Duke Power
A Duke Energy Company

GARY R. PETERSON
Vice President
Catawba Nuclear Station

Duke Power
CN01VP / 4800 Concord Rd.
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803 831 4251
803 831 3221 fax
grpeters@duke-energy.com

June 10, 2003

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Response to Request for Additional Information (RAI) for Proposed Technical Specification Amendment
TS 3.4.3 - Reactor Coolant System (RCS) Pressure and Temperature (P/T) Limits
TS 3.4.6, RCS Loops - MODE 4
TS 3.4.7, RCS Loops - MODE 5, Loops Filled
TS 3.4.10, Pressurizer Safety Valves
TS 3.4.11, Pressurizer Power Operated Relief Valves (PORVs)
TS 3.4.12, Low Temperature Overpressure Protection (LTOP) System

Reference: 1) Letter from G. R. Peterson to U.S. Nuclear Regulatory Commission dated March 24, 2003.

The purpose of this letter is to docket Catawba's response to your request for additional information dated June 9, 2003, related to the subject submittal.

In Reference 1, Duke Energy Corporation requested an amendment to the Catawba Nuclear Station Facility Operating License and Technical Specifications (TS). The proposed amendment revises various TS that are affected by the revised heatup, cooldown, criticality, and inservice test pressure and temperature (P/T) limits for the reactor coolant system (RCS) of each unit.

In a telephone call on May 22, 2003, the NRC staff requested two items. The first was for Duke to revise the proposed P/T curves for both units to remove some redundancy in the curves. This will help reduce any areas of potential confusion for personnel implementing the curves. In addition, the criticality limit curve for reactor coolant system heatup on Unit 1 required revision.

A001

This revision ensures that the requirements of 10 CFR 50 Appendix G are accurately shown on the figure.

The second was for Duke to provide the thermal stress intensity factors and fluid and metal temperatures associated with the P/T curves proposed in the referenced submittal. Attachment 2 contains the Westinghouse report detailing the thermal stress intensity factors and fluid and metal temperatures associated with the P/T curves.

The items discussed in this letter and in Attachments 1 and 2 have been reviewed against the No Significant Hazards Evaluation submitted in Reference 1. Duke has determined that the previous No Significant Hazards Evaluation still remains valid and has not been affected by any of these changes. There are no commitments contained within this letter.

Pursuant to 10 CFR 50.91, a copy of this RAI response is being sent to the appropriate State of South Carolina official.

Inquiries on this matter should be directed to R. D. Hart at (803) 831-3622.

Very truly yours,

Gary R. Peterson

RDH/s

Attachments

Gary R. Peterson affirms that he the person who subscribed his name to the foregoing statement and that all statements and matters set forth herein are true and correct to the best of his knowledge.

Gary R. Peterson, Site Vice President

Subscribed and sworn to me: June 11, 2003
Date

Brenda C. Albertson
Notary Public

My commission expires: Notary Public, South Carolina, State at Large My Commission Expires March 6, 2008
Date

SEAL

xc (with attachments):

L.A. Reyes
U.S. Nuclear Regulatory Commission
Regional Administrator, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

E.F. Guthrie
Senior Resident Inspector (CNS)
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

R.E. Martin (addressee only)
NRC Senior Project Manager (CNS)
U.S. Nuclear Regulatory Commission
Mail Stop O8-G9
Washington, D.C. 20555-0001

H.J. Porter
Assistant Director
Department of Health and Environmental Control
2600 Bull St.
Columbia, SC 29201

ATTACHMENT 1

MARKED-UP TECHNICAL SPECIFICATIONS PAGES FOR CATAWBA

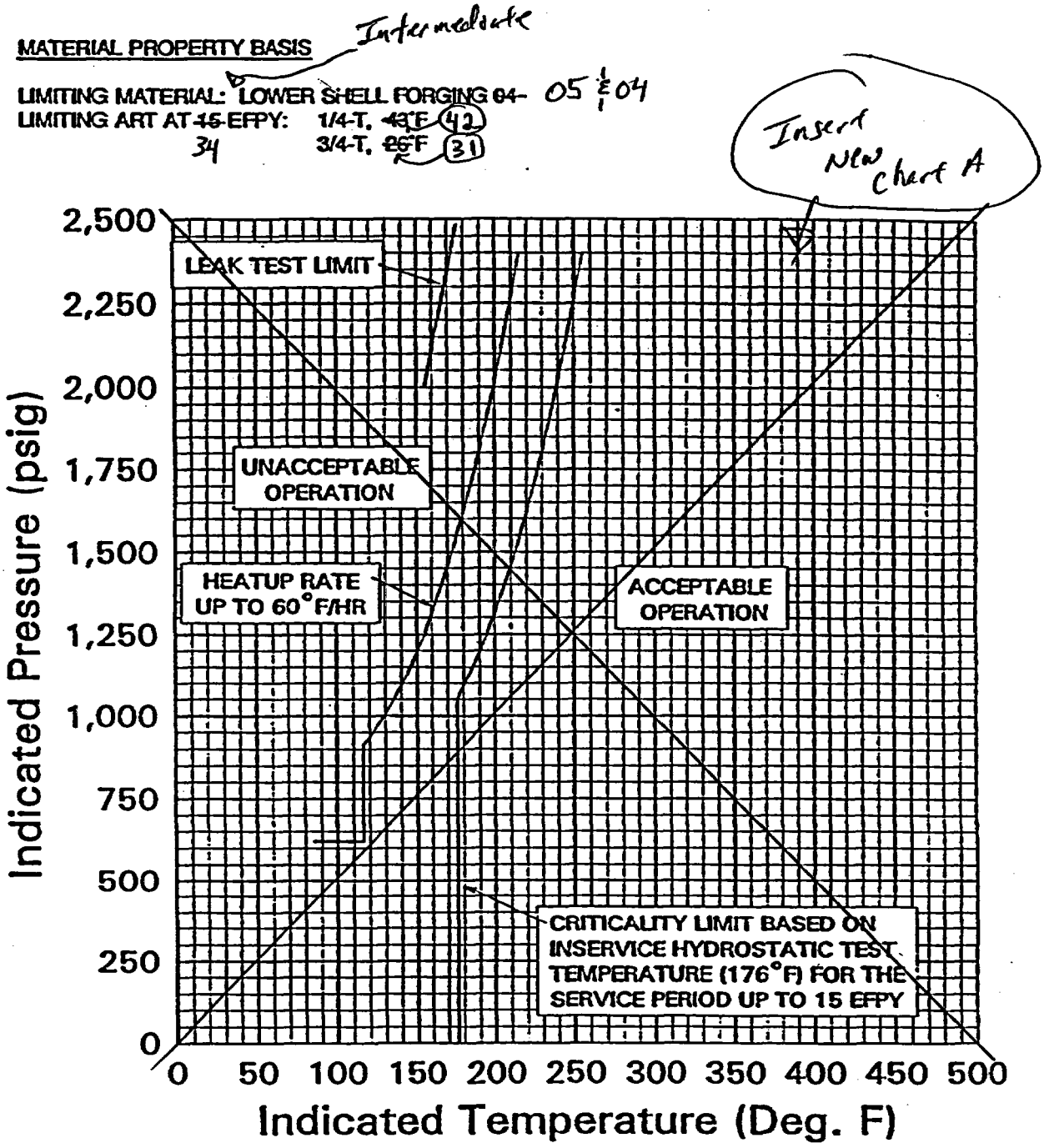

Figure 3.4.3-1
(UNIT 1 ONLY)
RCS Heatup Limitations

Chart A

MATERIALS PROPERTY BASIS
Limiting Material: Lower Shell Forging 04
and Intermediate Shell Forging 05
Limiting ART at 34 EFPY: 1/4-T, 42°F
3/4-T, 31°F

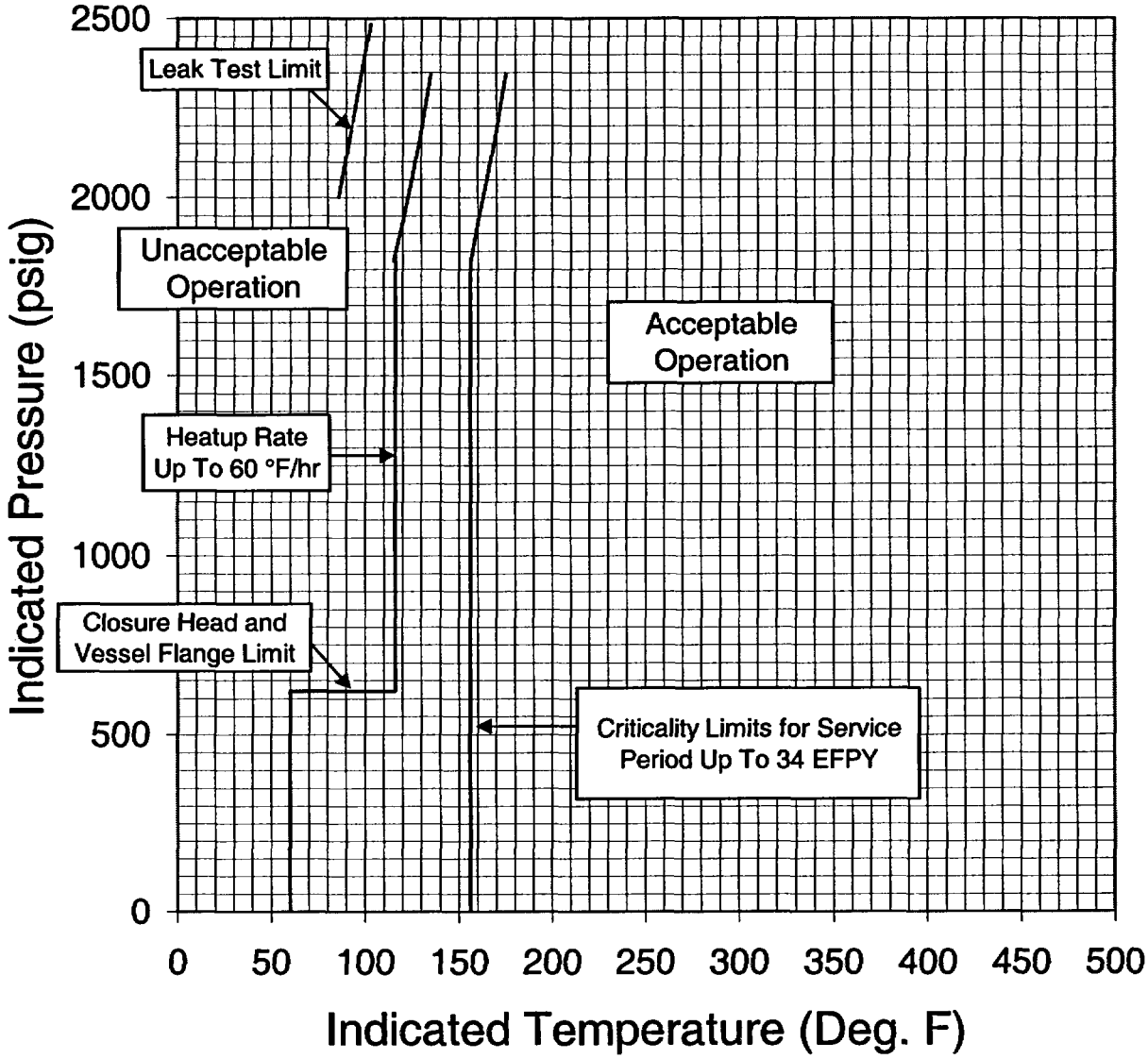

Figure 3.4.3-1
(UNIT 1 ONLY)
RCS Heatup Limitations

MATERIAL PROPERTY BASIS

LIMITING MATERIALS: INTERMEDIATE SHELL, B8605-2
LIMITING ART AT ~~15~~ EFPY: 1/4-t, ~~112.6~~ °F
3/4-t, ~~96.0~~ °F

121
34
106

Insert New Chart B

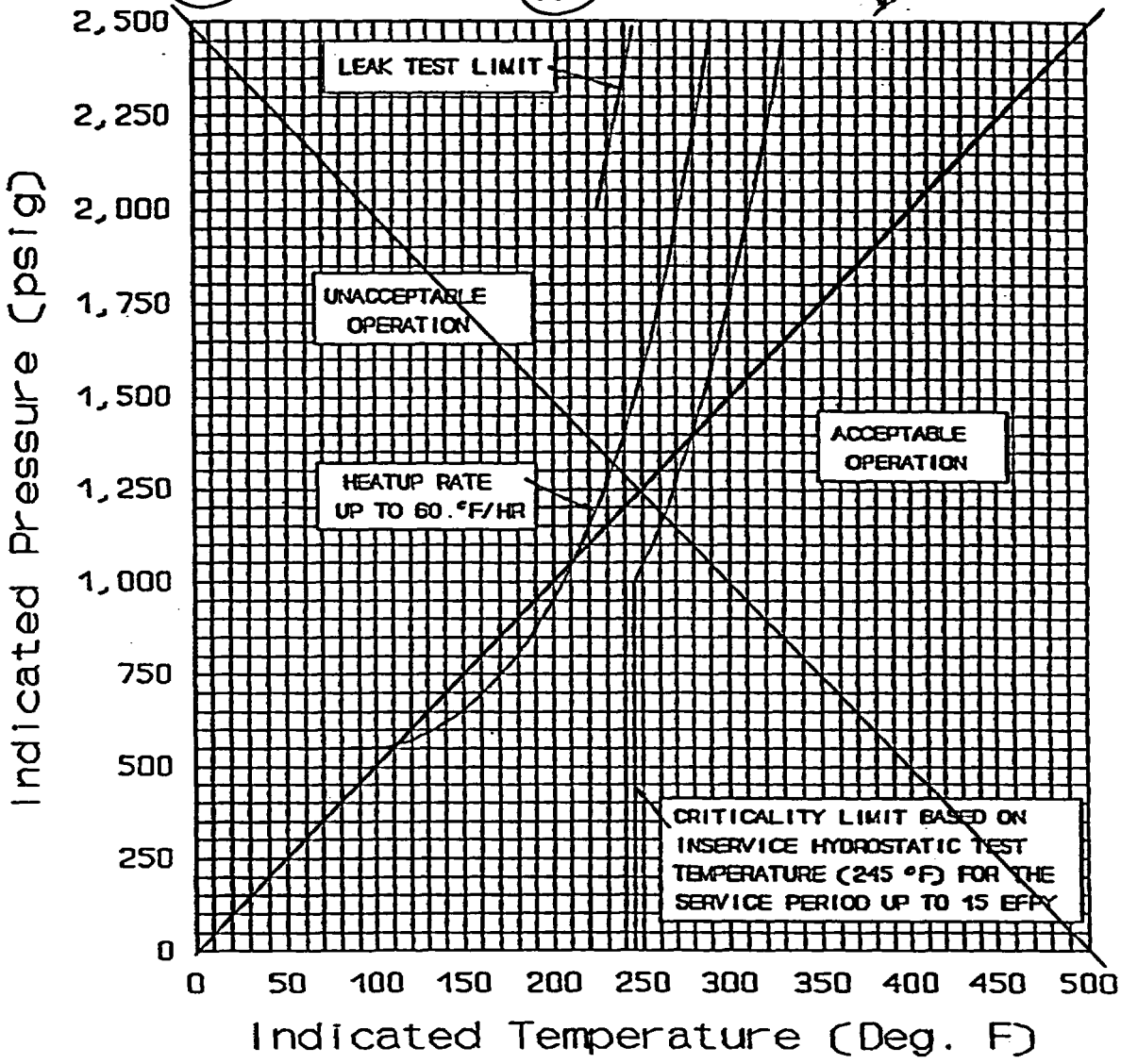

Figure 3.4.3-1
(UNIT 2 ONLY)
RCS Heatup Limitations

Chart B

MATERIALS PROPERTY BASIS
Limiting Material: Intermediate Shell, B8605-2
Limiting ART at 34 EFPY: 1/4-T, 121°F
3/4-T, 106°F

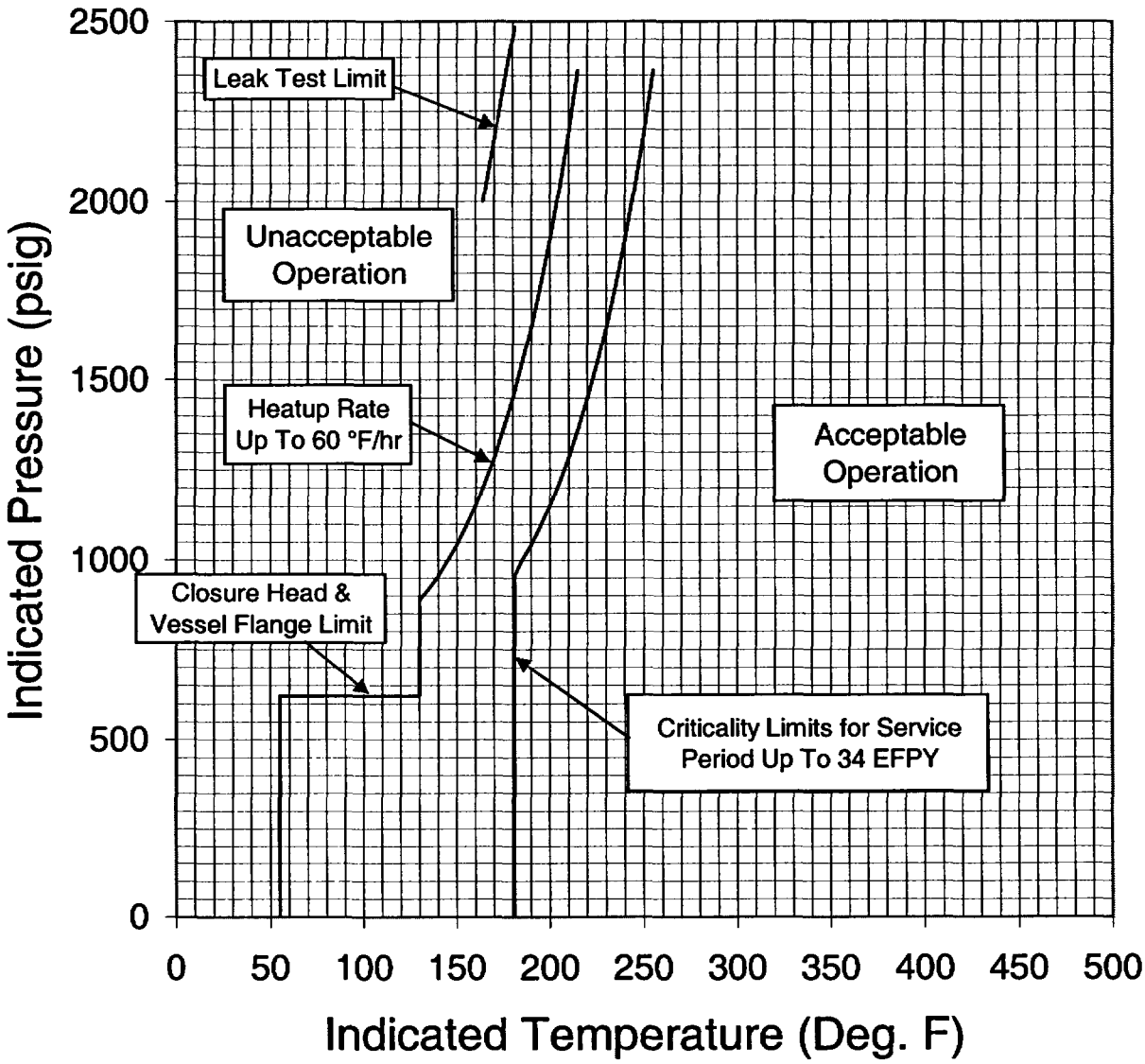

Figure 3.4.3-1
(UNIT 2 ONLY)
RCS Heatup Limitations

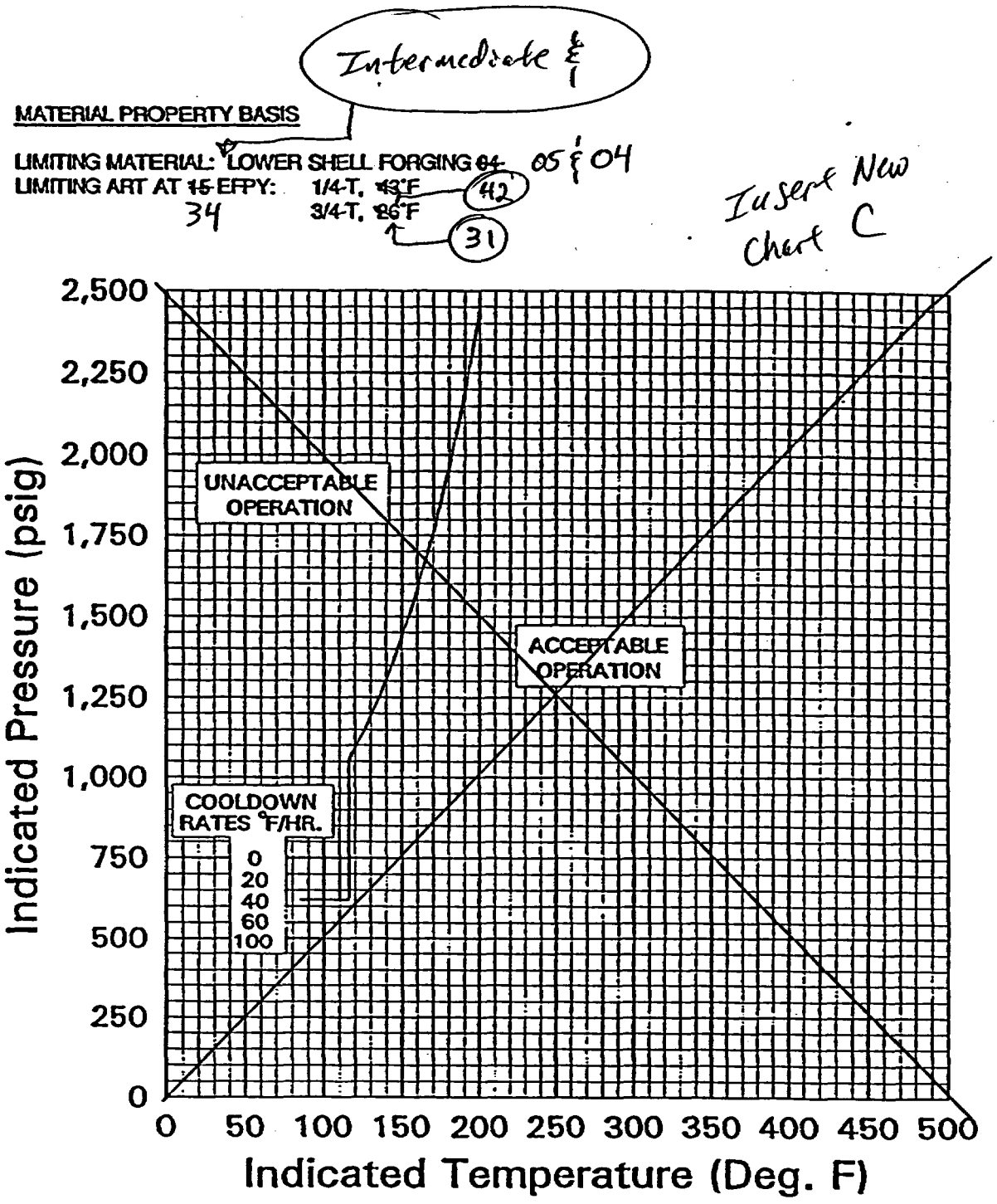

Figure 3.4.3-2
(UNIT 1 ONLY)
RCS Cooldown Limitations

Chart C

MATERIALS PROPERTY BASIS
Limiting Material: Lower Shell Forging 04
and Intermediate Shell Forging 05
Limiting ART at 34 EFPY: 1/4-T, 42°F
3/4-T, 31°F

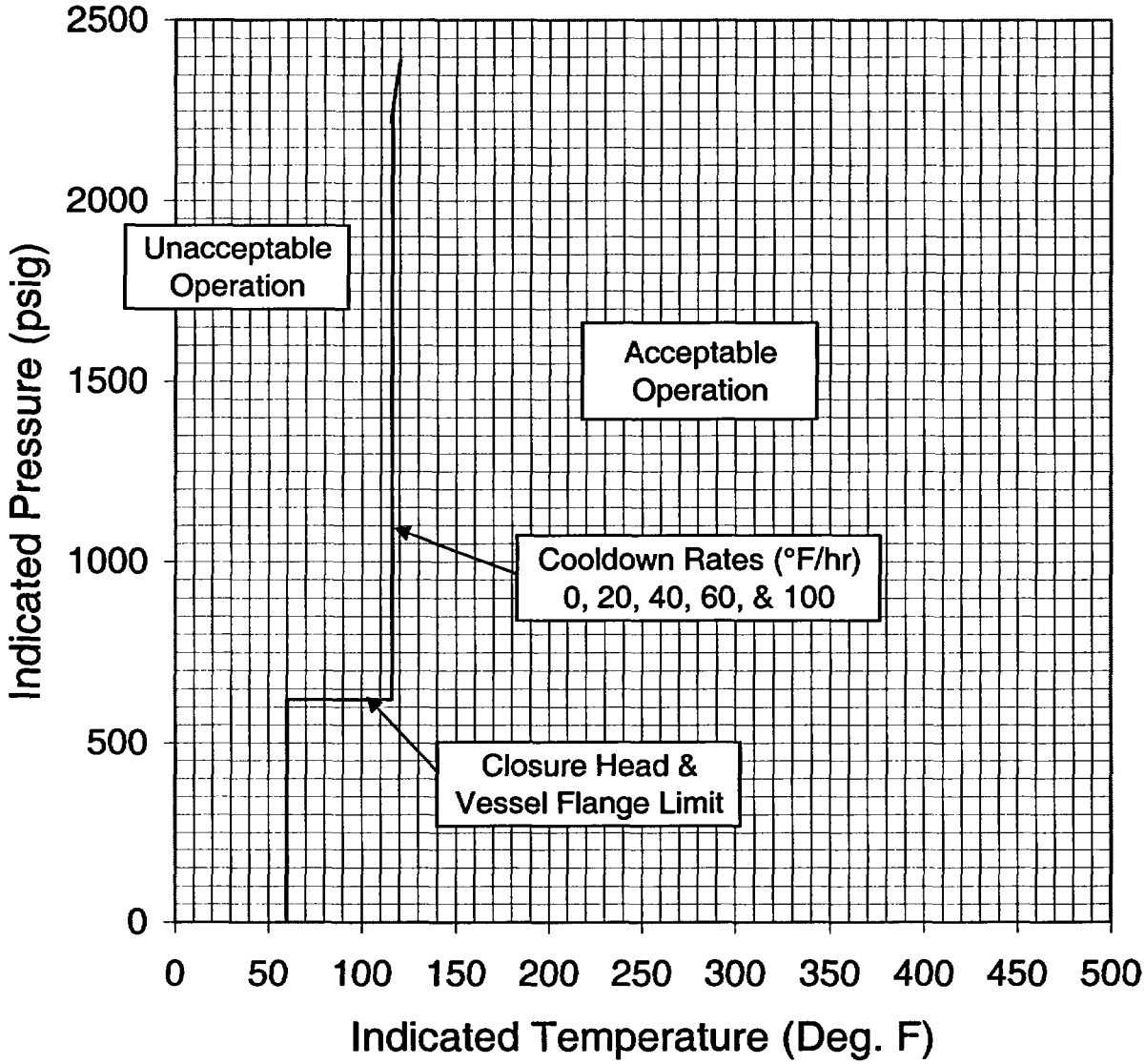

Figure 3.4.3-2
(UNIT 1 ONLY)
RCS Cooldown Limitations

MATERIAL PROPERTY BASIS

LIMITING MATERIALS: INTERMEDIATE SHELL, B8605-2
LIMITING ART AT ~~15~~ 34 EFPY: 1/4-t, ~~112.6~~ 121 °F
3/4-t, ~~96.8~~ 106 °F

Insert New Chart D

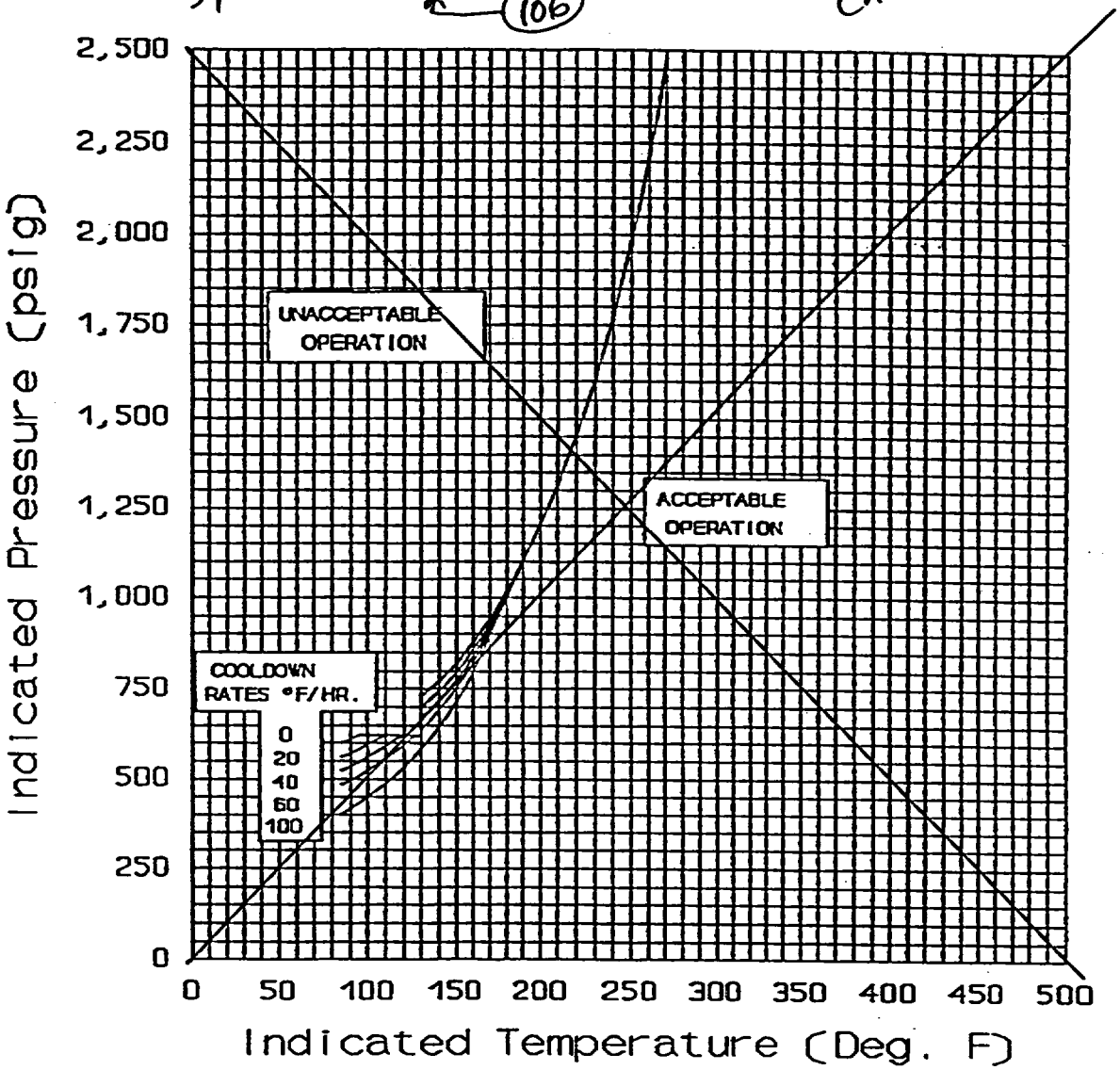

Figure 3.4.3-2
(UNIT 2 ONLY)
RCS Cooldown Limitations

Chart D

MATERIALS PROPERTY BASIS
Limiting Material: Intermediate Shell, B8605-2
Limiting ART at 34 EFPY: 1/4-T, 121°F
3/4-T, 106°F

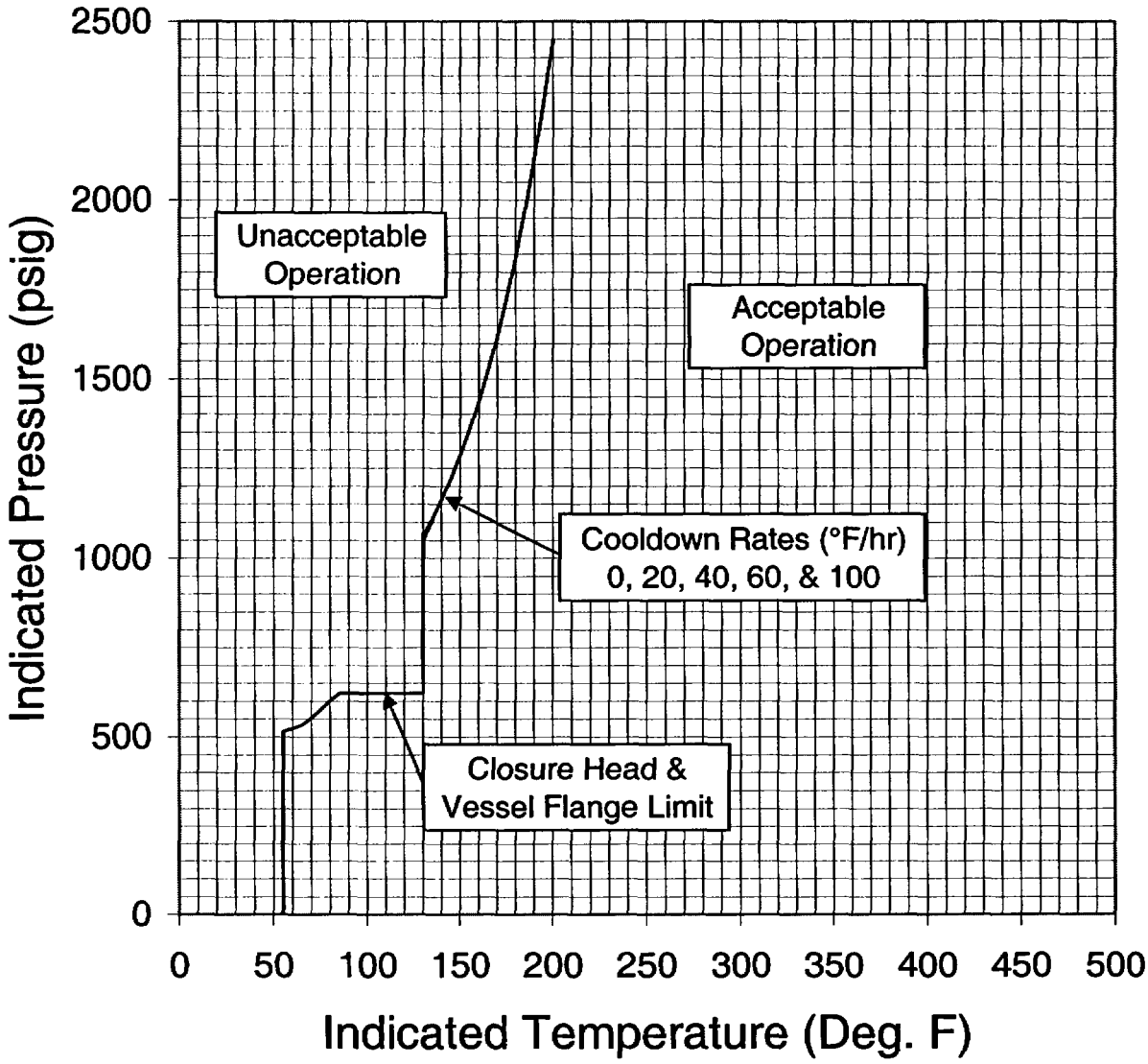

Figure 3.4.3-2
(UNIT 2 ONLY)
RCS Cooldown Limitations

ATTACHMENT 2

THERMAL STRESS INTENSITY FACTORS AND FLUID METAL TEMPERATURES ASSOCIATED WITH P/T CURVES

Westinghouse

Westinghouse Electric Company
Nuclear Services
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

Mr. Kevin Redmond
Duke Power Company
P. O. Box 1006, ECO5P
Charlotte, NC 28201-1006

Direct tel: 412-374-5651
Direct fax: 412-374-3451
e-mail: alexa1dw@westinghouse.com
Westinghouse S.O.: N/A
Customer P.O.: N/A
Our ref: DPC-03-15

March 17, 2003

DUKE POWER COMPANY
CATAWBA UNITS 1 & 2
Thermal Stress Intensity Factors for PT Curves

Dear Mr. Redmond:

Duke Power requested that Westinghouse supply the thermal stress intensity factors associated with the 34 EFPY PT limit curves from WCAP-15285 and WCAP-15203. To support this request, please find the attached Westinghouse letter LTR-EMT-03-148 titled "Thermal Stress Intensity Factors for Catawba Units 1 and 2 PT Curves" dated 3/12/03.

If there are any questions or comments concerning this information, please contact Mr. Thomas Laubham at 412-374-6788 or me at 412-374-5651.

Sincerely,

WESTINGHOUSE ELECTRIC COMPANY LLC

Joe Hamlin for

Dwain W. Alexander
Customer Projects Manager

Attachment

cc: M. Seagle — Duke ECO5P
Pete Harden — Westinghouse Charlotte
Jeff Gilreath — Duke Charlotte

Westinghouse

To: Joe Gambino
cc: J. A. Gresham

Date: 3/12/03

From: T. J. Laubham
Ext: Win 284-6788
Fax: Win 284-6647

Your ref:
Our ref: LTR-EMT-03-148

Subject: **Thermal Stress Intensity Factors for Catawba Units 1 and 2 PT Curves**

As a preventive measure to recent requests for additional information (RAI) from the NRC on pressure-temperature (PT) limit curves, Duke Energy requested Westinghouse supply them with the thermal stress intensity factors associated with the 34 EFPY PT limit curves from WCAP-15203 and WCAP-15285. Attached for Duke Energy's use are the thermal stress intensity factors and vessel wall temperatures in question. Tables 1 and 3 (Units 1 and 2, respectively) contain the 1/4T and 3/4T thermal stress intensity factors and vessel wall temperatures for the 100°F/hr heatup curves. Tables 2 and 4 (Units 1 and 2, respectively) contain the 1/4T thermal stress intensity factors and vessel wall temperatures for the 100°F/hr cooldown curves. Note that the Cooldown is only limited at the 1/4T location, thus the 3/4T values are not supplied. The heatup curves are limited at both the Steady-State and 3/4T locations, depending on the temperature.

Please send this information to Mr. Kevin Redmond at the Duke Energy Office in Charlotte, North Carolina. If you have any questions or need additional information, please contact the undersigned.

Author:

T. J. Laubham[1]
Engineering and Materials Technology

Approved by:

J. H. Ledger[1]
Engineering and Materials Technology

Attachments

[1]**Official record electronically approved in EDMS 2000**

Table 1: Catawba Unit 1 Kit Values for 100°F/hr Heatup Curve (34 EFPY)

Water Temp (°F)	1/4T Wall Temp. (°F)	1/4T Thermal Stress Intensity Factor (KSI SQ. RT. IN.)	3/4T Wall Temp. (°F)	3/4T Thermal Stress Intensity Factor (KSI SQ. RT. IN.)
• The 100°F/hr. Heatup Curve is limited by Steady State from 60°F to 80°F.				
• The 100°F/hr. Heatup Curve is limited by the 3/4T Location from 85°F to 155°F it is limited.				
85	76.7	-3.6761	71.0	2.4187
90	80.0	-4.8486	72.2	3.3300
95	83.6	-5.8585	73.8	4.1425
100	87.3	-6.7816	75.8	4.8695
105	91.1	-7.5830	78.2	5.5136
110	95.1	-8.3114	80.8	6.0880
115	99.2	-8.9477	83.7	6.5981
120	103.4	-9.5260	86.8	7.0539
125	107.7	-10.0339	90.2	7.4601
130	112.0	-10.4964	93.7	7.8242
135	116.5	-10.9045	97.3	8.1500
140	120.9	-11.2775	101.1	8.4431
145	125.5	-11.6082	105.1	8.7066
150	130.0	-11.9119	109.1	8.9447
155	134.7	-12.1826	113.2	9.1599

Table 2: Catawba Unit 1 Kit Values for 100°F/hr Cooldown Curve (34 EFPY)

Water Temp (°F)	1/4T Wall Temp. (°F)	100°F/hr Cooldown 1/4T Thermal Stress Intensity Factor (KSI SQ. RT. IN.)
120	144.5	15.1177
115	139.4	15.0517
110	134.3	14.9862
105	129.2	14.9205
100	124.1	14.8552
95	119.1	14.7897
90	114.0	14.7247
85	108.9	14.6595
80	103.8	14.5947
75	98.7	14.5297
70	93.6	14.4653
65	88.6	14.4006
60	83.5	14.3356

- **Note that the Vessel Radius to the ¼T and ¾T Locations are as follows:**

  1/4T Radius = 88.772" & 3/4T Radius = 93.005"

Table 3: Catawba Unit 2 Kit Values for 100°F/hr Heatup Curve (34 EFPY)

Water Temp (°F)	1/4T Wall Temp. (°F)	1/4T Thermal Stress Intensity Factor (KSI SQ. RT. IN.)	3/4T Wall Temp. (°F)	3/4T Thermal Stress Intensity Factor (KSI SQ. RT. IN.)
• The 100°F/hr. Heatup Curve is limited by Steady State from 55°F to 70°F.				
• The 100°F/hr. Heatup Curve is limited by the 3/4T Location from 85°F to 155°F it is limited.				
75	71.0	-0.9955	70.0	0.4731
80	73.6	-2.4523	70.3	1.4375
85	76.6	-3.7132	71.0	2.4249
90	79.9	-4.9128	72.1	3.3553
95	83.4	-5.9528	73.6	4.1908
100	87.1	-6.9070	75.6	4.9421
105	90.9	-7.7399	77.8	5.6108
110	94.8	-8.4995	80.4	6.2099
115	98.9	-9.1665	83.2	6.7442
120	103.1	-9.7746	86.2	7.2235
125	107.3	-10.3112	89.5	7.6524
130	111.6	-10.8012	92.9	8.0382
135	116.0	-11.2356	96.5	8.3847
140	120.5	-11.6336	100.3	8.6975
145	125.0	-11.9880	104.1	8.9797
150	129.5	-12.3141	108.1	9.2355
155	134.1	-12.6059	112.2	9.4673
160	138.7	-12.8758	116.3	9.6786
165	143.4	-13.1187	120.6	9.8710
170	148.1	-13.3446	124.9	10.0474
175	152.8	-13.5490	129.2	10.2090
180	157.6	-13.7405	133.6	10.3580
185	162.3	-13.9148	138.1	10.4955
190	167.1	-14.0793	142.6	10.6231
195	171.9	-14.2300	147.1	10.7416
200	176.7	-14.3733	151.7	10.8524
205	181.5	-14.5055	156.3	10.9560
210	186.3	-14.6321	160.9	11.0536
215	191.2	-14.7498	165.6	11.1456
220	196.0	-14.8633	170.3	11.2328
225	200.9	-14.9697	174.9	11.3156
230	205.8	-15.0729	179.6	11.3947
235	210.6	-15.1702	184.4	11.4703
240	215.5	-15.2654	189.1	11.5429

Table 4: Catawba Unit 2 Kit Values for 100°F/hr Cooldown Curve (34 EFPY)

Water Temp (°F)	1/4T Wall Temp. (°F)	100°F/hr Cooldown 1/4T Thermal Stress Intensity Factor (KSI SQ. RT. IN.)
125	150.6	15.9623
120	145.5	15.8933
115	140.4	15.8240
110	135.3	15.7553
105	130.2	15.6862
100	125.1	15.6177
95	120.0	15.5488
90	115.0	15.4805
85	109.9	15.4120
80	104.8	15.3439
75	99.7	15.2756
70	94.6	15.2078
65	89.5	15.1398
60	84.4	15.0715
55	79.4	15.0020

- **Note that the Vessel Radius to the ¼T and ¾T Locations are as follows:**

  1/4T Radius = 88.812" & 3/4T Radius = 93.125"