ATTACHMENT 3

TECHNICAL SPECIFICATION MARK-UP
and
Revised Figure 3.4.11-1

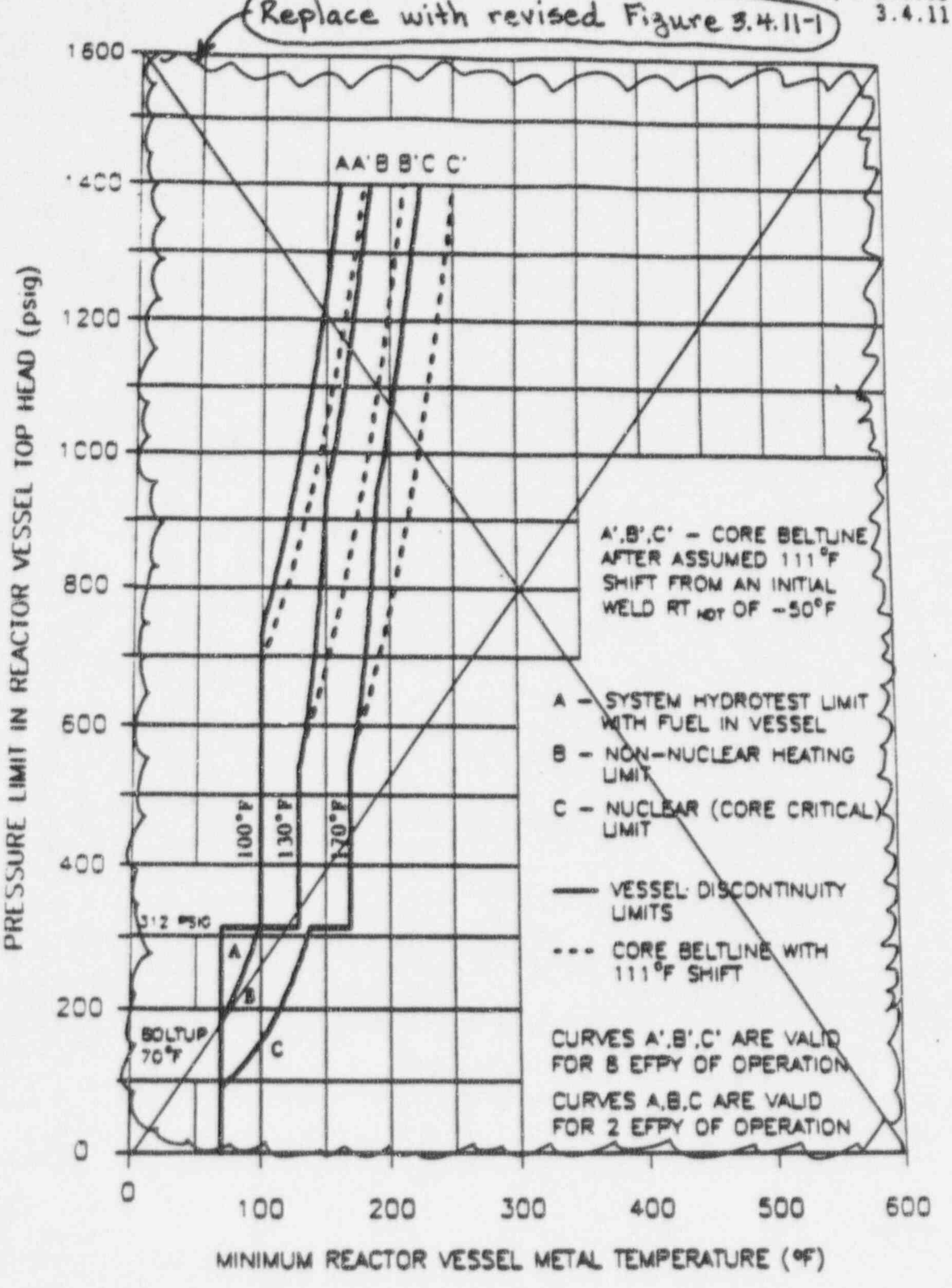

Figure 3.4.11-1 (page 1 of 1)
Minimum Temperature Required vs. RCS Pressure

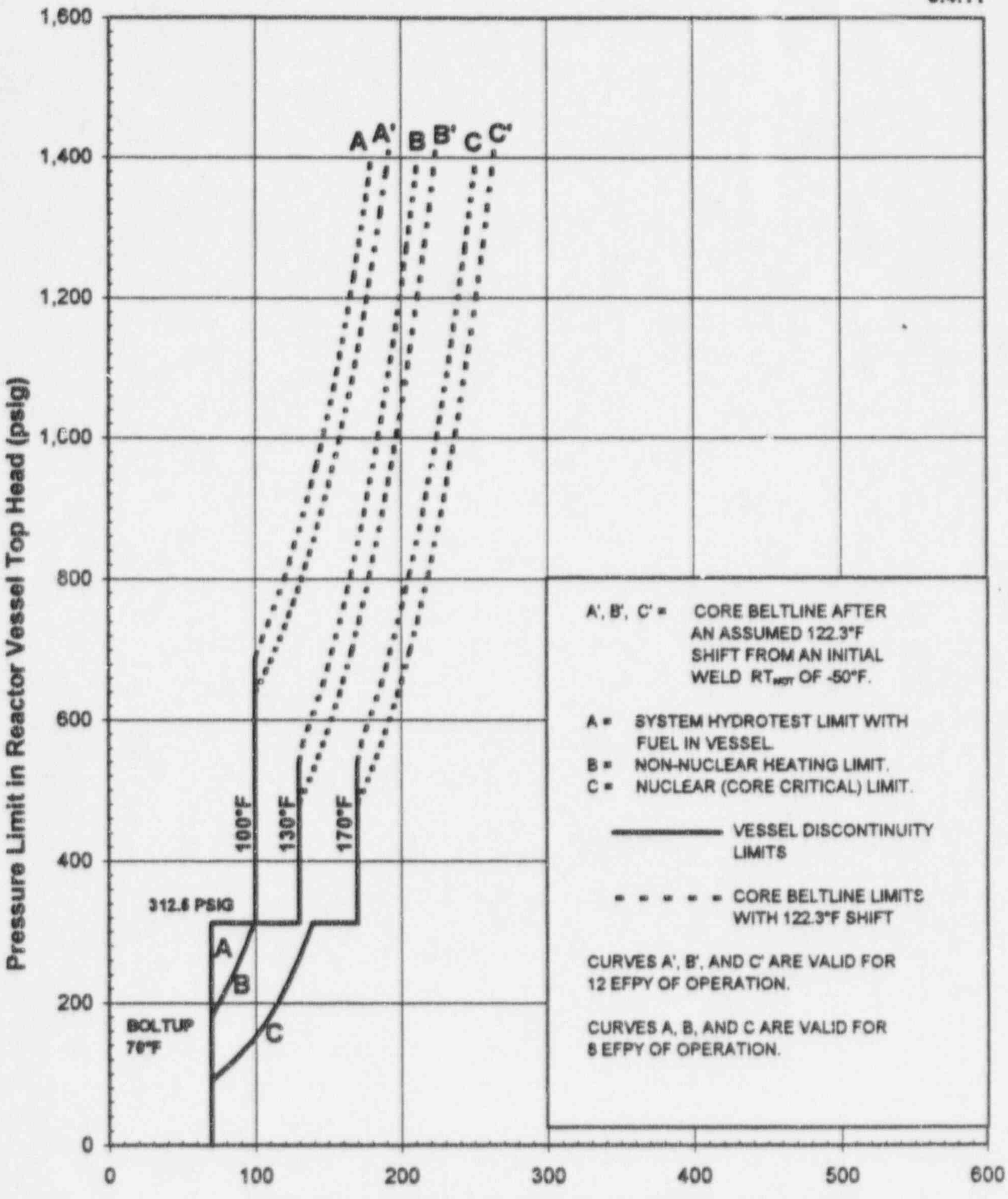

Figure 3.4.11-1 (page 1 of 1)
Minimum Temperature Required vs. RCS Pressure

ENCLOSURE 1

Structural Integrity Associates, Inc. Letter Report

Revised (12 EFPY) P-T Curves for River Bend Station

Letter #GLS-96-059; SIR-96-096, Rev. 0

October 22, 1996

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October 22, 1996
GLS-96-059
SIR-96-096, Rev. 0

Mr. Erwin J. Zoch, P.E.
River Bend Station
Entergy Operations, Inc.
P. O. Box 220
St. Francisville, LA 70775

Subject: Revised (12 EFPY) P-T Curves for River Bend Station

Dear Erwin:

In accordance with the Reference 1 contract, this letter report documents the results of the pressure-temperature (P-T) curve calculations performed by Structural Integrity Associates (SI) for 12 effective full power years (EFPY) for River Bend Station (RBS). The input, methodology, analysis, and results are described below. In addition, attached please find a copy of SI Calculation No. RBS-03Q-301, Revision 0, "Pressure-Temperature Curve Calculation for 12 EFPY," 10/16/96, and a floppy disk containing the RT_{NDT} and P-T curve EXCEL spreadsheets developed as a part of this work. The attached items, together with this letter report, constitute the complete set of deliverables for this project in accordance with Reference 1.

INTRODUCTION

This report documents the development of revised P-T curves for RBS valid for up to 12 EFPY of operation. The P-T curves documented herein are intended to replace the currently existing P-T curves [2] which are valid for up to 8 EFPY of operation. The development of the 8 EFPY P-T curves, in accordance with Regulatory Guide 1.99, Revision 2 (RG 1.99) [3], is documented in Reference 4. The Reference 4 report includes the effects of the beltline, bottom head (CRD penetrations), and feedwater nozzle locations. The detailed specifics of precisely how the P-T curves were calculated are not included; however, all of the necessary inputs are included. Tabulated values for the current P-T curves are provided in Reference 5.

There were three objectives to this current work, as identified in Reference 1:

1. *RT_{NDT} Determination*: The Reference 4 report provides RT_{NDT} estimates for all of the various RBS beltline materials. Since RT_{NDT} is an important and significant input parameter to the development of P-T curves, an EXCEL spreadsheet specific to RBS was generated to validate the RT_{NDT} estimates contained in Reference 4. The spreadsheet can be used in the future to provide RT_{NDT} estimates for any EFPY.

2. *Model Development*: A valid calculational tool (EXCEL spreadsheet) was developed for computing P-T curves for RBS. The spreadsheet tool is convenient in that it possesses both computational and plotting capabilities, both of which are necessary for generating P-T curves. This tool provides further convenience in that it can be used by Entergy for future use in developing their own P-T curves, as well as to fulfill their requirement of providing the tabulated P-T points for the developed P-T curves. The tool was "benchmarked" by first matching it to the current 8 EFPY curves. This step ensured consistency with past work done for RBS in the Reference 4 report. Of particular interest were the thermal stress intensity factors previously used in the Reference 4 analysis. Since there can be significant variation in these factors depending upon the method of calculation used, benchmarking the model eliminated any inconsistencies. Benchmarking against Reference 4 is considered reasonable, since it is apparent that significant effort has been expended in developing the RBS P-T curves in the past. The past work was initiated to address Generic Letter 88-11 requirements and implement Technical Specification changes.

3. *P-T Curve Development*: Once the spreadsheet model was developed and benchmarked, P-T curves were developed for 12 EFPY using the RT_{NDT} estimates established for RBS. The curves were generated in the format shown in Reference 2 so that they are suitable for placement into the RBS Technical Specifications.

The results of each of the objectives identified above are presented in the sections which follow.

RT_{NDT} DETERMINATION

Appendix A of Reference 4 provides RT_{NDT} estimates for the RBS beltline materials in accordance with RG 1.99 for various EFPY levels. An EXCEL spreadsheet was set up to perform the RT_{NDT} calculations, and is shown in Table 1. The inputs used for the calculations in Table 1 were obtained from Appendix A of Reference 4 unless otherwise noted. All details of the calculations are identified in the notes to the table. The results in Table 1 are seen to be identical to those of Appendix A of Reference 4 for 12 EFPY, thus validating the previous RT_{NDT} estimates and those used in the current evaluation.

MODEL DEVELOPMENT

In this section, the methodology used for calculating the P-T curves is detailed. This methodology documents the equations used in the P-T curve EXCEL spreadsheet developed for this work. The methodology is based on the requirements of References 6 and 7. The 1992 edition of Section XI, Appendix G of the ASME Code was compared to the 1989 edition, which is the latest NRC-accepted version of the ASME Code. Side-by-side comparison of these two editions of Appendix G reveals that the they are identical from a methodology point of view. Therefore, this analysis fulfills the requirements of both versions of Appendix G.

The approach used for calculating the P-T curves is summarized below. Note that the following is based on developing a model that calculates P-T curves which match those previously developed in Reference 4:

a. Assume a coolant temperature, $T_{coolant}$. A range of temperatures are assumed that result in P-T points appropriate for the boiling water reactor (BWR) operating regime.

b. For the $T_{coolant}$ assumed in step (a), compute the temperature at the assumed flaw tip, $T_{1/4t}$ (i.e., 1/4t into the vessel wall). This is accomplished by adding a through-wall temperature drop term, ΔT_{wall}, to $T_{coolant}$ to account for the temperature drop due to heat transfer between the inside surface and the 1/4t location. The value of ΔT_{wall} was varied such that the resulting P-T Curve A matched that previously determined in Reference 4. This eliminated any inconsistencies that might have arisen if ΔT_{wall} were determined by independent heat transfer analysis.

c. Calculate the allowable stress intensity factor, K_{IR}, based on $T_{1/4t}$ using the relationship from Reference 6:

$$K_{IR} = 1.223\, e^{[0.0145(T-ART+160)]} + 26.78$$

where: T = $T_{1/4t}$ (°F)
ART = adjusted reference temperature for limiting beltline material (°F)
K_{IR} = allowable stress intensity factor (ksi√inch)
Note that a maximum value of 200 ksi√inch is allowed.

d. Calculate the allowable pressure stress intensity factor, K_{IP}, using the appropriate relationship for the P-T curve under consideration:

$K_{IP} = K_{IR}/1.5$ for Curve A (i.e., pressure-test curve)
$K_{IP} = (K_{IR}-K_{IT})/2.0$ for Curves B and C (i.e., core not critical and core critical curves)

where: K_{IT} = thermal stress intensity factor (ksi√inch)
The value of K_{IT} was varied such that the resulting P-T Curve B matched that previously determined in Reference 4. This eliminated any inconsistencies that might have arisen if K_{IT} were determined by independent thermal stress analysis.
K_{IP} = allowable pressure stress intensity factor (ksi√inch)

e. Compute the pressure, P. The relationship for the pressure, P, to the allowable pressure stress intensity factor, K_{IP}, is as follows:

$$K_{IP} = M_m \sigma_m + M_b \sigma_b$$

where: M_m = membrane stress correction factor from Figure G-2214-1 of Reference 6. The bounding upper line for M_m (corresponding to $\sigma/\sigma_{ys} = 1.0$) in Figure G-2214-1 was used. Note, however, that any differences introduced by this assumption were effectively removed by adjusting ΔT_{wall} and K_{IT} such that the resulting P-T limits matched the previous RBS P-T curves, as mentioned above.

σ_m = membrane stress due to pressure (ksi)
= PR/t for a thin-walled vessel
P = pressure (ksi)
R = vessel inside radius (inches)
t = vessel minimum wall thickness (inches)
M_b = bending stress correction factor = $(2/3)M_m$
σ_b = bending stress due to pressure (ksi)
= 0 for a thin-walled vessel

Thus, $$P = K_{IP}t/(RM_m)$$

f. Repeat steps (a) through (e) for other temperatures to generate a series of P-T points.

g. Subtract any applicable instrument errors for temperature and pressure from $T_{coolant}$ and P, respectively. The resulting pressure and temperature series constitutes the P-T curve. Instrument errors were assumed to be zero for RBS, as they were not used in the prior P-T curve work. The P-T curve relates the minimum required reactor fluid temperature in the beltline region to the reactor pressure in the beltline region. For the purposes of this evaluation, it was assumed that the minimum reactor metal temperature and the minimum reactor fluid temperature were equal. This assumption is consistent with prior P-T curves developed for RBS.

The following additional requirements were used in the Reference 4 report to define the lower portion of the P-T curves. These limits are established by the discontinuity regions of the vessel (i.e., flanges, nozzles, etc.), and were retained throughout the current analysis (i.e., they were assumed correct and do not change since the discontinuity regions are not affected significantly by fluence):

For Curve A:

- Thermal stresses were assumed to be negligible during the pressure test condition and were therefore not considered.
- If P is greater than 20% of the pre-service hydro test pressure, the temperature must be greater than RT_{NDT} of the limiting flange material plus 90°F [7]. The pre-service hydro test pressure was assumed to be 1562.5 psig (=312.5/0.20), based on the fact that the current 8 EFPY P-T curves establish this limit at 312.5 psig [5].
- If P is less than 20% of the pre-service hydro test pressure, the temperature must be greater than RT_{NDT} of the limiting flange material plus 60°F. This has been a standard recommendation by GE for the BWR industry [4]. For the RBS flange material, this minimum temperature is 70°F [5].

For Curve B:

- If P is greater than 20% of the pre-service hydro test pressure, the temperature must be greater than RT_{NDT} of the limiting flange material plus 120°F [7].
- If P is less than 20% of the pre-service hydro test pressure, the temperature must be greater than RT_{NDT} of the limiting flange material plus 60°F. This has been a standard recommendation by GE for the BWR industry [4]. For the RBS flange material, this minimum temperature is 70°F [5].

For Curve C:

- Per the requirements of Paragraph IV.A.2 of Reference 7, the core critical (Curve C) P-T limits must be 40°F above any Curve A or B limits. Curve B is more limiting than Curve A, so Curve C is Curve B plus 40°F.
- Another requirement of Paragraph IV.A.2 of Reference 7 (or actually an allowance for the BWR), concerns minimum temperature for initial criticality in a startup. Given that water level is normal, BWRs are allowed initial criticality at the closure flange region temperature (RT_{NDT} + 60°F) if the pressure is below 20% of the pre-service hydro test pressure. This corresponds to 70°F for RBS.
- Also per Paragraph IV.A.2 of Reference 7, at pressure above 20% of the pre-service hydro test pressure, the Curve C temperature must be at least that required for the pressure test (Curve A at 1,100 psig). As a result of this requirement, Curve C must have a step at a pressure equal to 20% of the pre-service hydro pressure to the temperature required by Curve A at 1,100 psig, or 40°F, whichever is greater. (For the curves covered in this analysis through 12 EFPY, the 40°F step is limiting.)

An EXCEL spreadsheet was developed to perform the necessary calculations described above and generate the P-T curves. A "benchmark" case was run in the spreadsheet for 8 EFPY. The limiting ART value of 60.5°F for 8 EFPY, and the vessel dimensions for the RBS plate material

documented in Reference 4 were used as input to the spreadsheet for this case. The results generated by the spreadsheet were identical to those contained in the Reference 4 report after appropriate "adjustment" of the ΔT_{wall} and K_{IT} values. This comparison of the two sets of curves demonstrated that the spreadsheet results are consistent and accurate.

P-T CURVES FOR 12 EFPY

The P-T curve EXCEL spreadsheet was next used to generate the 12 EFPY P-T curves. The limiting ART value used comes from Table 1 for 12 EFPY, and is 72.3°F. This value was entered into the spreadsheet to generate the 12 EFPY P-T curves. The results are shown in Table 2 and Figure 1. Also contained within this table and figure are the current 8 EFPY Tech. Spec. curves [2,5] for comparative purposes.

SUMMARY AND CONCLUSIONS

The analysis documented in this report develops RT_{NDT} estimates and P-T curves for the RBS reactor pressure vessel. EXCEL spreadsheets were developed for each of these items.

Table 1 provides the results of the RT_{NDT} estimations. Those results are identical to estimates previously developed in the Reference 4 report, thus confirming the past results and the spreadsheet used for the current analysis.

The P-T curve spreadsheet developed for RBS was benchmarked against the results previously developed in Reference 4. Comparison of the calculated results for 8 EFPY to those contained in the current Tech. Spec. P-T curves for 8 EFPY [2,5] demonstrate the validity of the spreadsheet, as the two sets of results were identical.

Finally, Table 2 and Figure 1 provide the results of the P-T curve spreadsheet for 12 EFPY. The results are seen to be reasonable based on the "shift" in results from those at 8 EFPY. This, coupled with the results of the "benchmark" test case, conclude the Figure 1 P-T limits to be appropriate for RBS for 12 EFPY of operation.

It should be noted that the 12 EFPY P-T curve is also applicable for power uprate conditions. Actually, the implementation of power uprate has no effect on the development of the P-T curves, other than in determining the length of time the curves are applicable for (i.e., implementation of power uprate may cause 12 EFPY to be achieved sooner than if power uprate were not implemented). In calculating the full power operating time after power uprate implementation, it is important that the EFPY value be determined using methodology which is consistent with that used to estimate fluence. Otherwise, developed P-T limits will not be reflective of the assumed fluence level. Based on this, both the fluence estimate and the EFPY value should be based on the 100% core thermal power value of 2894 MWt.

SPREADSHEET LIMITATIONS

It should be noted that although the spreadsheet tool for generating P-T curves has been validated, each future use of this spreadsheet should be validated on a case-by-case basis. All possible temperature limitation requirements were not placed into the spreadsheet for "automatic" implementation. For example, the minimum temperature described above for Curve C that requires the minimum Curve C temperature to be equal to the temperature of Curve A at 1,100 psig was not necessary for this analysis (i.e., Curve A @ 1,100 psig ≈ 168°F whereas Curve A plus 40°F at pressures just above 312.5 psig = 170°F which is more limiting). At some point in the near future (i.e., beyond 12 EFPY), this requirement will be necessary (it was implemented in the 32 EFPY curves in Reference 4). Therefore, modifications of the spreadsheet to account for this and other requirements may have to be made as a part of future use of the spreadsheet.

OTHER OBSERVATIONS

A few observations were made during the course of performing this work that may be worthy of consideration by Entergy in future P-T curve work. These items are as follows:

- *The K_{IT} and ΔT_{wall} values used are slightly conservative.* Based on observations made during this effort for RBS, as well as other evaluations done for other BWRs by SI, the values for K_{IT} and ΔT_{wall} that had to be used to match the previously developed P-T curves for 8 EFPY are slightly conservative. Less conservative values could be technically justified, thereby improving P-T limits. Although the magnitude of this improvement is not precisely known, it is estimated to be on the order of a few degrees in temperature. This may be of benefit for RBS operation in the future when shifts in material properties become more significant and the P-T operating window shrinks.

- *The vessel discontinuity limits portion of the P-T curves may be conservative.* Typically, GE uses stresses available from Design Stress Reports or computes stresses using conservative stress concentration factors for geometric discontinuities for application to vessel discontinuity regions (i.e., nozzles, penetrations, flanges, etc.). Based on analysis SI has performed for other BWRs using more refined plant-specific stress analysis, these assumptions can lead to overly conservative P-T limits. This would only be applicable for the lower curved portions of Curves B and C (i.e., between 70°F and 100°F for Curve B, and between 70°F and 140°F for Curve C) since the other discontinuity limit portions of these curves are set by the requirements of Reference 7. If these limits are too restrictive for RBS operation, further evaluation may provide relief. This issue affects regions of the P-T curve that are not typically a problem for BWR operation; thus, it is mentioned for future reference purposes only.

We would like to thank you for the opportunity to complete this work for Entergy, and hope you find it to your satisfaction. If you have questions, please contact me.

Prepared by: Gary L. Stevens 10/22/96
Gary L. Stevens, P. E.

Verified by: David A. Gerlach
for H. L. Gustin, P. E.

/jj
attachments

REFERENCES

1. Entergy Contract No. **NRSM1469** dated 9/26/96.

2. RBS Technical Specifications, Amendment No. 81, Figure 3.4.11-1, "Minimum Temperature Required vs. RCS Pressure," SI File No. RBS-03Q-202.

3. USNRC Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," U. S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, (Task ME 305-4), May 1988.

4. GE Report No. SASR 89-20, Revision 1, "Implementation of Regulatory Guide 1.99 Revision 2 for River Bend Station Unit 1," March 1990, (LAR90-02, SCRB-14842 dated 3/20/90), SI File No. RBS-03Q-203.

5. Letter No. G-LD-2-085 from W. D. Arndt (GE) to Mr. J. C. Deddens (GSU), "Tabulated Values from 8 EFPY Curves River Bend Station," May 26, 1992, (EOI File #3221.110-000-004A), SI File No. RBS-03Q-201.

6. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, Nonmandatory Appendix G, "Fracture Toughness Criteria for Protection Against Failure," 1992 Edition.

7. U. S. Code of Federal Regulations, Chapter 10, Part 50, Appendix G, "Fracture Toughness Requirements," 1-1-96 Edition.

Table 1
RT_{NDT} Estimates for RBS for 12 EFPY

(Data Source: Appendix A of SASR 89-20, Rev. 1, "Implementation of Regulatory Guide 1.99 Revision 2 for River Bend Station Unit 1," March 1990)

RPV thickness =	5.41	inches		
Reference Fluence =	6.600E+18	n/cm^2 at	32	Reference EFPY (nominal peak value at RPV ID)
Desired EFPY for RT_{NDT} Prediction =	12.0	EFPY		
Estimated Fluence (1) =	2.475E+18	n/cm^2 (nominal peak value at RPV ID)		
Attenuated Fluence at 1/4T (2) =	1.789E+18	n/cm^2		
Fluence Factor (3) =	0.5431			

Part Name & Material	ID	Heat No.	Lot No.	Estimated Initial RT_{NDT} (°F)	Chemistry: Cu (wt %)	Chemistry: Ni (wt %)	Chemistry Factor (4) (°F)	Adjustments For 1/4 T: ΔRT_{NDT} (5) (°F)	Margin: σ_Δ (°F) (6)	Margin: σ_I (°F)	ART (7) (°F)
Vessel Plate	22-1-3	C3138-2	---	9	0.08	0.63	51	27.7	13.8	0.0	64.4
Vessel Plate	22-1-1	C3054-1	---	-20	0.09	0.70	58	31.5	15.7	0.0	43.0
Vessel Plate	22-1-2	C3054-2	---	2	0.09	0.70	58	31.5	15.7	0.0	65.0
Vessel Weld	BE, BF, BG	492L4871	A421B27AE	-60	0.04	0.95	54	29.3	14.7	0.0	-1.3
Vessel Weld	BE, BF, BG	492L4871	A421B27AF	-50	0.03	0.98	41	22.3	11.1	0.0	-5.5
Vessel Weld	BE, BF, BG	5P6756	0342 (Tandem)	-50	0.09	0.92	122	66.3	28.0	0.0	72.3
Vessel Weld	BE, BF, BG	5P6756	0342 (Single)	-60	0.09	0.93	122	66.3	28.0	0.0	62.3
								Limiting Beltline ART =			**72.3**

Notes:

1. Estimated Fluence = (Reference Fluence) * (Desired EFPY)/(Reference EFPY).
2. Attenuated Fluence = (Estimated Fluence) $e^{-0.24x}$ where x = 1/4T distance per Section 1.1 of RG 1.99.
3. Fluence factor = $f^{(0.28 - \log f)}$ where f = (Attenuated Fluence at 1/4T)/(1×10^{19}) per Section 1.1 of RG 1.99.
4. Obtained from RG 1.99, Table 1 (Welds) and Table 2 (Base Metal).
5. ΔRT_{NDT} = (Chemistry Factor)*(Fluence Factor) per Section 1.1 of RG 1.99.
6. σ_Δ = 17°F for base metal and 28°F for welds, except that σ_Δ need not exceed 0.50*ΔRT_{NDT} per Section 1.1 of RG 1.99.
7. Adjusted Reference Temperature (ART) = Initial RT_{NDT} + ΔRT_{NDT} + $2*(\sigma_\Delta^2 + s_I^2)^{1/2}$ per Section 1.1 of RG 1.99.

Table 2
P-T Calculation Results for 12 EFPY

Inputs:

Limiting Beltline Component =	Vessel Weld 5P6756 (Lot 0342, Tandem)	
EFPY =	12.0	
Minimum Vessel Wall Thickness =	6.41	inches
Maximum Vessel Inside Radius =	110.2	inches
RT_{NDT} =	73.3	°F
Temperature Instrument Error =	0.0	°F
Pressure Instrument Error =	0.0	psig
Code Hydro Test Pressure =	[illegible]	psig
Boltup Temperature =	[illegible]	°F
Fluid-to-1/4T Temp. Adj. =	[illegible]	°F (assumed value to match GE P-T Curve A results)
Thermal Stress Intensity Factor, K_{It} =	[illegible]	ksi√inch (assumed value to match GE P-T curve results, used for Curves B and C only)

Calculation Results:

Membrane Correction Factor, M_m = 2.413

Reactor Coolant Temperature T_{RC} (°F)	Adjusted Temperature at 1/4T (°F)	Adjusted Temperature for P-T Curve (°F)	K_{IR} (ksi√inch)	CURVE 'A' CALCULATIONS [illegible] (ksi√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	8 EFPY Tech. Spec. Curve A Temperature (°F)	8 EFPY Tech. Spec. Curve A Pressure (psig)	CURVE 'B' CALCULATIONS K_{Ip} (ksi√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	8 EFPY Tech. Spec. Curve B Temperature (°F)	8 EFPY Tech. Spec. Curve B Pressure (psig)	CURVE 'C' Adjusted Temperature for P-T Curve (psig)	8 EFPY Tech. Spec. Curve C Temperature (°F)	8 EFPY Tech. Spec. Curve C Pressure (psig)
70.0	76.0	70.0	38.92	26.61	0.0	0.0	70.0	0	14.50	0.0	0.0	70.0	0	70.0	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	90.0	90.0	70.0	0	70.0	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	100.0	100.0	70.0	0	74.8	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	110.0	110.0	70.0	0	80.4	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	120.0	120.0	70.0	0	85.3	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	130.0	130.0	70.0	0	90.1	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	140.0	140.0	70.0	0	94.7	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	150.0	150.0	70.0	0	99.0	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	160.0	160.0	70.0	0	102.9	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	170.0	170.0	70.0	0	106.3	70.0	0
70.0	76.0	70.0	38.92	26.61	312.5	312.5	70.0	0	14.50	180.0	180.0	70.0	10	109.3	70.0	10
72.1	78.1	72.1	40.32	26.88	312.5	312.5	70.0	10	14.71	190.0	190.0	70.0	20	112.1	70.0	20
74.8	80.8	74.8	40.86	27.24	312.5	312.5	70.0	20	14.98	200.0	200.0	70.0	30	114.8	70.0	30
77.5	83.5	77.5	41.43	27.62	312.5	312.5	70.0	30	15.26	210.0	210.0	70.0	40	117.5	70.0	40
80.1	86.1	80.1	41.99	27.98	312.5	312.5	70.0	40	15.54	220.0	220.0	70.0	50	120.1	70.0	50
82.4	88.4	82.4	42.50	28.34	312.5	312.5	70.0	50	15.80	230.0	230.0	70.0	60	122.4	70.0	60
84.7	90.7	84.7	43.04	28.69	312.5	312.5	70.0	60	16.06	240.0	240.0	70.0	70	124.7	70.0	70
86.9	92.9	86.9	43.56	29.04	312.5	312.5	70.0	70	16.33	250.0	250.0	70.0	80	126.9	70.0	80
89.0	95.0	89.0	44.08	29.39	312.5	312.5	70.0	80	16.59	260.0	260.0	70.0	90	129.0	70.0	90
91.0	97.0	91.0	44.59	29.73	312.5	312.5	70.0	90	16.84	270.0	270.0	70.0	100	131.0	74.8	100
93.0	99.0	93.0	45.12	30.08	312.5	312.5	70.0	100	17.10	280.0	280.0	70.0	110	133.0	80.4	110
94.9	100.9	94.9	45.63	30.42	312.5	312.5	70.0	110	17.36	290.0	290.0	70.0	120	134.9	85.3	120
96.7	102.7	96.7	46.13	30.75	312.5	312.5	70.0	120	17.61	300.0	300.0	70.0	130	136.7	90.1	130
98.5	104.5	98.5	46.64	31.09	312.5	312.5	70.0	130	17.86	310.0	310.0	70.0	140	138.5	94.7	140
98.9	104.9	98.9	46.75	31.17	312.5	312.5	70.0	140	17.92	312.5	312.5	70.0	150	138.9	99.0	150
100.0	106.0	100.0	47.08	31.38	312.5	312.5	70.0	150	18.08	312.5	312.5	70.0	160	140.0	102.9	160
100.0	106.0	100.0	47.08	31.38	638.6	638.6	70.0	160	18.08	312.5	312.5	70.0	170	140.0	106.3	170
101.0	107.0	101.0	47.37	31.58	642.6	642.6	70.0	170	18.23	312.5	312.5	70.0	180	141.0	109.3	180
102.0	108.0	102.0	47.67	31.78	646.7	646.7	70.0	180	18.38	312.5	312.5	72.1	190	142.0	112.1	190
103.0	109.0	103.0	47.98	31.99	650.8	650.8	70.0	190	18.53	312.5	312.5	74.8	200	143.0	114.8	200
104.0	110.0	104.0	48.29	32.19	655.0	655.0	70.0	200	18.69	312.5	312.5	77.5	210	144.0	117.5	210
105.0	111.0	105.0	48.60	32.40	659.3	659.3	70.0	210	18.85	312.5	312.5	80.1	220	145.0	120.1	220
106.0	112.0	106.0	48.92	32.61	663.6	663.6	70.0	220	19.01	312.5	312.5	82.4	230	146.0	122.4	230
107.0	113.0	107.0	49.24	32.83	668.0	668.0	70.0	230	19.17	312.5	312.5	84.7	240	147.0	124.7	240
108.0	114.0	108.0	49.57	33.05	672.5	672.5	70.0	240	19.33	312.5	312.5	86.9	250	148.0	126.9	250
109.0	115.0	109.0	49.90	33.27	677.0	677.0	70.0	250	19.50	312.5	312.5	89.0	260	149.0	129.0	260
110.0	116.0	110.0	50.24	33.49	681.6	681.6	70.0	260	19.67	312.5	312.5	91.0	270	150.0	131.0	270
111.0	117.0	111.0	50.58	33.72	686.2	686.2	70.0	270	19.84	312.5	312.5	93.0	280	151.0	133.0	280
112.0	118.0	112.0	50.93	33.96	690.9	690.9	70.0	280	20.01	312.5	312.5	94.9	290	152.0	134.9	290
113.0	119.0	113.0	51.29	34.19	695.7	695.7	70.0	290	20.19	312.5	312.5	96.7	300	153.0	136.7	300
114.0	120.0	114.0	51.64	34.43	700.6	700.6	70.0	300	20.37	312.5	312.5	98.5	310	154.0	138.5	310
115.0	121.0	115.0	52.01	34.67	705.5	705.5	70.0	312.5	20.55	312.5	312.5	98.9	312.5	155.0	138.9	312.5
116.0	122.0	116.0	52.37	34.92	710.5	710.5	100.0	312.5	20.73	312.5	312.5	130.0	312.5	156.0	170.0	312.5
117.0	123.0	117.0	52.75	35.17	715.6	715.6	100.0	320	20.92	312.5	312.5	130.0	320	157.0	170.0	320

Table 2 (continued)
P-T Calculation Results for 12 EFPY

Inputs:

Limiting Beltline Component = Vessel Weld 6P6756 (Lot 0342, Tandem)
EFPY = 12.0
Minimum Vessel Wall Thickness = 6.41 inches
Maximum Vessel Inside Radius = 110.2 inches
RT_{NDT} = 72.3 °F
Temperature Instrument Error = 0.0 °F
Pressure Instrument Error = 0.0 psig
Code Hydro Test Pressure = 1063.6 psig
Boltup Temperature = 70 °F
Fluid to 1/4T Temp. Adj. = [redacted] °F (assumed value to match GE P-T Curve A results)
Thermal Stress Intensity Factor, K_{it} = [redacted] ksi√inch (assumed value to match GE P-T curve results, used for Curves B and C only)

Calculation Results:

Membrane Correction Factor, M_m = 2.413

Reactor Coolant Temperature T_{RC} (°F)	Adjusted Temperature at 1/4T (°F)	Adjusted Temperature for P-T Curve (°F)	K_{IM} (ksi√inch)	CURVE 'A' CALCULATIONS [illegible] (ksi√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	8 EFPY Tech. Spec. Curve A Temperature (°F)	8 EFPY Tech. Spec. Curve A Pressure (psig)	CURVE 'B' CALCULATIONS K_{IP} (ksi√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	8 EFPY Tech. Spec. Curve B Temperature (°F)	8 EFPY Tech. Spec. Curve B Pressure (psig)	CURVE 'C' Adjusted Temperature for P-T Curve (psig)	8 EFPY Tech. Spec. Curve C Temperature (°F)	8 EFPY Tech. Spec. Curve C Pressure (psig)
118.0	124.0	118.0	53.13	35.42	720.7	720.7	100.0	330	21.11	312.5	312.5	130.0	330	158.0	170.0	330
119.0	125.0	119.0	53.51	35.68	725.9	725.9	100.0	340	21.30	312.5	312.5	130.0	340	159.0	170.0	340
120.0	126.0	120.0	53.90	35.94	731.2	731.2	100.0	350	21.50	312.5	312.5	130.0	350	160.0	170.0	350
121.0	127.0	121.0	54.30	36.20	736.6	736.6	100.0	360	21.69	312.5	312.5	130.0	360	161.0	170.0	360
122.0	128.0	122.0	54.70	36.47	742.0	742.0	100.0	370	21.90	312.5	312.5	130.0	370	162.0	170.0	370
123.0	129.0	123.0	55.11	36.74	747.6	747.6	100.0	380	22.10	312.5	312.5	130.0	380	163.0	170.0	380
124.0	130.0	124.0	55.52	37.02	753.2	753.2	100.0	390	22.31	312.5	312.5	130.0	390	164.0	170.0	390
125.0	131.0	125.0	55.94	37.30	758.9	758.9	100.0	400	22.52	312.5	312.5	130.0	400	165.0	170.0	400
126.0	132.0	126.0	56.37	37.58	764.7	764.7	100.0	410	22.73	312.5	312.5	130.0	410	166.0	170.0	410
127.0	133.0	127.0	56.80	37.87	770.5	770.5	100.0	420	22.95	312.5	312.5	130.0	420	167.0	170.0	420
128.0	134.0	128.0	57.24	38.16	776.5	776.5	100.0	430	23.16	312.5	312.5	130.0	430	168.0	170.0	430
129.0	135.0	129.0	57.68	38.46	782.5	782.5	100.0	440	23.39	312.5	312.5	130.0	440	169.0	170.0	440
130.0	136.0	130.0	58.14	38.76	788.6	788.6	100.0	450	23.61	312.5	312.5	130.0	450	170.0	170.0	450
130.0	136.0	130.0	58.14	38.76	788.6	788.6	100.0	460	23.61	480.5	480.5	130.0	460	170.0	170.0	460
131.0	137.0	131.0	58.59	39.06	794.8	794.8	100.0	470	23.84	485.1	485.1	130.0	470	171.0	170.0	470
132.0	138.0	132.0	59.06	39.37	801.1	801.1	100.0	480	24.07	489.9	489.9	130.0	480	172.0	170.0	480
133.0	139.0	133.0	59.53	39.69	807.5	807.5	100.0	490	24.31	494.7	494.7	130.0	490	173.0	170.0	490
134.0	140.0	134.0	60.01	40.01	814.0	814.0	100.0	500	24.55	499.5	499.5	130.0	500	174.0	170.0	500
135.0	141.0	135.0	60.49	40.33	820.6	820.6	100.0	510	24.79	504.5	504.5	130.0	510	175.0	170.0	510
136.0	142.0	136.0	60.98	40.66	827.3	827.3	100.0	520	25.04	509.5	509.5	139.0	520	176.0	170.0	520
137.0	143.0	137.0	61.49	40.99	834.1	834.1	100.0	530	25.29	514.6	514.6	130.0	530	177.0	170.0	530
138.0	144.0	138.0	61.99	41.33	840.9	840.9	100.0	540	25.54	519.7	519.7	130.0	540	178.0	170.0	540
139.0	145.0	139.0	62.51	41.67	847.9	847.9	100.0	550	25.80	524.9	524.9	131.0	550	179.0	171.0	550
140.0	146.0	140.0	63.03	42.02	855.0	855.0	100.0	560	26.06	530.3	530.3	132.0	560	180.0	172.0	560
141.0	147.0	141.0	63.56	42.37	862.2	862.2	100.0	570	26.32	535.6	535.6	133.1	570	181.0	173.1	570
142.0	148.0	142.0	64.09	42.73	869.5	869.5	100.0	580	26.59	541.1	541.1	134.9	580	182.0	174.9	580
143.0	149.0	143.0	64.64	43.09	876.9	876.9	100.0	590	26.86	546.6	546.6	136.6	590	183.0	176.6	590
144.0	150.0	144.0	65.19	43.46	884.4	884.4	100.0	600	27.14	552.3	552.3	138.2	600	184.0	178.2	600
145.0	151.0	145.0	65.75	43.84	892.0	892.0	100.0	610	27.42	558.0	558.0	139.9	610	185.0	179.9	610
146.0	152.0	146.0	66.32	44.22	899.7	899.7	100.0	620	27.71	563.8	563.8	141.4	620	186.0	181.4	620
147.0	153.0	147.0	66.90	44.60	907.5	907.5	100.0	630	28.00	569.7	569.7	143.0	630	187.0	183.0	630
148.0	154.0	148.0	67.49	44.99	915.5	915.5	100.0	640	28.29	575.6	575.6	144.5	640	188.0	184.5	640
149.0	155.0	149.0	68.08	45.39	923.5	923.5	100.0	650	28.56	581.7	581.7	146.0	650	189.0	186.0	650
150.0	156.0	150.0	68.68	45.79	931.7	931.7	100.0	660	28.89	587.8	587.8	147.4	660	190.0	187.4	660
151.0	157.0	151.0	69.30	46.20	940.0	940.0	100.0	670	29.19	594.0	594.0	148.8	670	191.0	188.8	670
152.0	158.0	152.0	69.92	46.61	948.5	948.5	100.0	680	29.50	600.3	600.3	150.2	680	192.0	190.2	680
153.0	159.0	153.0	70.55	47.03	957.0	957.0	100.0	690	29.82	606.8	606.8	151.6	690	193.0	191.6	690
154.0	160.0	154.0	71.19	47.46	965.7	965.7	101.8	700	30.14	613.3	613.3	152.9	700	194.0	192.9	700
155.0	161.0	155.0	71.84	47.89	974.5	974.5	103.8	710	30.46	619.9	619.9	154.2	710	195.0	194.2	710
156.0	162.0	156.0	72.49	48.33	983.4	983.4	105.8	720	30.79	626.6	626.6	155.5	720	196.0	195.5	720
157.0	163.0	157.0	73.16	48.77	992.5	992.5	107.8	730	31.13	633.3	633.3	156.8	730	197.0	196.8	730
158.0	164.0	158.0	73.84	49.23	1001.6	1001.6	109.6	740	31.48	640.2	640.2	158.0	740	198.0	198.0	740
159.0	165.0	159.0	74.53	49.68	1011.0	1011.0	111.5	750	31.81	647.2	647.2	159.2	750	199.0	199.2	750
160.0	166.0	160.0	75.22	50.15	1020.4	1020.4	113.3	760	32.16	654.3	654.3	160.4	760	200.0	200.4	760

Table 2 (continued)
P-T Calculation Results for 12 EFPY

Inputs:

Limiting Beltline Component =	Vessel Weld 5P6756 (Lot 0342, Tandem)	
EFPY =	12.0	
Minimum Vessel Wall Thickness =	6.41	inches
Maximum Vessel Inside Radius =	110.2	inches
RT_{ndt} =	72.3	°F
Temperature Instrument Error =	0.0	°F
Pressure Instrument Error =	0.0	psig
Code Hydro Test Pressure =	1062.6	psig
Boltup Temperature =	[illegible]	°F
Fluid-to-1/4T Temp. Adj. =	[illegible]	°F (assumed value to match GE P-T Curve A results)
Thermal Stress Intensity Factor, K_{It} =	[illegible]	ksi-√inch (assumed value to match GE P-T curve results, used for Curves B and C only)

Calculation Results:

Membrane Correction Factor, M_m = 2.413

Reactor Coolant Temperature T_{cc} (°F)	Adjusted Temperature at 1/4T (°F)	Adjusted Temperature for P-T Curve (°F)	[illegible] K_{Ic} (ksi-√inch)	CURVE 'A' CALCULATIONS [illegible] (ksi-√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	6 EFPY Tech. Spec. Curve A Temperature (°F)	6 EFPY Tech. Spec. Curve A Pressure (psig)	CURVE 'B' CALCULATIONS K_{Ip} (ksi-√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	6 EFPY Tech. Spec. Curve B Temperature (°F)	6 EFPY Tech. Spec. Curve B Pressure (psig)	CURVE 'C' Adjusted Temperature for P-T Curve (psig)	6 EFPY Tech. Spec. Curve C Temperature (°F)	6 EFPY Tech. Spec. Curve C Pressure (psig)
161.0	167.0	161.0	75.93	50.62	1030.0	1030.0	115.0	770	32.51	661.5	661.5	161.6	770	201.0	201.6	770
162.0	168.0	162.0	76.65	51.10	1039.8	1039.8	116.7	780	32.87	668.8	668.8	162.8	780	202.0	202.8	780
163.0	169.0	163.0	77.38	51.58	1049.6	1049.6	118.4	790	33.23	676.2	676.2	163.9	790	203.0	203.9	790
164.0	170.0	164.0	78.12	52.08	1059.7	1059.7	120.0	800	33.60	683.8	683.8	165.0	800	204.0	205.0	800
165.0	171.0	165.0	78.87	52.58	1069.8	1069.8	121.8	810	33.98	691.4	691.4	166.1	810	205.0	206.1	810
166.0	172.0	166.0	79.63	53.08	1080.2	1080.2	123.1	820	34.38	699.1	699.1	167.2	820	206.0	207.2	820
167.0	173.0	167.0	80.40	53.60	1090.6	1090.6	124.6	830	34.74	707.0	707.0	168.3	830	207.0	208.3	830
168.0	174.0	168.0	81.18	54.12	1101.3	1101.3	126.1	840	35.14	714.9	714.9	169.3	840	208.0	209.3	840
169.0	175.0	169.0	81.98	54.66	1112.0	1112.0	127.5	850	35.53	723.0	723.0	170.4	850	209.0	210.4	850
170.0	176.0	170.0	82.78	55.19	1123.0	1123.0	129.0	860	35.94	731.2	731.2	171.4	860	210.0	211.4	860
171.0	177.0	171.0	83.60	55.73	1134.1	1134.1	130.3	870	36.35	739.6	739.6	172.4	870	211.0	212.4	870
172.0	178.0	172.0	84.43	56.29	1145.3	1145.3	131.7	880	36.76	748.0	748.0	173.4	880	212.0	213.4	880
173.0	179.0	173.0	85.27	56.85	1156.7	1156.7	133.3	890	37.18	756.6	756.6	174.4	890	213.0	214.4	890
174.0	180.0	174.0	86.13	57.42	1168.3	1168.3	134.4	900	37.61	765.3	765.3	175.3	900	214.0	215.3	900
175.0	181.0	175.0	86.99	58.00	1180.1	1180.1	135.6	910	38.04	774.1	774.1	176.3	910	215.0	216.3	910
176.0	182.0	176.0	87.87	58.58	1192.0	1192.0	136.9	920	38.46	783.0	783.0	177.2	920	216.0	217.2	920
177.0	183.0	177.0	88.76	59.18	1204.1	1204.1	138.1	930	38.93	792.1	792.1	178.1	930	217.0	218.1	930
178.0	184.0	178.0	89.67	59.78	1216.4	121C.4	139.4	940	39.38	801.3	801.3	179.0	940	218.0	219.0	940
179.0	185.0	179.0	90.59	60.39	1228.9	1228.9	140.6	950	39.84	810.7	810.7	179.9	950	219.0	219.9	950
180.0	186.0	180.0	91.52	61.01	1241.5	1241.5	141.7	960	40.31	820.1	820.1	180.8	960	220.0	220.8	960
181.0	187.0	181.0	92.47	61.64	1254.3	1254.3	142.9	970	40.78	829.8	829.8	181.7	970	221.0	221.7	970
182.0	188.0	182.0	93.43	62.28	1267.4	1267.4	144.0	980	41.26	839.5	839.5	182.6	980	222.0	222.6	980
183.0	189.0	183.0	94.40	62.93	1280.6	1280.6	145.2	990	41.74	849.4	849.4	183.4	990	223.0	223.4	990
184.0	190.0	184.0	95.39	63.59	1294.0	1294.0	146.3	1000	42.24	859.5	859.5	184.3	1000	224.0	224.3	1000
185.0	191.0	185.0	96.39	64.26	1307.8	1307.8	147.3	1010	42.74	869.7	869.7	185.1	1010	225.0	225.1	1010
186.0	192.0	186.0	97.41	64.94	1321.3	1321.3	148.4	1020	43.25	880.0	880.0	185.9	1020	226.0	225.9	1020
187.0	193.0	187.0	98.44	65.62	1335.3	1335.3	149.5	1030	43.76	890.5	890.5	186.7	1030	227.0	226.7	1030
188.0	194.0	188.0	99.48	66.32	1349.5	1349.5	150.5	1040	44.29	901.2	901.2	187.5	1040	228.0	227.5	1040
189.0	195.0	189.0	100.55	67.03	1363.9	1363.9	151.5	1050	44.82	912.0	912.0	188.3	1050	229.0	228.3	1050
190.0	196.0	190.0	101.62	67.75	1378.6	1378.6	152.5	1060	45.36	922.9	922.9	189.1	1060	230.0	229.1	1060
191.0	197.0	191.0	102.72	68.48	1393.4	1393.4	153.5	1070	45.90	934.0	934.0	189.9	1070	231.0	229.9	1070
192.0	198.0	192.0	103.83	69.22	1408.4	1408.4	154.5	1080	46.46	945.3	945.3	190.7	1080	232.0	230.7	1080
193.0	199.0	193.0	104.85				155.4	1090	47.02	956.8	956.8	191.4	1090	233.0	231.4	1090
194.0	200.0	194.0	106.09				156.4	1100	47.59	968.4	968.4	192.2	1100	234.0	232.2	1100
195.0	201.0	195.0	107.25				157.3	1110	48.17	980.2	980.2	192.9	1110	235.0	232.9	1110
196.0	202.0	196.0	108.43				158.3	1120	48.76	992.1	992.1	193.7	1120	236.0	233.7	1120
197.0	203.0	197.0	109.62				159.2	1130	49.35	1004.3	1004.3	194.4	1130	237.0	234.4	1130
198.0	204.0	198.0	110.83				160.1	1140	49.96	1016.6	1016.6	195.1	1140	238.0	235.1	1140
199.0	205.0	199.0	112.08				161.0	1150	50.57	1029.1	1029.1	195.8	1150	239.0	235.8	1150
200.0	206.0	200.0	113.30				161.8	1160	51.20	1041.7	1041.7	196.5	1160	240.0	236.5	1160
201.0	207.0	201.0	114.57				162.7	1170	51.83	1054.6	1054.6	197.2	1170	241.0	237.2	1170
202.0	208.0	202.0	115.85				163.6	1180	52.47	1067.6	1067.6	197.9	1180	242.0	237.9	1180
203.0	209.0	203.0	117.15				164.4	1190	53.12	1080.9	1080.9	198.6	1190	243.0	238.6	1190
204.0	210.0	204.0	118.47				165.2	1200	53.78	1094.3	1094.3	199.3	1200	244.0	239.3	1200

Table 2 (concluded)
P-T Calculation Results for 12 EFPY

Inputs:

Limiting Beltline Component =	Vessel Weld 6P6756 (Lot 0342, Tandem)	
EFPY =	12.0	
Minimum Vessel Wall Thickness =	6.41	inches
Maximum Vessel Inside Radius =	110.2	inches
RT_{NDT} =	72.3	°F
Temperature Instrument Error =	6.6	°F
Pressure Instrument Error =	0.0	psig
Code Hydro Test Pressure =	1063.6	psig
Boltup Temperature =	[redacted]	°F
Fluid-to-1/4T Temp. Adj. =	[redacted]	°F (assumed value to match GE P-T Curve A results)
Thermal Stress Intensity Factor, K_{It} =	[redacted]	ksi-√inch (assumed value to match GE P-T curve results, used for Curves B and C only)

Calculation Results:

Membrane Correction Factor, M_m = 2.413

Reactor Coolant Temperature T_{RC} (°F)	Adjusted Temperature at 1/4T (°F)	Adjusted Temperature for P-T Curve (°F)	K_{IR} (ksi-√inch)	CURVE A CALCULATIONS (ksi-√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	EFPY Tech. Spec. Curve A Temperature (°F)	EFPY Tech. Spec. Curve A Pressure (psig)	CURVE B CALCULATIONS K_{Im} (ksi-√inch)	Calculated Pressure P (psig)	Adjusted Pressure for P-T Curve (psig)	EFPY Tech. Spec. Curve B Temperature (°F)	EFPY Tech. Spec. Curve B Pressure (psig)	CURVE C Adjusted Temperature for P-T Curve (psig)	EFPY Tech. Spec. Curve C Temperature (°F)	EFPY Tech. Spec. Curve C Pressure (psig)
205.0	211.0	205.0	119.81				166.1	1210	54.45	1107.9	1107.9	200.0	1210	245.0	240.0	1210
206.0	212.0	206.0	121.17				166.8	1220	55.13	1121.7	1121.7	200.6	1220	246.0	240.6	1220
207.0	213.0	207.0	122.64				167.7	1230	55.82	1135.8	1135.8	201.3	1230	247.0	241.3	1230
208.0	214.0	208.0	123.94				168.5	1240	56.52	1150.0	1150.0	201.9	1240	248.0	241.9	1240
209.0	215.0	209.0	125.38				169.3	1250	57.23	1164.4	1164.4	202.6	1250	249.0	242.6	1250
210.0	216.0	210.0	126.80				170.0	1260	57.95	1179.1	1179.1	203.2	1260	250.0	243.2	1260
211.0	217.0	211.0	128.26				170.8	1270	58.68	1194.0	1194.0	203.9	1270	251.0	243.9	1270
212.0	218.0	212.0	129.75				171.6	1280	59.42	1209.0	1209.0	204.5	1280	252.0	244.5	1280
213.0	219.0	213.0	131.25				172.3	1290	60.17	1224.3	1224.3	205.1	1290	253.0	245.1	1290
214.0	220.0	214.0	132.77				173.1	1300	60.93	1239.9	1239.9	205.7	1300	254.0	245.7	1300
215.0	221.0	215.0	134.32				173.8	1310	61.71	1255.6	1255.6	206.3	1310	255.0	246.3	1310
216.0	222.0	216.0	135.89				174.5	1320	62.49	1271.6	1271.6	207.0	1320	256.0	247.0	1320
217.0	223.0	217.0	137.49				175.3	1330	63.29	1287.8	1287.8	207.6	1330	257.0	247.6	1330
218.0	224.0	218.0	139.10				176.0	1340	64.10	1304.3	1304.3	208.2	1340	258.0	248.2	1340
219.0	225.0	219.0	140.75				176.7	1350	64.92	1320.9	1320.9	208.7	1350	259.0	248.7	1350
220.0	226.0	220.0	142.41				177.4	1360	65.75	1337.9	1337.9	209.3	1360	260.0	249.3	1360
221.0	227.0	221.0	144.10				178.1	1370	66.59	1355.1	1355.1	209.9	1370	261.0	249.9	1370
222.0	228.0	222.0	145.81				178.8	1380	67.45	1372.5	1372.5	210.5	1380	262.0	250.5	1380
223.0	229.0	223.0	147.55				179.4	1390	68.32	1390.2	1390.2	211.1	1390	263.0	251.1	1390
224.0	230.0	224.0	149.31				180.1	1400	69.20	1408.1	1408.1	211.6	1400	264.0	251.6	1400
225.0	231.0	225.0	151.10													
226.0	232.0	226.0	152.82													
227.0	233.0	227.0	154.78													
228.0	234.0	228.0	156.63													
229.0	235.0	229.0	158.53													
230.0	236.0	230.0	160.45													
231.0	237.0	231.0	162.40													
232.0	238.0	232.0	164.39													
233.0	239.0	233.0	166.40													
234.0	240.0	234.0	168.43													
235.0	241.0	235.0	170.50													
236.0	242.0	236.0	172.66													
237.0	243.0	237.0	174.73													
238.0	244.0	238.0	176.89													
239.0	245.0	239.0	179.09													

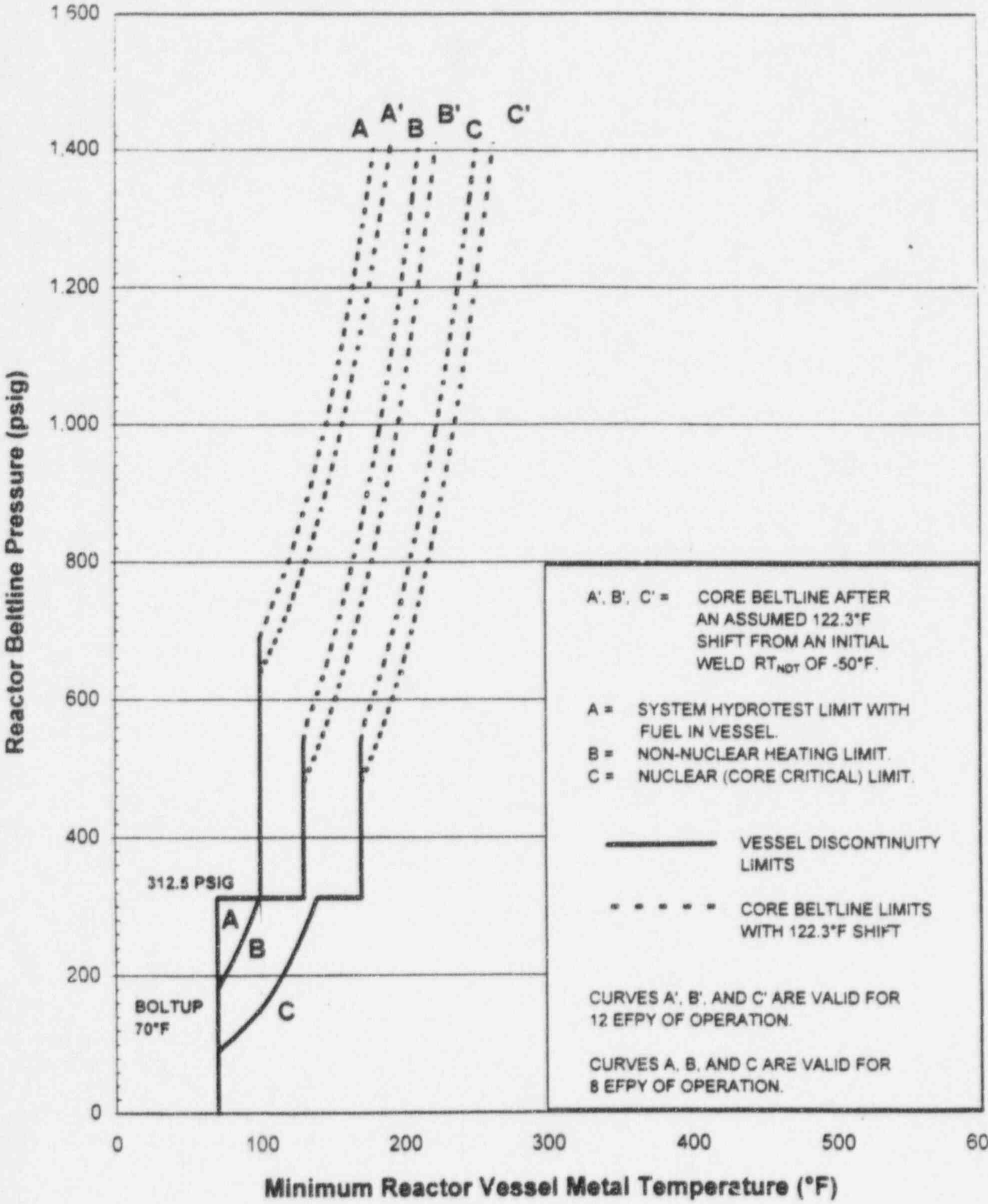

Figure 1. P-T Curves for 12 EFPY