

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 22, 2001

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

Serial No. 01-168
NL&OS/GSS/ETS R0
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
PROPOSED TECHNICAL SPECIFICATIONS CHANGES
REACTOR COOLANT SYSTEM PRESSURE/TEMPERATURE LIMITS
LTOPS SETPOINTS, AND LTOPS ENABLE TEMPERATURES

By letters dated June 22, 2000 and January 4, 2001, Virginia Electric and Power Company (Dominion) submitted a Technical Specification Change Request (TSCR) involving the Reactor Coolant System (RCS) Pressure/Temperature (P/T) operating limits, the Low Temperature Overpressure Protection System (LTOPS) setpoints, and the LTOPS enable temperature. During a teleconference on Monday, February 26, 2001, Westinghouse informed Dominion and the NRC of a computer code error that affects this TSCR. The net effect of the computer code error is a slight non-conservatism in the high temperature region of the heatup curves previously submitted.

This submittal addresses the computer code error by revising the proposed North Anna Units 1 and 2 Technical Specification RCS P/T limit curves applicable to heatup (i.e., North Anna Units 1 and 2 Technical Specification Figures 3.4-2). The heatup curves documented herein replace those previously provided in our letter of January 4, 2001. The LTOPS setpoint analysis previously submitted is unaffected by the changes to the heatup curves, since the LTOPS setpoint analysis uses the isothermal P/T limit curve as a design limit. Similarly, the LTOPS enable temperature analysis previously submitted is unaffected by the changes to the heatup curves, since the proposed LTOPS enable temperature is a function of the design value of RT_{NDT} only, which is unaffected by the changes to the heatup curves. The previously submitted cooldown curves are unaffected by this computer code error. Therefore, with the exception of the previously proposed Technical Specification RCS P/T limit curves applicable to heatup, the previously submitted Technical Specification change request remains valid. Please substitute the attached revised RCS P/T limit heatup curves for those provided in our January 4, 2001 submittal to complete your review.

A001

We have evaluated the revised proposed changes and have determined that they do not impact the significant hazards consideration determination provided in our letter dated January 4, 2001 (Serial No. 01-020). We have also determined that operation with the revised proposed changes will not result in any significant increases in the amounts of effluents that may be released offsite and in any significant increases in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment remains eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed changes.

The revised cumulative core burnup applicability limit of 17.2 EFPY for the North Anna Unit 1 P/T limits, LTOPS setpoints, and LTOPS enable temperature is predicted to be reached on May 15, 2001. North Anna Unit 2 is predicted to reach the cumulative core burnup applicability limit for the Technical Specification P/T limits, LTOPS setpoints, and LTOPS enable temperature in September 2001. Therefore, we request approval of the proposed Technical Specification changes, associated bases, and exemption requests by mid-April 2001 in order to facilitate an orderly implementation of the changes into plant equipment and procedures and provide training by the existing May 15, 2001 limit date.

If you have any further questions or require additional information, please contact us.

Very truly yours,



William R. Matthews
Vice President Nuclear Operations

Attachments:

Attachment 1	Discussion of Change
Attachment 2	Mark-up of Units 1 and 2 Technical Specifications Changes
Attachment 3	Proposed Units 1 and 2 Technical Specifications Changes

Commitments made in this letter:

1. There are no commitments in this letter

cc: U.S. Nuclear Regulatory Commission
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COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by William R. Matthews, who is Vice President - Nuclear Operations, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 22nd day of March, 2001.

My Commission Expires: 3-31-04

Maggie McClure
Notary Public

(SEAL)

Attachment 1

Discussion of Change

**North Anna Power Station
Units 1 and 2
Virginia Electric and Power Company
(Dominion)**

Background

During a teleconference on Monday, February 26, 2001, Westinghouse informed Dominion and the NRC of a computer code error that adversely affected the Reactor Coolant System (RCS) pressure/temperature (P/T) limits used in the North Anna Units 1 and 2 RCS P/T limits Technical Specification Change Request (TSCR) [1] [2]. The Westinghouse OPERLIM computer code calculates RCS P/T limits by calculating the combined pressure and thermal stresses in the reactor vessel during normal operation heatup and cooldown. According to Westinghouse, the computer code was modified to incorporate changes associated with the 1996 Addenda to ASME Section XI Appendix G, including separate membrane (i.e., "pressure") stress formulations for the 1/4-thickness (1/4-T) and 3/4-thickness (3/4-T) reactor vessel locations. During heatup conditions, it is possible for the location of limiting combined stresses to change from the 3/4-T location to the 1/4-T location. Although the computer code modifications were intended to account for this situation, the computer code did not include correct logic to switch the membrane stress formulation from that which applies at the 3/4-T location to that which applies at the 1/4-T location when the location of limiting stresses changes from the 3/4-T location to the 1/4-T location. The net effect of this error is a slight non-conservatism in the high temperature region of the heatup curves generated for the TSCR described above.

Discussion of Changes

Westinghouse has provided corrected design basis P/T limit curves applicable to heatup for North Anna Units 1 and 2. (See Appendix A of this document. Changed values relative to the Reference [2] submittal, are presented in bold.) These curves were developed with the same design inputs as those used in the development of the end-of-license-extension heatup curves in WCAP-15112 Revision 1 [3]. The Appendix A curves supersede the end-of-license-extension heatup curves presented in WCAP-15112 Revision 1 [3]. Dominion has modified these curves to account for pressure and temperature measurement uncertainty, and for the pressure difference between the point of measurement (RCS hot leg) and the point of interest (the reactor vessel beltline). An allowance of 70 psi was applied to accommodate the Channel Statistical Accuracy (CSA) for Wide Range RCS pressure measurement. An allowance of 13.5°F was applied to accommodate the CSA for Wide Range RCS temperature measurement. Finally, an allowance of 10 psi has been applied to accommodate the pressure difference between the point of measurement (RCS hot leg) and the point of interest (reactor vessel beltline). These CSA and measurement location bias values are unchanged from those previously applied in Reference [2]. The resulting proposed revised North Anna Units 1 and 2 Technical Specification P/T limit curves applicable to heatup are presented in Appendix B of this document.

Changes to North Anna Units 1 and 2 Technical Specifications

Revised North Anna Units 1 and 2 Technical Specification RCS P/T limits applicable to heatup (i.e., North Anna Units 1 and 2 Technical Specification Figures 3.4-2) were proposed in Reference [2]. The RCS P/T limits applicable to heatup presented in Appendix B replace those previously

proposed in Reference [2]. This replacement corrects the error introduced into the previously proposed curves by the computer code error described above.

Conclusions

This submittal provides revised proposed North Anna Units 1 and 2 Technical Specification RCS P/T limit curves applicable to heatup (i.e., North Anna Units 1 and 2 Technical Specification Figures 3.4-2). The revised proposed Technical Specification heatup curves documented herein replace the heatup curves previously provided in Reference [2]. The proposed revised heatup curves have been corrected to address the Westinghouse OPERLIM computer code error described above. The curves have been modified to include allowances for temperature and pressure measurement instrument uncertainties, and for the pressure difference between the point of measurement (RCS hot leg) and the point of interest (reactor vessel beltline).

The LTOPS setpoint analysis presented in Reference [2] is unaffected by the changes to the heatup curves, since the LTOPS setpoint analysis uses the isothermal P/T limit curve as a design limit. Similarly, the LTOPS enable temperature analysis presented in Reference [2] is unaffected by the changes to the heatup curves, since the proposed LTOPS enable temperature is a function of the design value of RT_{NDT} only, which is unaffected by the changes to the heatup curves. Only the proposed Technical Specification RCS P/T limit curves applicable to heatup are affected by the changes described herein. Therefore, with the exception of the previously proposed Technical Specification heatup curves presented in Reference [2], the TSCR presented in Reference [1] and supplemented in Reference [2] remains valid.

References

- [1] Letter from D. A. Christian to USNRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Proposed Technical Specifications Changes, Requests for Exemptions Per 10 CFR 50.60(b), Reactor Coolant System Pressure/Temperature Limits, LTOPS Setpoints, and LTOPS Enable Temperatures," Serial No. 00-306, dated June 22, 2000.
- [2] Letter from W. R. Matthews to USNRC, "Virginia Electric and Power Company, North Anna Power Station Units 1 and 2, Response to Request for Additional Information, Proposed Technical Specifications Changes, Requests for Exemption per 10 CFR 50.60(b), Reactor Coolant System Pressure/Temperature Limits, LTOPS Setpoints, and LTOPS Enable Temperatures," Serial No. 01-020, dated January 4, 2001.
- [3] WCAP-15112, Revision 1, "North Anna Units 1 and 2 WOG Reactor Vessel 60-Year Evaluation Minigroup Heatup and Cooldown Limit Curves for Normal Operation," dated October, 1998.

Appendix A

Revised P/T Limit Curves Applicable to Heatup
For North Anna Units 1 and 2
(Unmodified for Instrument Uncertainties or Measurement Location Bias)

Table 1 North Anna Units 1 and 2 Heatup Data with Margins of 0 Degrees F and 0 psi for Instrumentation Errors (VRA-01-012 * -- Correction to data previously provided in WCAP-15112 Rev. 1)

Heatup Rate = 20 Deg. F/hr			Heatup Rate = 40 Deg. F/hr			Heatup Rate = 60 Deg. F/hr		
	Indicated Temperature (Deg. F)	Indicated Pressure (psig)		Indicated Temperature (Deg. F)	Indicated Pressure (psig)		Indicated Temperature (Deg. F)	Indicated Pressure (psig)
1	60	621	1	60	621	1	60	618
2	65	621	2	65	621	2	65	618
3	85	621	3	85	621	3	85	618
4	90	621	4	90	621	4	90	618
5	95	621	5	95	621	5	95	618
6	98	621	6	98	621	6	100	618
7	98	664	7	98	640	7	105	618
8	100	666	8	100	640	8	110	618
9	105	670	9	105	642	9	115	619
10	110	674	10	110	645	10	120	621
11	115	679	11	115	649	11	125	624
12	120	684	12	120	654	12	130	629
13	125	690	13	125	660	13	135	634
14	130	696	14	130	666	14	140	640
15	135	703	15	135	674	15	145	647
16	140	711	16	140	683	16	150	656
17	145	719	17	145	692	17	155	665
18	150	729	18	150	703	18	160	676
19	155	739	19	155	715	19	165	688
20	160	751	20	160	728	20	170	701
21	165	764	21	165	743	21	175	716
22	170	778	22	170	759	22	180	732
23	175	794	23	175	777	23	185	751
24	180	811	24	180	797	24	190	771
25	185	830	25	185	819	25	195	793
26	190	851	26	190	843	26	200	818
27	195	875	27	195	870	27	205	846
28	200	901	28	200	900	28	210	876
29	205	929	29	205	929	29	215	910
30	210	961	30	210	961	30	220	947
31	215	995	31	215	995	31	225	988
32	220	1034	32	220	1034	32	230	1033
33	225	1077	33	225	1077	33	235	1083
34	230	1124	34	230	1124	34	240	1138
35	235	1176	35	235	1176	35	245	1199
36	240	1233	36	240	1233	36	250	1266
37	245	1291	37	245	1289	37	255	1340
38	250	1356	38	250	1349	38	260	1422
39	255	1427	39	255	1415	39	265	1513
40	260	1506	40	260	1487	40	270	1613
41	265	1593	41	265	1567	41	275	1719
42	270	1690	42	270	1656	42	280	1818
43	275	1796	43	275	1754	43	285	1928
44	280	1913	44	280	1862	44	290	2049
45	285	2043	45	285	1981	45	295	2183
46	290	2187	46	290	2113	46	300	2330
47	295	2345	47	295	2258			

* Letter from M. P. Osborne (Westinghouse) to J. R. Harrell (Dominion), "Virginia Power, North Anna Power Station Units 1 & 2, Retrieval of Data for Heatup and Cooldown Curves Documented in WCAP-15112, Rev. 1," Serial No. VRA-01-012, dated March 1, 2001.

Appendix B

Revised P/T Limit Curves Applicable to Heatup

For North Anna Units 1 and 2

(Modified to Accommodate Instrument Uncertainties and Measurement Location Bias)

Table 2 North Anna Units 1 and 2 Heatup Data with Margins of 13.5 Degrees F and 70 psi for Instrumentation Errors (VRA-01-012 *, Modified – Correction to data previously provided in WCAP-15112 Rev. 1)

Heatup Rate = 20 Deg. F/hr			Heatup Rate = 40 Deg. F/hr			Heatup Rate = 60 Deg. F/hr		
	Indicated Temperature (Deg. F)	Indicated Pressure (psig)		Indicated Temperature (Deg. F)	Indicated Pressure (psig)		Indicated Temperature (Deg. F)	Indicated Pressure (psig)
1	73.5	540.90	1	73.5	540.90	1	73.5	537.90
2	78.5	540.90	2	78.5	540.90	2	78.5	537.90
3	98.5	540.90	3	98.5	540.90	3	98.5	537.90
4	103.5	540.90	4	103.5	540.90	4	103.5	537.90
5	108.5	540.90	5	108.5	540.90	5	108.5	537.90
6	111.5	540.90	6	111.5	540.90	6	113.5	537.90
7	111.5	583.90	7	111.5	559.90	7	118.5	537.90
8	113.5	585.90	8	113.5	559.90	8	123.5	537.90
9	118.5	589.90	9	118.5	561.90	9	128.5	538.90
10	123.5	593.90	10	123.5	564.90	10	133.5	540.90
11	128.5	598.90	11	128.5	568.90	11	138.5	543.90
12	133.5	603.90	12	133.5	573.90	12	143.5	548.90
13	138.5	609.90	13	138.5	579.90	13	148.5	553.90
14	143.5	615.90	14	143.5	585.90	14	153.5	559.90
15	148.5	622.90	15	148.5	593.90	15	158.5	566.90
16	153.5	630.90	16	153.5	602.90	16	163.5	575.90
17	158.5	638.90	17	158.5	611.90	17	168.5	584.90
18	163.5	648.90	18	163.5	622.90	18	173.5	595.90
19	168.5	658.90	19	168.5	634.90	19	178.5	607.90
20	173.5	670.90	20	173.5	647.90	20	183.5	620.90
21	178.5	683.90	21	178.5	662.90	21	188.5	635.90
22	183.5	697.90	22	183.5	678.90	22	193.5	651.90
23	188.5	713.90	23	188.5	696.90	23	198.5	670.90
24	193.5	730.90	24	193.5	716.90	24	203.5	690.90
25	198.5	749.90	25	198.5	738.90	25	208.5	712.90
26	203.5	770.90	26	203.5	762.90	26	213.5	737.90
27	208.5	794.90	27	208.5	789.90	27	218.5	765.90
28	213.5	820.90	28	213.5	819.90	28	223.5	795.90
29	218.5	848.90	29	218.5	848.90	29	228.5	829.90
30	223.5	880.90	30	223.5	880.90	30	233.5	866.90
31	228.5	914.90	31	228.5	914.90	31	238.5	907.90
32	233.5	953.90	32	233.5	953.90	32	243.5	952.90
33	238.5	996.90	33	238.5	996.90	33	248.5	1002.90
34	243.5	1043.90	34	243.5	1043.90	34	253.5	1057.90
35	248.5	1095.90	35	248.5	1095.90	35	258.5	1118.90
36	253.5	1152.90	36	253.5	1152.90	36	263.5	1185.90
37	258.5	1210.90	37	258.5	1208.90	37	268.5	1259.90
38	263.5	1275.90	38	263.5	1268.90	38	273.5	1341.90
39	268.5	1346.90	39	268.5	1334.90	39	278.5	1432.90
40	273.5	1425.90	40	273.5	1406.90	40	283.5	1532.90
41	278.5	1512.90	41	278.5	1486.90	41	288.5	1638.90
42	283.5	1609.90	42	283.5	1575.90	42	293.5	1737.90
43	288.5	1715.90	43	288.5	1673.90	43	298.5	1847.90
44	293.5	1832.90	44	293.5	1781.90	44	303.5	1968.90
45	298.5	1962.90	45	298.5	1900.90	45	308.5	2102.90
46	303.5	2106.90	46	303.5	2032.90	46	313.5	2249.90
47	308.5	2264.90	47	308.5	2177.90			

* Letter from M. P. Osborne (Westinghouse) to J. R. Harrell (Dominion), "Virginia Power, North Anna Power Station Units 1 & 2, Retrieval of Data for Heatup and Cooldown Curves Documented in WCAP-15112, Rev. 1," Serial No. VRA-01-012, dated March 1, 2001.

Attachment 2

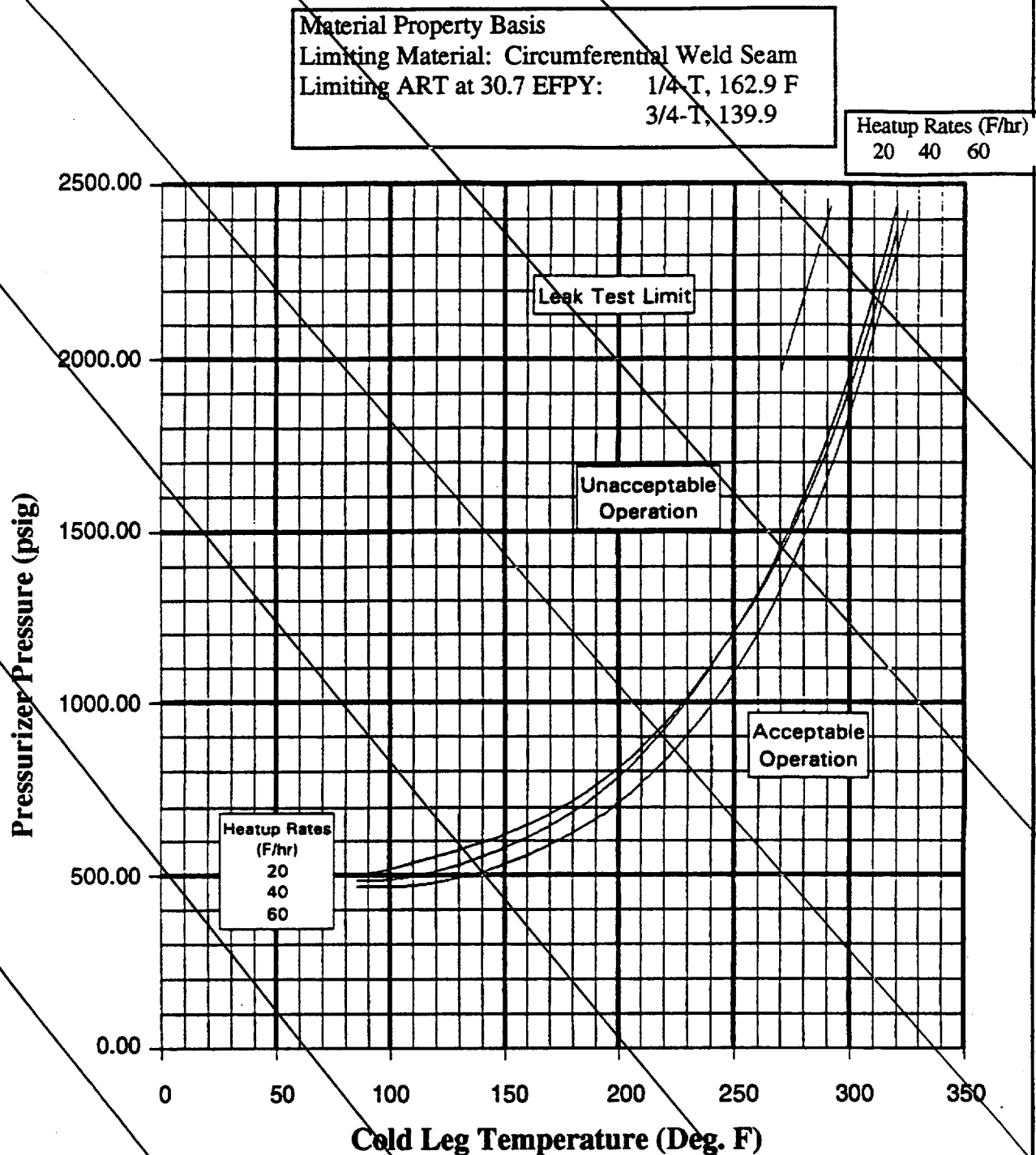
Mark-up of Unit 1 and Unit 2 Technical Specifications Changes

**North Anna Power Station
Units 1 and 2
Virginia Electric and Power Company
(Dominion)**

Replace w/new Figure 3.4-2

10-05-94

Figure 3.4-2 — North Anna Unit 1
Reactor Coolant System Heatup Limitations

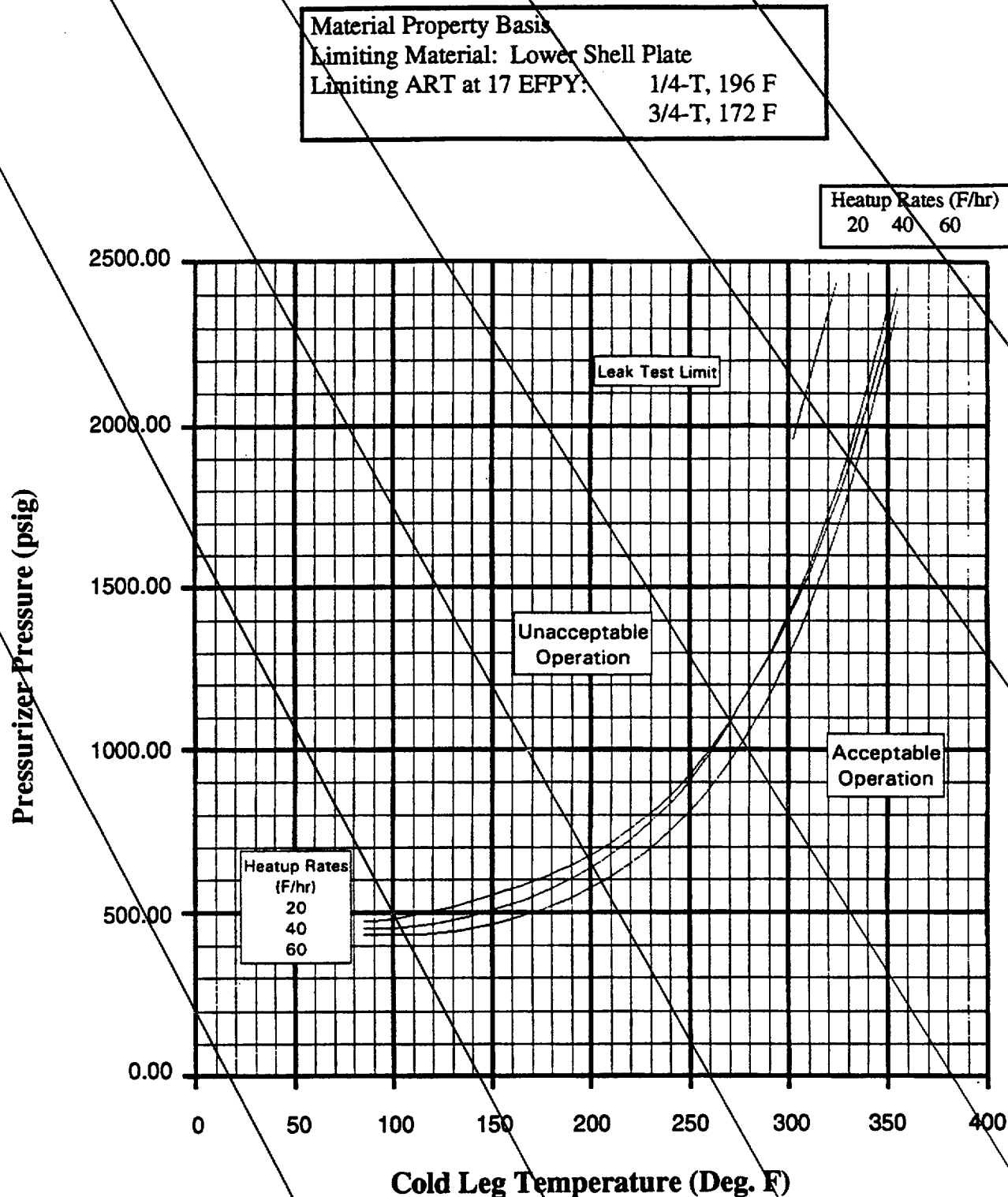


North Anna Unit 1 Reactor Coolant System Heatup Limitations (Heatup Rates up to 60 F/hr) Applicable for the First 30.7 EFPY (Without Margins for Instrumentation Errors)

Replace w/ new Figure 3.4-2

10-05-94

Figure 3.4-2 — North Anna Unit 2
Reactor Coolant System Heatup Limitations



North Anna Unit 2 Reactor Coolant System Heatup Limitations (Heatup Rates up to 60 F/hr). Applicable for the First 17 EFY (Without Margins for Instrumentation Errors)

Attachment 3

Proposed Unit 1 and Unit 2 Technical Specifications Changes

**North Anna Power Station
Units 1 and 2
Virginia Electric and Power Company
(Dominion)**

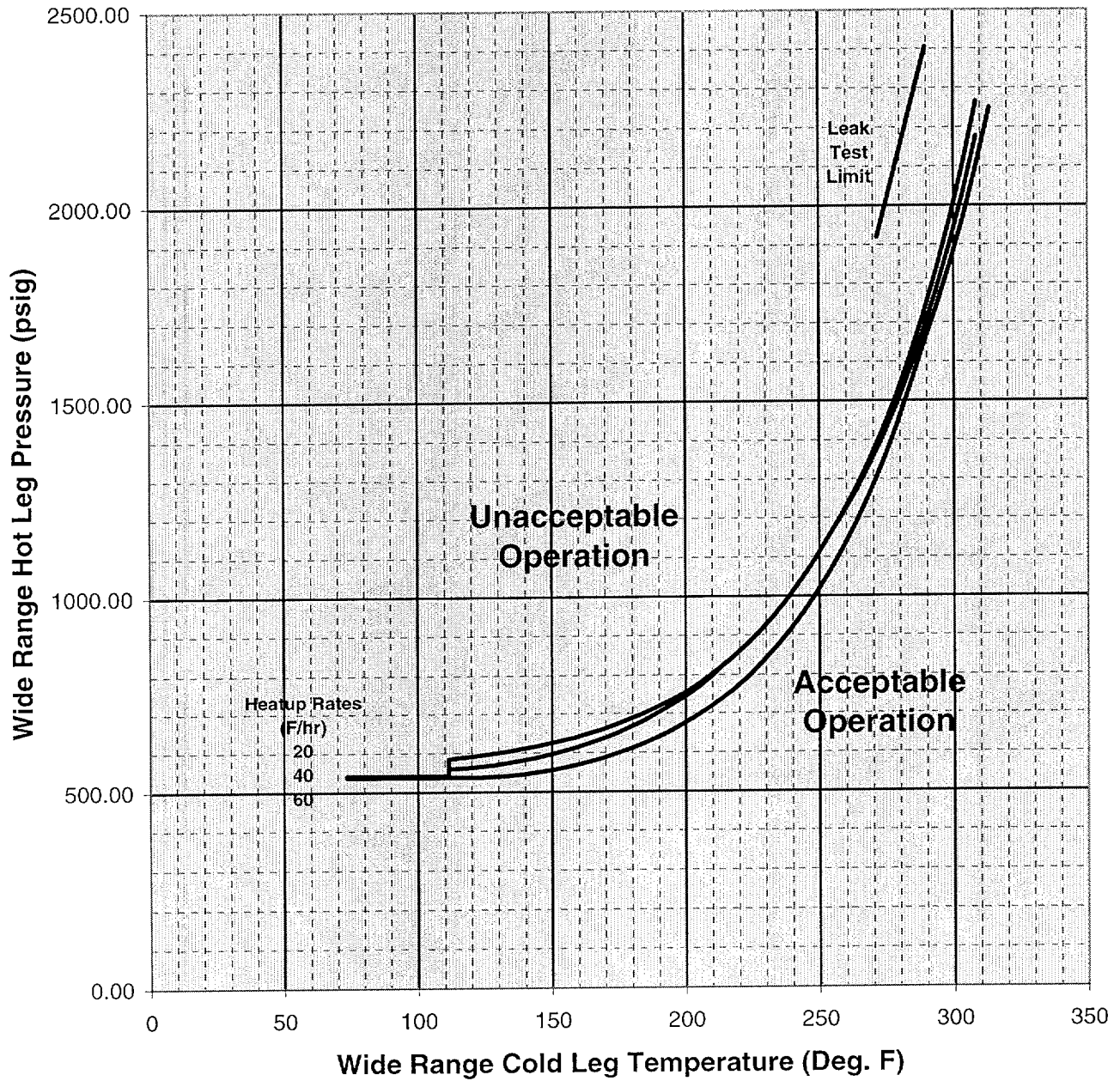
Figure 3.4-2

North Anna Unit 1
Reactor Coolant System Heatup Limitations

Material Property Basis

Limiting ART at 32.3 EFPY: 1/4-T, 218.5 deg. F

3/4-T, 195.6 deg. F



North Anna Unit 1 Reactor Coolant System Heatup Limitations (Heatup Rates up to 60 F/hr)
Applicable for the first 32.3 EFPY (Including Margins for Instrumentation Errors)

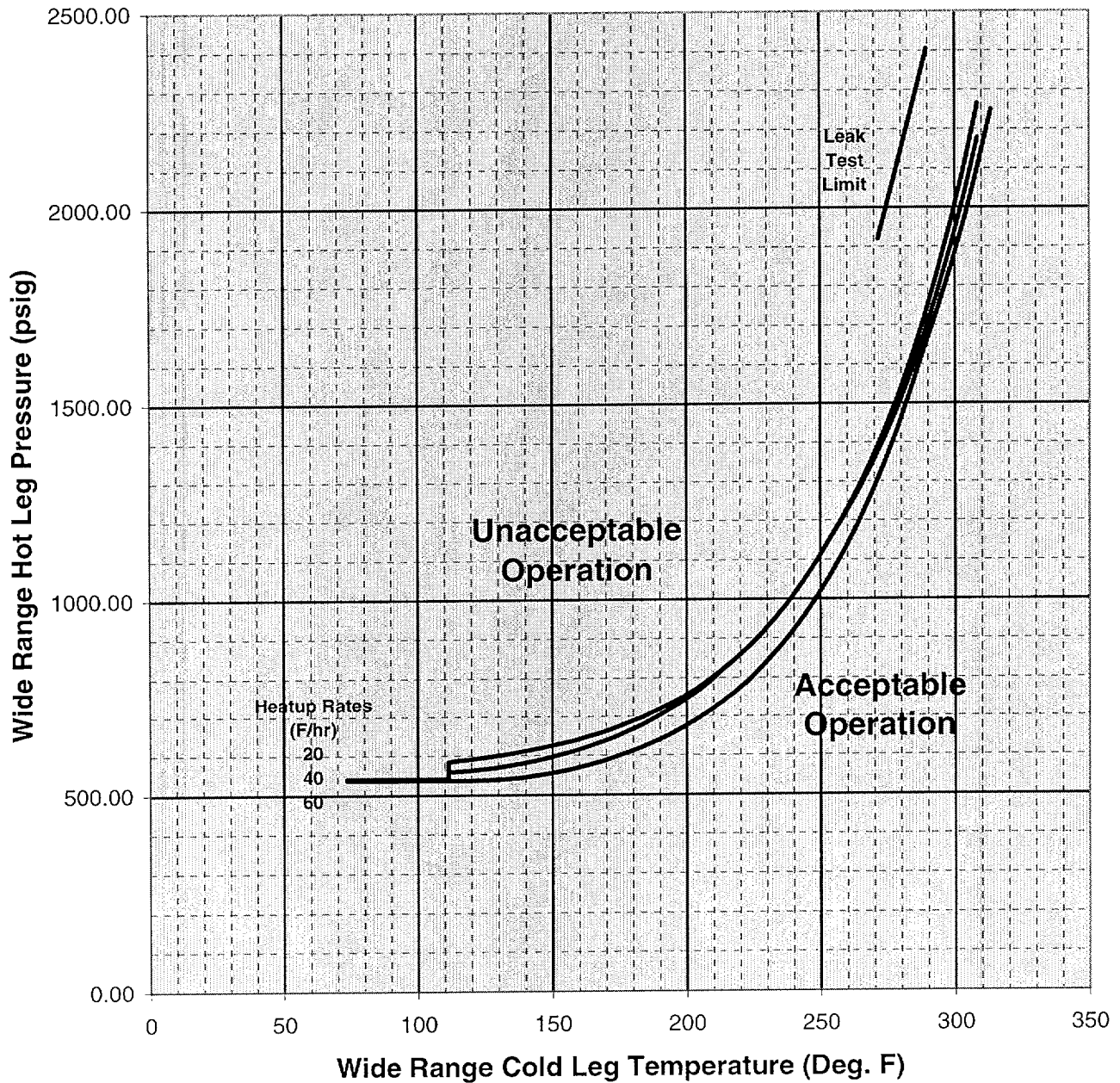
Figure 3.4-2

North Anna Unit 2
Reactor Coolant System Heatup Limitations

Material Property Basis

Limiting ART at 34.3 EFPY: 1/4-T, 218.5 deg. F

3/4-T, 195.6 deg. F



North Anna Unit 2 Reactor Coolant System Heatup Limitations (Heatup Rates up to 60 F/hr)
Applicable for the first 34.3 EFPY (Including Margins for Instrumentation Errors)