.91(b)(1), PPL is sending a copy of this letter to the Pennsylvania Department of Environmental Protection.

PPL plans to implement the proposed changes to the Unit 2 Technical Specifications within 30 days after NRC approval, but no later than May 1, 2005. Therefore, we request NRC to complete the review of this change request by April 1, 2005 to support our implementation.

If you have any questions, please contact Mr. Duane L. Filchner at (610) 774-7819.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Executed on: September 22, 2004

B. T. McKinney

Enclosure:
PPL Evaluation of the Proposed Changes

Attachment:

Attachment – Proposed Technical Specification Changes for
Figures 3.4.10-1, 3.4.10-2, and 3.4.10-3 (Mark-ups)

Copy: NRC Region I
Mr. A. J. Blamey, NRC Sr. Resident Inspector
Mr. R. V. Guzman, NRC Project Manager
Mr. D. J. Allard, PA DEP

Enclosure to PLA-5811

PPL Evaluation of the Proposed Changes

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1.0 DESCRIPTION

The present Unit 2 Technical Specification Figures 3.4.10-1, 3.4.10-2 and 3.4.10-3 represent the reactor pressure vs. minimum vessel temperature limits. These three figures are the Pressure-Temperature (P-T) curves, and they are based upon 10 CFR 50 Appendix G requirements and Code Case N-640 which allows use of the lower bound static fracture toughness curve K_{IC} for the system hydrotest limit with fuel in the vessel (designated Curve A), the non-nuclear heating limit (designated Curve B), and the nuclear (core critical) limit (designated Curve C).

2.0 PROPOSED CHANGES

In accordance with 10 CFR 50.90, PPL Susquehanna, LLC (PPL) proposes to revise the Susquehanna Steam Electric Station Unit 2 Technical Specifications for reactor pressure vessel (RPV) P-T curves. The revised P-T curves will contain identical technical information as the present curves previously approved as License Amendment 174 (Ref. 1). These figures show the P-T limit curves for inservice leakage and hydrostatic testing, non-nuclear heatup and cooldown, and criticality, respectively.

The current end of validity or "expiration date" of the curves is May 1, 2005. The proposed change extends the expiration date until May 1, 2006 for the Unit 2 Technical Specification Figures 3.4.10-1, 3.4.10-2 and 3.4.10-3.

The basis for the expiration date extension of the Unit 2 P-T curves from May 1, 2005 to May 1, 2006 is that a recalculation of the P-T curves using re-evaluated fluence (due to operation at 3489 MWt) cannot be finalized and submitted to the NRC until the end of 2004. The methodology to perform the subject calculations has not yet been approved by the NRC. At that time, it is presumed that there would not be enough time for the NRC to review revised P-T curves and issue a license amendment for new curves before the May 1, 2005 expiration date. Therefore, this extension request for the new expiration date is necessary.

Extending the expiration date of the Unit 2 P-T curves for an additional year to May 1, 2006 results in an additional 0.987 Effective Full Power Years (EFPYs) of accumulated exposure. The total accumulated exposure as a result of operating at 3489 MWt for an additional year remains considerably less than the maximum exposure due to fluence that would be expected after 32 EFPYs. This is the lifetime exposure upon which the curves are based.

3.0 BACKGROUND

During all modes of operation, reactor vessel pressure and temperature limits are imposed to ensure that, at the existing pressure, the vessel temperature will not approach the low temperature that could lead to brittle fracture; i.e., the nil ductility temperature. 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Lightwater Nuclear Power Reactors for Normal Operation," provides the requirement that the pressure and temperature limits as well as the associated vessel surveillance program are consistent with 10 CFR 50 Appendix G, "Fracture Toughness Requirements," and 10 CFR 50 Appendix H, "Reactor Vessel Material Surveillance Program Requirements."

10 CFR 50 Appendix G, "Fracture Toughness Requirements," and Appendix H, "Reactor Vessel Material Surveillance Program Requirements," describe specific requirements for fracture toughness and reactor vessel material surveillance that must be considered in establishing P-T limits. 10 CFR 50 Appendix G specifies fracture toughness and testing requirements for reactor vessel material in accordance with Section XI of the ASME B&PV Code, Appendix G. 10 CFR 50 Appendix G also requires the prediction of the effects of neutron irradiation on the vessel embrittlement by calculating the Adjusted Reference Temperature (ART) and Charpy upper shelf energy. Generic Letter 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations," requires that the methods in Regulatory Guide 1.99, Revision 2, be used to predict the effect of neutron irradiation on the reactor vessel material. Appendix H of 10 CFR 50 requires the establishment of a surveillance program to periodically withdraw surveillance capsules from the reactor vessel.

All components in the RCS 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, and startup and shutdown operations. During startup and shutdown, the rates of temperature and pressure changes are limited so that the maximum specified heatup and cooldown rates are consistent with the design assumptions and satisfy the stress limits for cyclic operation.

The heatup and cooldown process for SSES is controlled by P-T limit curves which are developed based on fracture mechanics analysis. These limits are developed according to Appendix G of the ASME Boiler and Pressure Vessel Code, Section XI, and incorporate a number of safety margins. A key safety margin is the lower bound fracture toughness curve, or K_{IA} (equivalent to K_{IR}). Section XI recently approved Code Case N-640 permitting the use of the lower bound static fracture toughness curve, K_{IC}, for calculating operating P-T limit curves. The same change appears in Appendix G of Section XI in the 1999 Addenda.

4.0 TECHNICAL ANALYSIS

The proposed change to the P-T curves does not change the technical basis for the existing curves approved by Amendment 174. The only change is to the expiration date of the curves. This date is being changed from May 1, 2005 to May 1, 2006.

The existing Unit 2 P-T limit curves have been developed for use until May 1, 2005. Resolution of the current industry issues related to fluence calculational methodology required PPL to limit applicability of the Unit 2 P-T curves until May 1, 2005. One of the major considerations for extended life of the RPV is irradiation of the core region, or beltline. The effect of irradiation is to shift the reference nil-ductility transition temperature (RT_{NDT}) of the beltline materials. This shift must be evaluated to meet the requirements of 10 CFR 50 Appendix G. To encompass the effects of neutron fluence due to irradiation, a maximum lifetime of 32 EFPYs was originally established.

The proposed change for the extension of the expiration date on the P-T curves is justified because adequate margin exists in present curves. These curves were developed in accordance with ASME code requirements as required by 10 CFR 50 Appendix G. The total accumulated exposure for Unit 2 by May 1, 2005 is anticipated to be 17.648 EFPYs, (per Reference 1). Operation for an additional year at 3489 MWt will add 0.987 EFPYs, thus producing a revised total accumulated exposure of 18.635 EFPYs by May 1, 2006. This revised exposure is significantly lower than the 32 EFPYs from which the curves are based.

Therefore, it is acceptable to extend the applicability of the existing curves for another year until May 1, 2006.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration 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; (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.

PPL proposes changes to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station Unit 2.

The proposed change to the Unit 2 Pressure-Temperature (P-T) curves is not technical in nature. The change is only an extension of the applicability date for the curves. The expiration date for the existing P-T curves is proposed to be changed from May 1, 2005 to May 1, 2006.

In accordance with the criteria set forth in 10 CFR 50.92, PPL has evaluated the proposed TS change and determined it does not represent a significant hazards consideration. The following is provided in support of this conclusion:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The evaluation for the Unit 2 P-T limit curves for 32 EFPYs was performed using the approved methodologies of 10 CFR 50 Appendix G and Code Case N-640. The curves generated from these methods were approved as Amendment 174 (Ref. 1) and are currently in the Unit 2 TS. These curves ensure the P-T limits will not be exceeded during any phase of reactor operation. Resolution of the current industry issues related to fluence calculation methodology required PPL to limit applicability of the curves to May 1, 2005 for Unit 2. The proposed change does not alter any of the technical information shown on the present P-T curves. The change extends the expiration date for one year while maintaining the total accumulated exposure well below the 32 EFPY maximum exposure lifetime limit. Therefore, there is no increase in the probability or consequences of any previously evaluated accident as a result of this change.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change involves changing the expiration date on the Unit 2 P-T limit curves. The change does not affect the present operating margin in the P-T limit curves for inservice leakage and hydrostatic pressure testing, non-nuclear heatup and cooldown, and criticality. Operation in accordance with the present P-T curves, developed in accordance with the provisions of ASME Code, Section XI, Appendix G; 10 CFR 50 Appendix G, and ASME Code Case N-640 provides adequate protection against a non-ductile-type fracture of the RPV. This proposed change does not create the possibility of any new or different type of accident. The change extends the expiration date of the present P-T curves and does not result in any new or unanalyzed operation of any system or piece of equipment important to safety.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The technical information contained in the present P-T curves approved by Amendment 174 (Ref. 1) is not affected by this change. Extending the expiration date of the curves from May 1, 2005 to May 1, 2006 will not reduce the margin of safety to RPV brittle fracture.

Since the Unit 2 P-T curves have a maximum lifetime exposure of 32 EFPYs and the anticipated exposure by May 1, 2006 will be well below this maximum value, the margin of safety is not reduced as the result of this change in expiration date. Resolution of the current industry issues related to fluence calculation methodology requires PPL to limit applicability of the Unit 2 P-T curves to May 1, 2006.

5.2 Applicable Regulatory Requirements/Criteria

These proposed changes are consistent with previously approved Amendment 174 (Ref. 1) that established the P-T curves in the present Unit 2 TS. These curves were developed in accordance with the provisions of ASME Code, Section XI, Appendix G, 10 CFR 50 Appendix G, and ASME Code Case N-640 and, therefore, provide adequate protection against a nonductile-type fracture of the RPV.

6.0 ENVIRONMENTAL CONSIDERATIONS

10 CFR 51.22(c)(9) identifies certain licensing and regulatory actions which are eligible for categorical exclusion from the requirement to perform an environmental assessment. A proposed amendment to an operating license for a facility does not require an environmental assessment if operation of the facility in accordance with the proposed amendment would not (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; or (3) result in a significant increase in individual or cumulative occupational radiation exposure. PPL has evaluated the proposed change and has determined that the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Accordingly, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with issuance of the amendment. This determination, using the above criteria, is:

1. As demonstrated in the "No Significant Hazards Consideration Evaluation" the proposed amendment does not involve a significant hazards consideration.

2. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite. The proposed change does not involve any physical alteration of the plant (no new or different type of equipment will be installed) or change in methods governing normal plant operation.

7.0 REFERENCES

1. Letter from D. S. Collins (USNRC) to R. G. Byram (PPL) "Susquehanna Steam Electric Station, Units 1 and 2 – Issuance of Amendment Re: Reactor Pressure Vessel Pressure-Temperature Limit Curves (TAC Nos. MB2516 and MB2518)" dated February 7, 2002.

Attachment

Proposed Technical Specification Changes

(Mark-ups)

TS Figures 3.4.10-1, 3.4.10-2, & 3.4.10-3

(Unit 2)

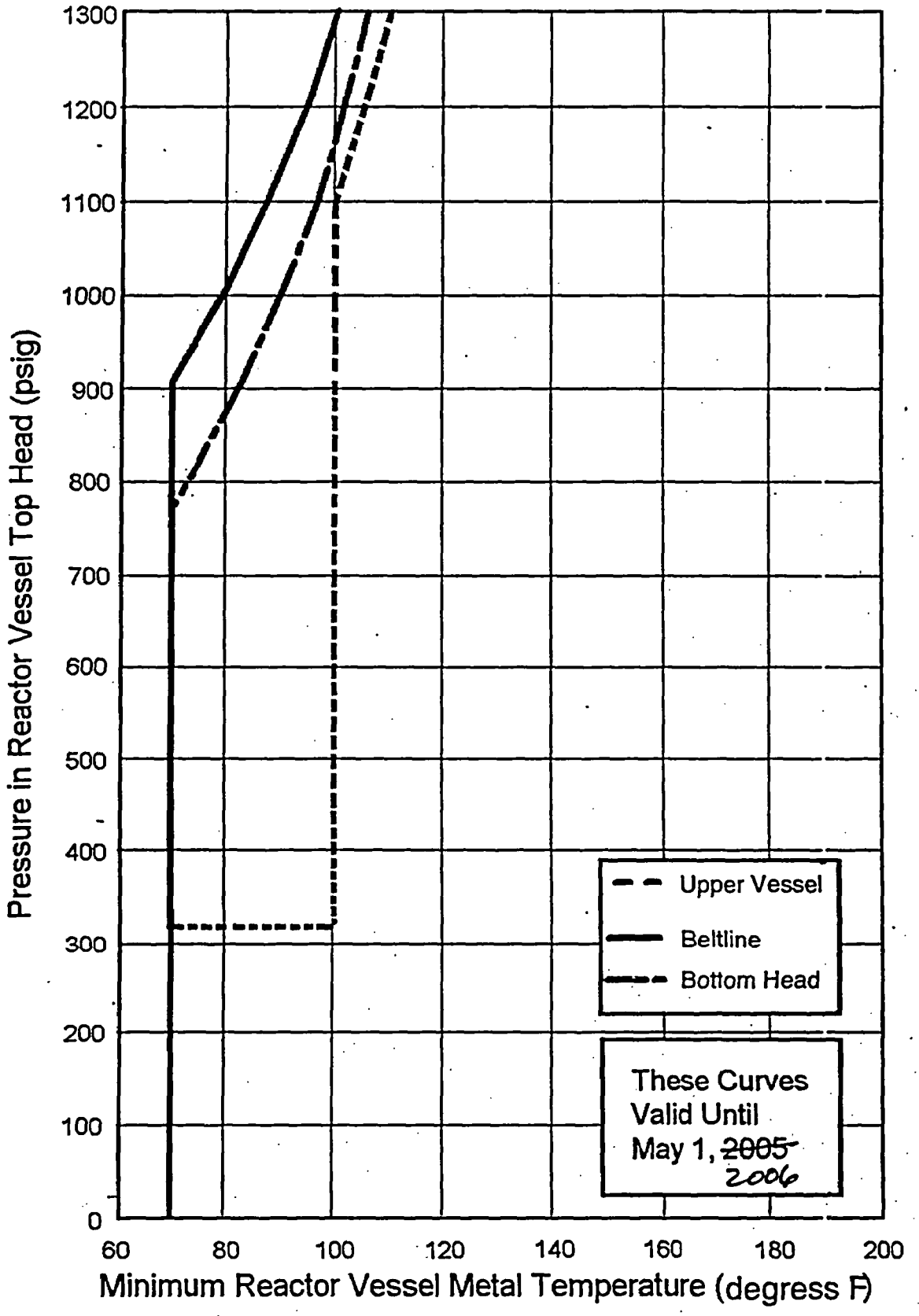

Figure 3.4.10-1
System Hydrotest Limit with Fuel in Vessel (Curve A)

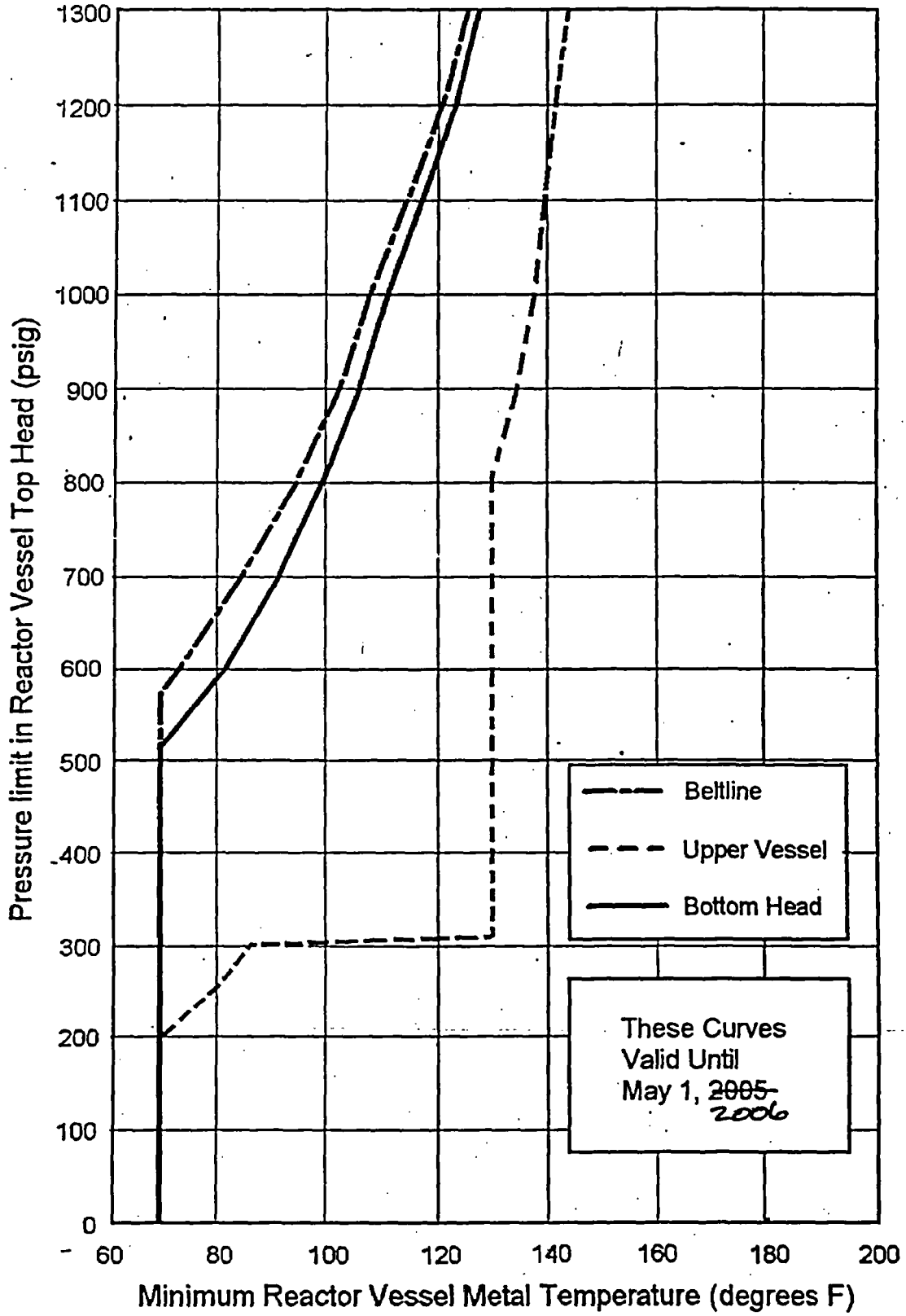

Figure 3.4.10-2
Non-Nuclear Heating Limit (Curve B)

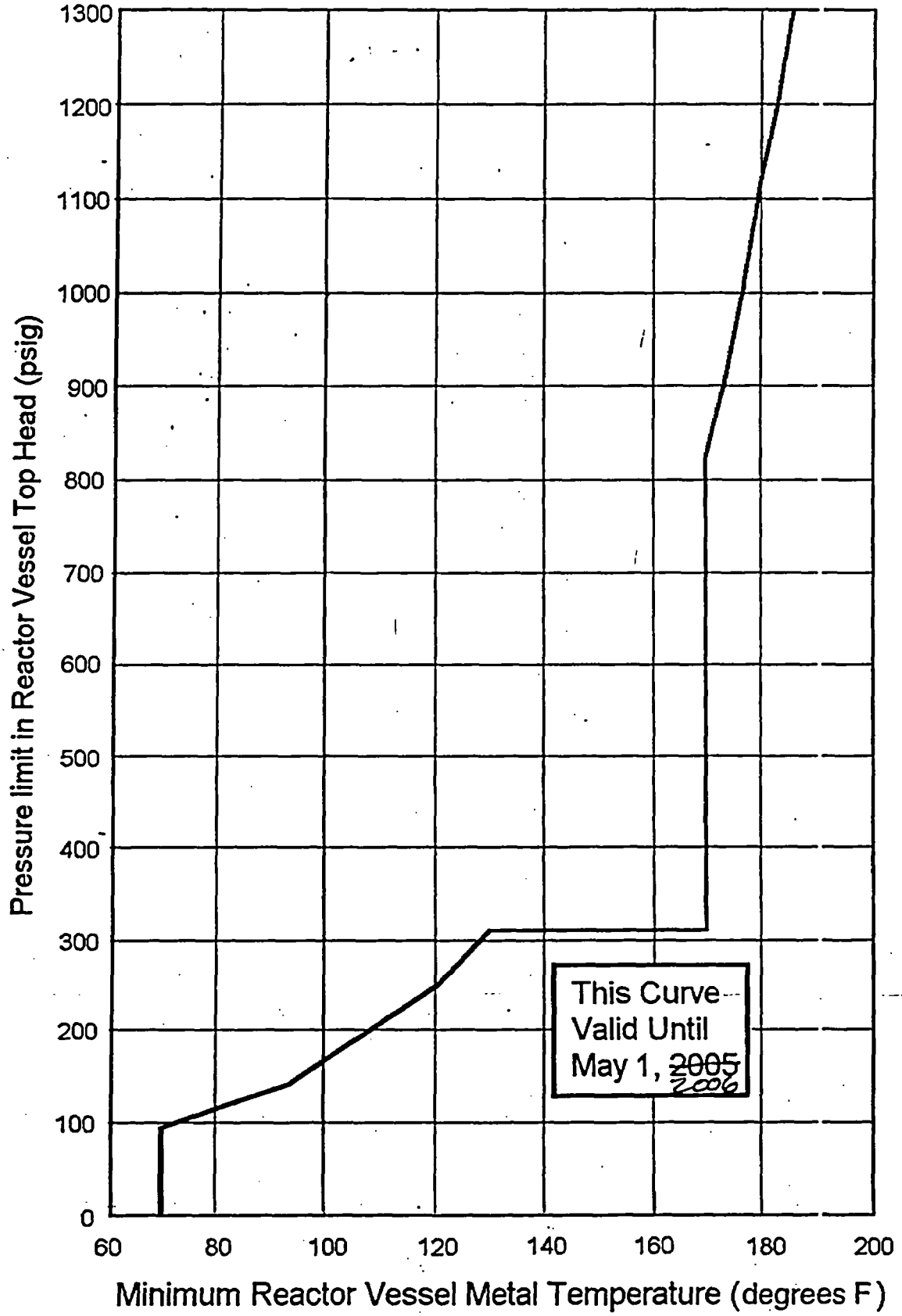

FIGURE 3.4.10-3
Nuclear (Core Critical) Limit (Curve C)