

ATTACHMENT A

NIAGARA MOHAWK POWER CORPORATION
LICENSE NO. DPR-63
DOCKET NO. 50-220

Proposed Changes to the Current Technical Specifications (TS)

Replace existing pages 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, and 95 with the attached revised pages. These pages have been retyped in their entirety with marginal markings to indicate changes to the text. Also, pages 94a, 94b, 94c, and 94d have been added.

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LIMITING CONDITION FOR OPERATION

- c. During leakage and hydrostatic testing, the reactor vessel temperature and pressure shall satisfy the requirements of Figures 3.2.2.e, 3.2.2.f, or 3.2.2.g, as appropriate, if the core is not critical. During reactor vessel heatup and cooldown for the purpose of leakage and hydrostatic testing, the reactor vessel temperature and pressure shall satisfy the requirements of Figures 3.2.2.a and 3.2.2.b for non-critical heatup and cooldown, respectively.
- d. The reactor vessel head bolting studs shall not be under tension unless the temperature of the vessel head flange and the head are equal to or greater than 100°F.

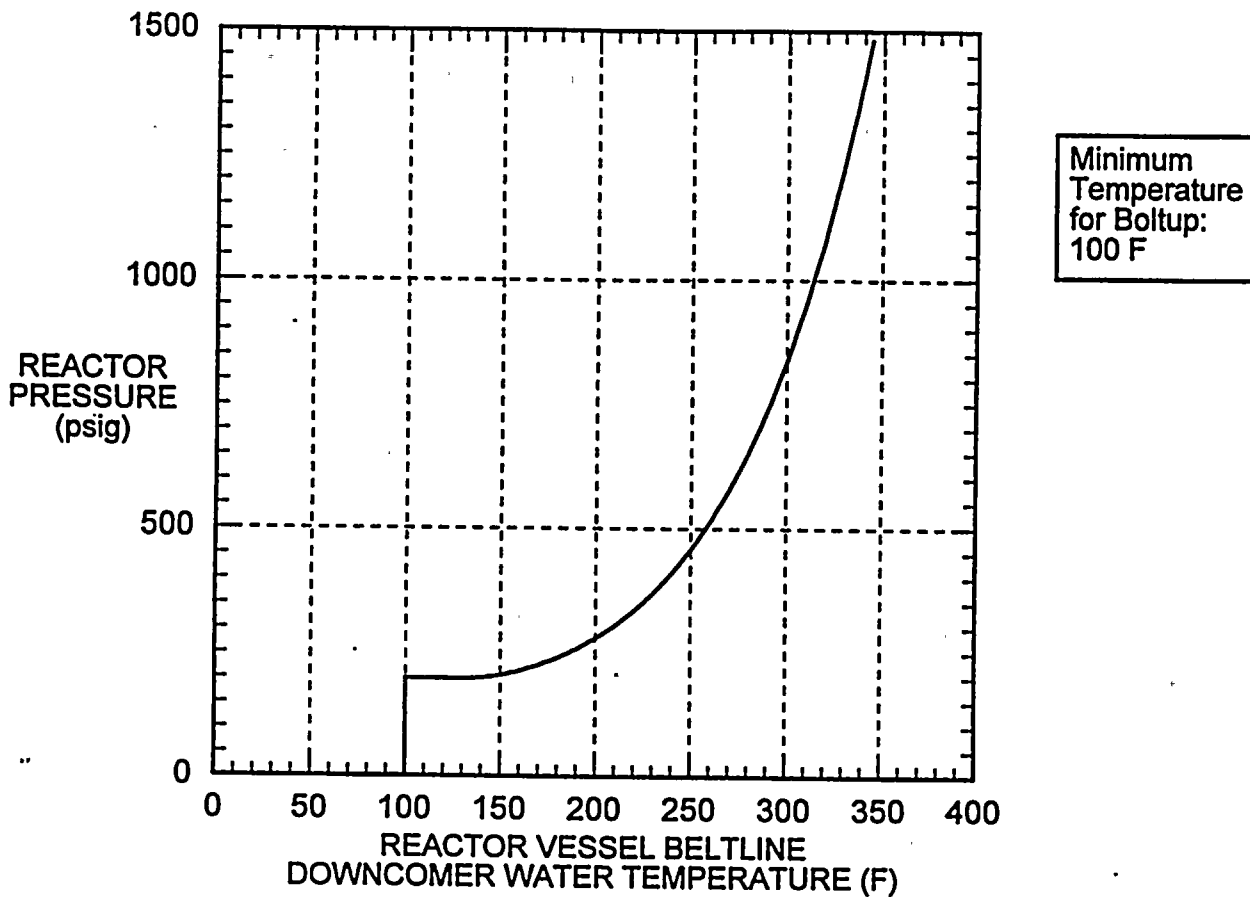
SURVEILLANCE REQUIREMENT

In order to generate additional plant-specific data, a capsule containing irradiated and unirradiated material will be re-inserted at the B capsule location. Re-insertion capsules have already been installed at the A and C locations. A prime (') is used to indicate a re-insertion capsule. The withdrawal schedule for the re-insertion capsules is as follows:

Fourth capsule (A') - 24 EFPY
Fifth capsule (C') - 32 EFPY
Sixth capsule (B') - 40 EFPY



HEATUP - CORE NOT CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this figure)

FIGURE 3.2.2.a

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR
PRESSURIZATION DURING HEATUP AND LOW-POWER PHYSICS
TESTS (CORE NOT CRITICAL) (HEATING RATE $\leq 100^\circ\text{F/HR}$)
FOR UP TO 28 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR NON-CRITICAL OPERATION
HEATUP AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig)</u> <u>IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE</u> <u>DOWNCOMER WATER</u> <u>TEMPERATURE (F)</u>
197	100
197	110
197	120
197	130
199	140
205	150
213	160
225	170
239	180
257	190
279	200
304	210
334	220
369	230
410	240
458	250
513	260
577	270
651	280
737	290
835	300
949	310
1079	320

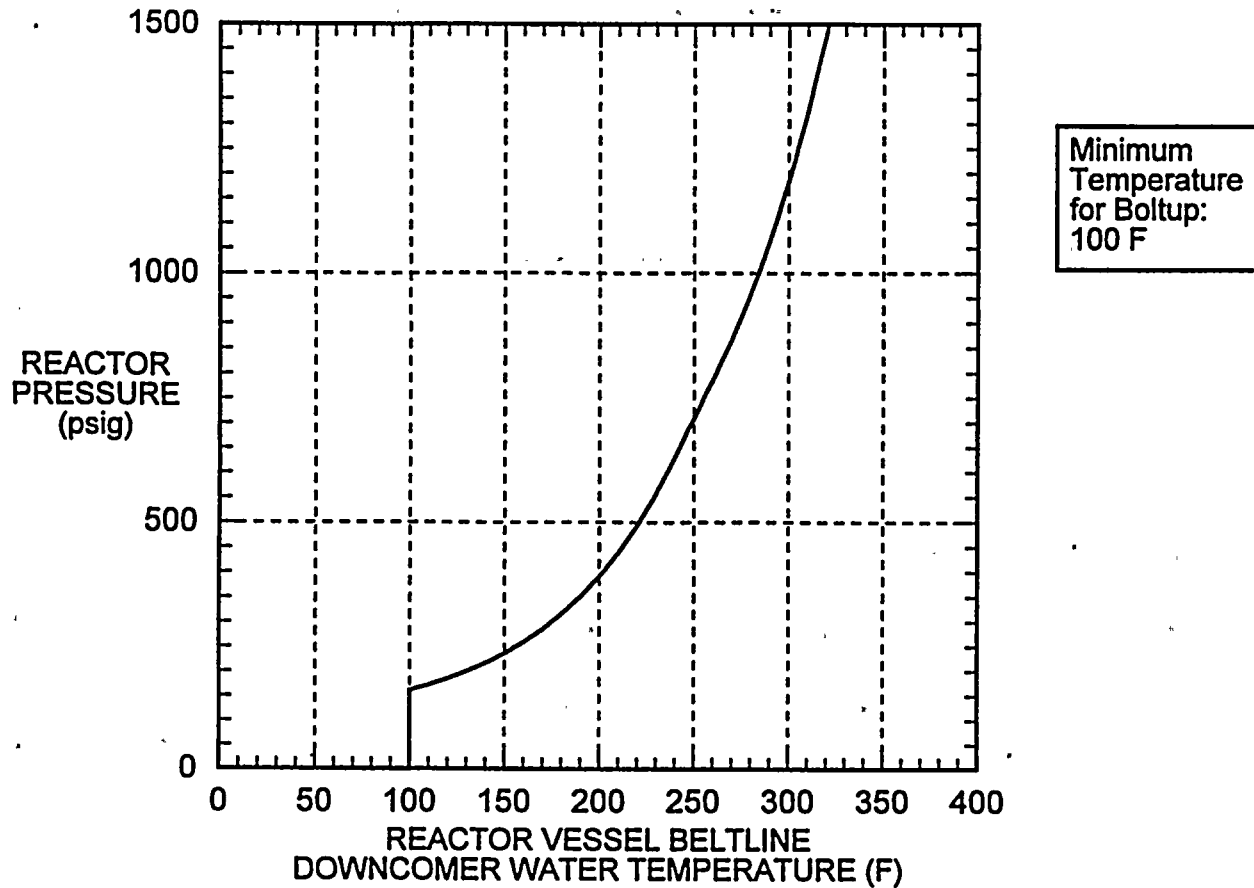
(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this table)

TABLE 3.2.2.a

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
HEAT-UP (CORE NOT CRITICAL) (HEATING RATE \leq 100°F/HR)
FOR UP TO TWENTY EIGHT EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



COOLDOWN - CORE NOT CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this figure)

FIGURE 3.2.2.b

**MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR
PRESSURIZATION DURING COOLDOWN AND LOW-POWER
PHYSICS TESTS (CORE NOT CRITICAL) (COOLING RATE $\leq 100^\circ\text{F}/\text{HR}$)
FOR UP TO 28 EFFECTIVE FULL POWER YEARS OF OPERATION**



**LIMIT FOR NON-CRITICAL OPERATION
COOLDOWN AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig)</u> <u>IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE</u> <u>DOWNCOMER WATER</u> <u>TEMPERATURE (F)</u>
160	100
171	110
184	120
199	130
216	140
235	150
258	160
284	170
315	180
350	190
391	200
438	210
493	220
556	230
630	240
708	250
786	260
866	270
957	280
1062	290

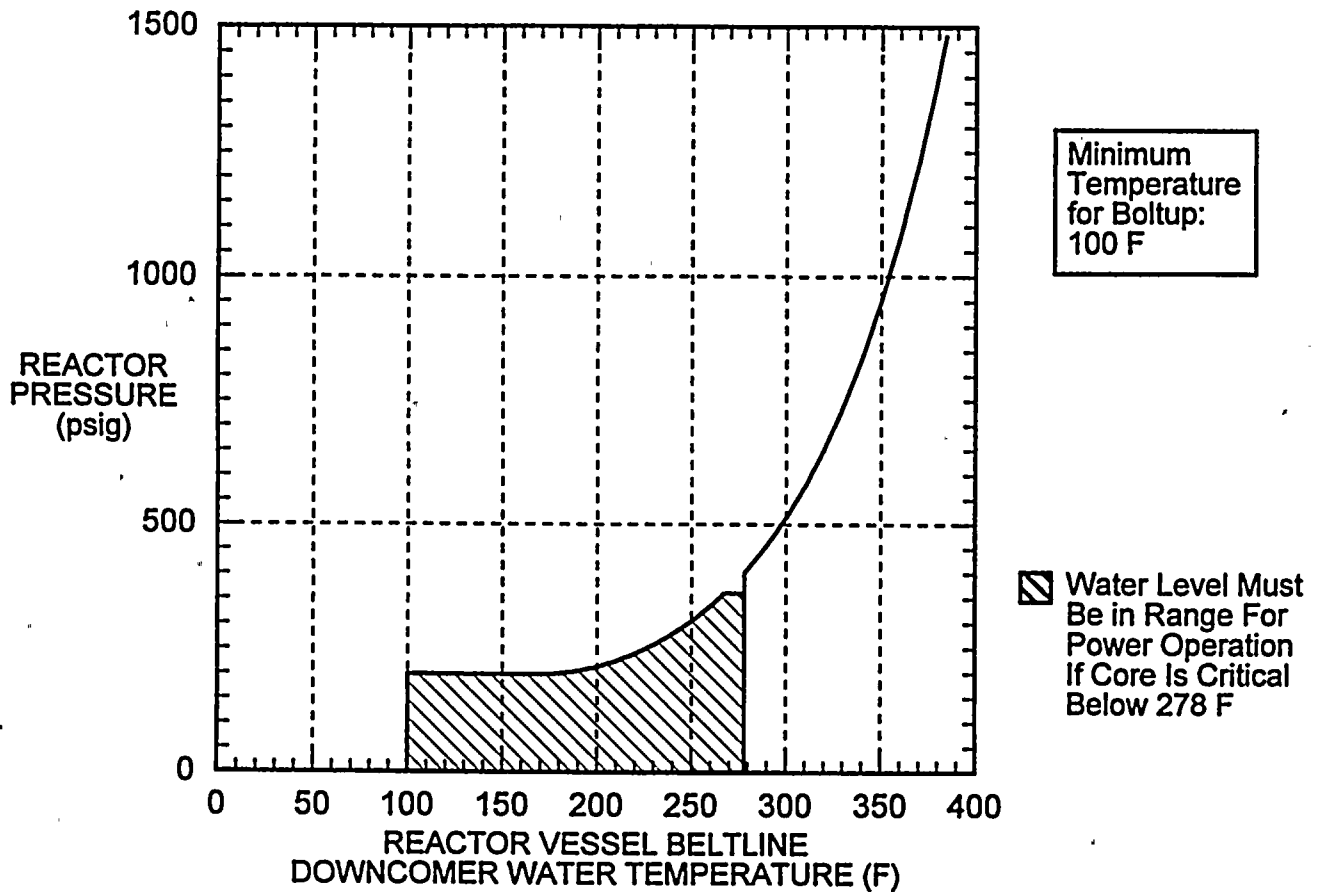
(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this table)

TABLE 3.2.2.b

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
COOLDOWN (CORE NOT CRITICAL) (COOLING RATE \leq 100°F/HR)
FOR UP TO TWENTY EIGHT EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



HEATUP - CORE CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
 (instrument uncertainties have been included in this figure)

FIGURE 3.2.2.c

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE
 FOR PRESSURIZATION DURING CORE OPERATION
 (CORE CRITICAL) (HEATING RATE $\leq 100^\circ\text{F}/\text{HR}$) FOR UP TO
 28 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR POWER OPERATION (CORE CRITICAL)
HEATUP AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig)</u> <u>IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE</u> <u>DOWNCOMER WATER</u> <u>TEMPERATURE (F)</u>
197	100
197	110
197	120
197	130
197	140
197	150
197	160
197	170
199	180
205	190
213	200
225	210
239	220
257	230
279	240
304	250
334	260
360	268
360	270
360	277
402	278*
410	280
458	290
513	300
577	310
651	320
737	330
835	340
949	350
1079	360

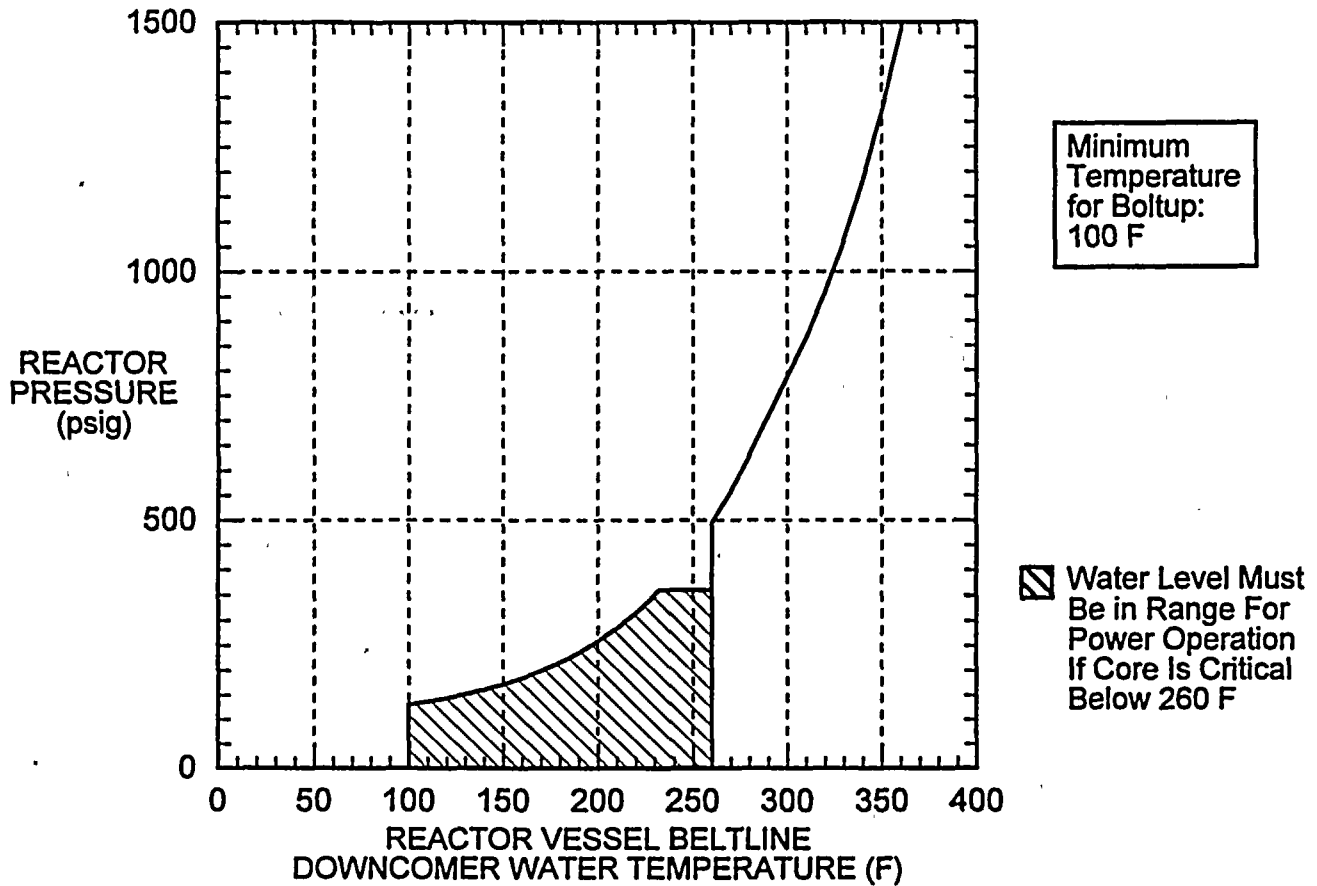
(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
 (*water level must be in range for power operation if core is critical below 278 F)
 (instrument uncertainties have been included in this table)

TABLE 3.2.2.c

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
HEATUP (CORE CRITICAL) (HEATING RATE ≤ 100°F/HR)
FOR UP TO TWENTY EIGHT EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



COOLDOWN - CORE CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
 (instrument uncertainties have been included in this figure)

FIGURE 3.2.2.d

**MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE
 FOR PRESSURIZATION DURING CORE OPERATION
 (CORE CRITICAL) (COOLING RATE $\leq 100^\circ\text{F}/\text{HR}$) FOR UP TO
 28 EFFECTIVE FULL POWER YEARS OF OPERATION**



**LIMIT FOR POWER OPERATION (CORE CRITICAL)
COOLDOWN AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
130	100
136	110
143	120
151	130
160	140
171	150
184	160
199	170
216	180
235	190
258	200
284	210
315	220
350	230
360	233
360	240
360	250
360	259
493	260*
556	270
630	280
708	290
786	300
866	310
957	320
1062	330

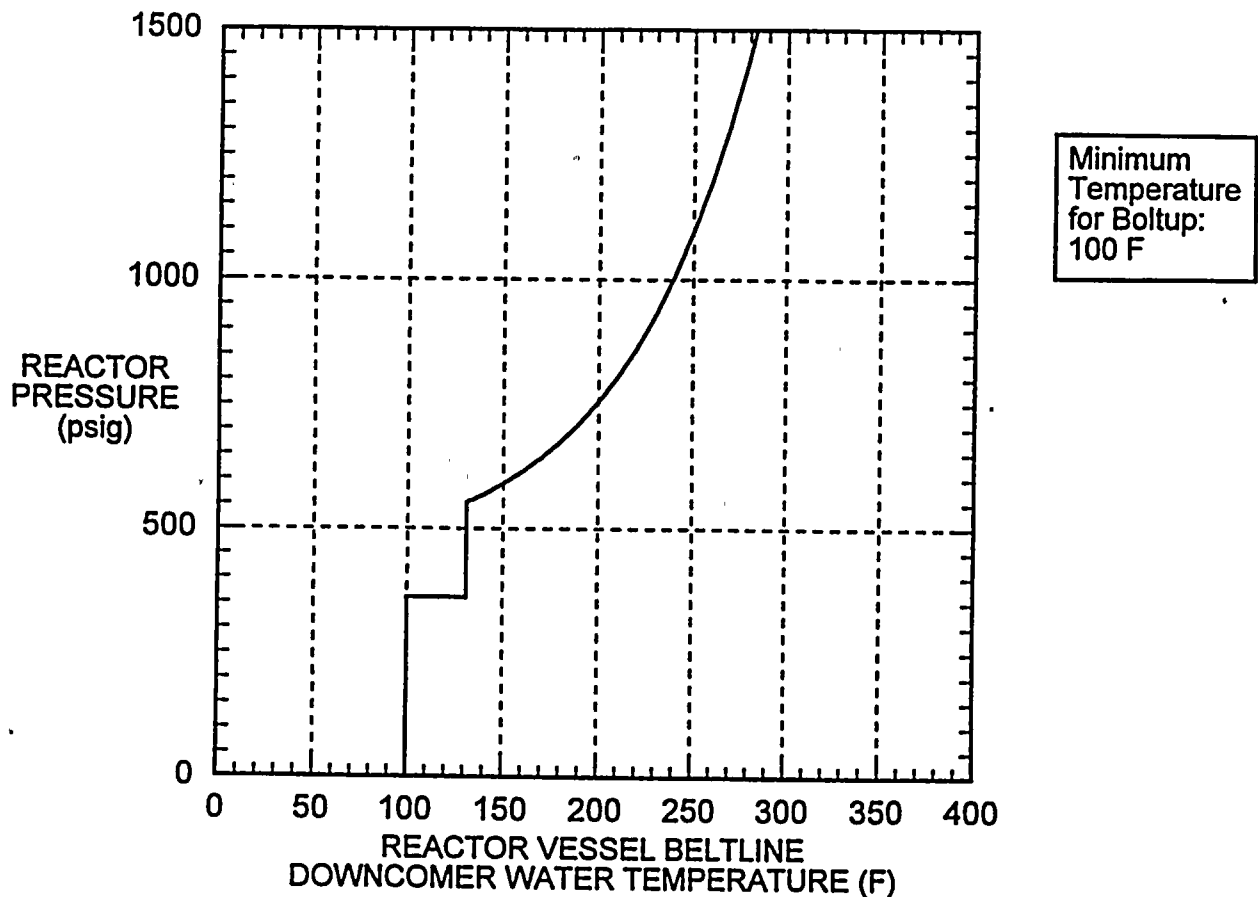
(reactor vessel beltlane downcomer water temperature is measured at recirculation loop suction)
(*water level must be in range for power operation if core is critical below 260 F)
(instrument uncertainties have been included in this table)

TABLE 3.2.2.d

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
COOLDOWN (CORE CRITICAL) (COOLING RATE \leq 100°F/HR)
FOR UP TO TWENTY EIGHT EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



LEAK/HYDRO TEST - CORE NOT CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this figure)

FIGURE 3.2.2.e

**MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR
PRESSURIZATION DURING IN-SERVICE HYDROSTATIC TESTING
AND LEAK TESTING (CORE NOT CRITICAL) FOR UP TO
28 EFFECTIVE FULL POWER YEARS OF OPERATION**



**LIMIT FOR IN-SERVICE TEST
(CORE NOT CRITICAL, FUEL IN VESSEL)**

<u>REACTOR PRESSURE (psig)</u> <u>IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE</u> <u>DOWNCOMER WATER</u> <u>TEMPERATURE (F)</u>
360	100
360	110
360	120
360	130
569	140
590	150
614	160
642	170
675	180
712	190
755	200
805	210
862	220
929	230
1005	240
1032	243
1093	250
1195	260

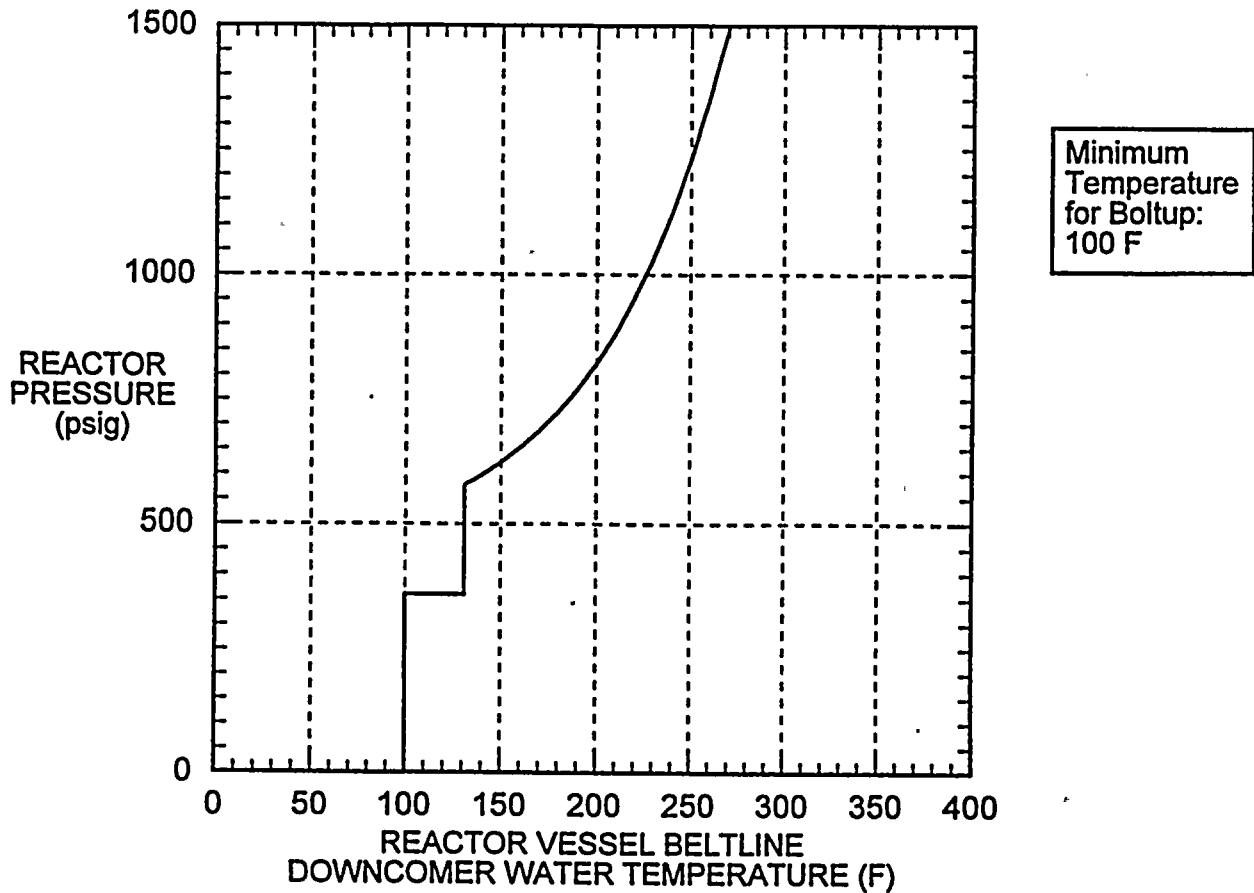
(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this table)

TABLE 3.2.2.e

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
LEAK/HYDROSTATIC TESTING (CORE NOT CRITICAL)
FOR UP TO TWENTY EIGHT EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



LEAK/HYDRO TEST - CORE NOT CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this figure)

FIGURE 3.2.2.f

**MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR
PRESSURIZATION DURING IN-SERVICE HYDROSTATIC TESTING
AND LEAK TESTING (CORE NOT CRITICAL) FOR UP TO
20 EFFECTIVE FULL POWER YEARS OF OPERATION**



**LIMIT FOR IN-SERVICE TEST
(CORE NOT CRITICAL, FUEL IN VESSEL)**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
360	100
360	110
360	120
360	130
597	140
622	150
652	160
685	170
724	180
769	190
821	200
881	210
951	220
1031	230
1123	240
1229	250

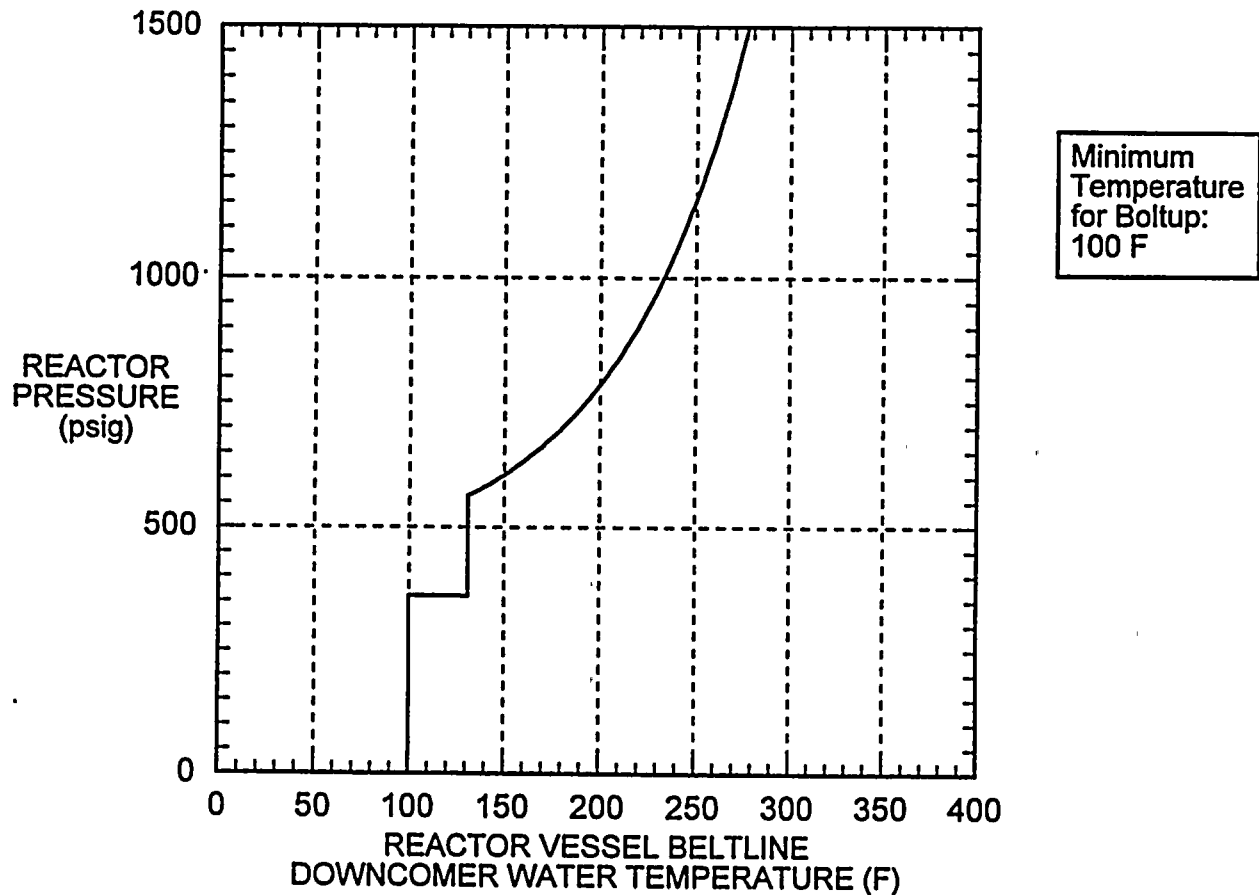
(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this table)

TABLE 3.2.2.f

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
LEAK/HYDROSTATIC TESTING (CORE NOT CRITICAL)
FOR UP TO TWENTY EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



LEAK/HYDRO TEST - CORE NOT CRITICAL



(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this figure)

FIGURE 3.2.2.g

**MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR
PRESSURIZATION DURING IN-SERVICE HYDROSTATIC TESTING
AND LEAK TESTING (CORE NOT CRITICAL) FOR UP TO
24 EFFECTIVE FULL POWER YEARS OF OPERATION**



**LIMIT FOR IN-SERVICE TEST
(CORE NOT CRITICAL, FUEL IN VESSEL)**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
360	100
360	110
360	120
360	130
582	140
604	150
631	160
661	170
697	180
737	190
785	200
839	210
902	220
974	230
1033	237
1058	240
1154	250

(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)
(instrument uncertainties have been included in this table)

TABLE 3.2.2.g

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
LEAK/HYDROSTATIC TESTING (CORE NOT CRITICAL)
FOR UP TO TWENTY FOUR EFFECTIVE FULL POWER YEARS
OF CORE OPERATION**



BASES FOR 3.2.2 AND 4.2.2 MINIMUM REACTOR VESSEL TEMPERATURE FOR PRESSURIZATION

Figures 3.2.2.a, 3.2.2.b, 3.2.2.c, and 3.2.2.d are plots of pressure versus temperature for heatup and cooldown rates of up to 100°F/hr. maximum (Specification 3.2.1). Figures 3.2.2.e, 3.2.2.f, and 3.2.2.g are plots of pressure versus temperature for leakage and hydrostatic testing. When the minimum temperature for leakage and hydrostatic testing is reached, a thermal soak shall be performed to ensure that the thermal gradient across the vessel wall is negligible. These curves are based on calculations of stress intensity factors according to Appendix G of Section III of the ASME Boiler and Pressure Vessel Code 1980 Edition with Winter 1982 Addenda. In addition, temperature shifts due to fast neutron fluence at twenty-eight effective full power years of operation were incorporated into the figures. These shifts were calculated using the procedure presented in Regulatory Guide 1.99, Revision 2. Reactor vessel flange/reactor head flange boltup is governed by other criteria as stated in Specification 3.2.2.d. The pressure readings on the figures have been adjusted to account for instrument uncertainties and to reflect the calculated elevation head difference between the pressure sensing instrument locations and the pressure sensitive area of the core beltline region. The temperature readings on the figures have been adjusted to account for instrument uncertainties.

The reactor vessel head flange and vessel flange in combination with the double "O" ring type seal are designed to provide a leak-tight seal when bolted together. When the vessel head is placed on the reactor vessel, only that portion of the head flange near the inside of the vessel rests on the vessel flange. As the head bolts are replaced and tensioned, the vessel head is flexed slightly to bring together the entire contact surfaces adjacent to the "O" rings of the head and vessel flanges. Both the head and vessel flanges have an NDT temperature of 40°F and they are not subject to any appreciable neutron radiation exposure. Therefore, the minimum vessel flange and head flange temperature for bolting is established at 40°F + 60°F or 100°F.

Figures 3.2.2.a, 3.2.2.b, 3.2.2.c, 3.2.2.d, 3.2.2.e, 3.2.2.f and 3.2.2.g have incorporated a temperature shift due to the calculated fast neutron fluence. The neutron flux at the vessel wall is calculated from core physics data and has been determined using flux monitors installed inside the vessel. The curves, except for 3.2.2.f and 3.2.2.g, are applicable for up to twenty-eight effective full power years of operation. Curves 3.2.2.f and 3.2.2.g are applicable for up to twenty and twenty-four effective full power years, respectively.

Vessel material surveillance samples are located within the core region to permit periodic monitoring of exposure and changes in material properties. The material sample program conforms with ASTM E185-66 except for the material withdrawal schedule which is specified in Specification 4.2.2.b.



ATTACHMENT B

NIAGARA MOHAWK POWER CORPORATION
LICENSE NO. DPR-63
DOCKET NO. 50-220

Marked Up Copy of Technical Specifications



LIMITING CONDITION FOR OPERATION

- c. During hydrostatic testing, the reactor vessel temperature and pressure shall satisfy the requirements of Figures 3.2.2.e if the core is not critical.
- d. The reactor vessel head bolting studs shall not be under tension unless the temperature of the vessel head flange and the head are equal to or greater than 100°F.

During reactor vessel heatup and cooldown for the purpose of leakage and hydrostatic testing, the reactor vessel temperature and pressure shall satisfy the requirements of Figures 3.2.2.a and 3.2.2.b for non-critical heatup and cooldown, respectively.

leakage and

3.2.2.f, or 3.2.2.g,
as appropriate,

SURVEILLANCE REQUIREMENT

In order to generate additional plant-specific data, a capsule containing irradiated and unirradiated material will be re-inserted at the B capsule location. Re-insertion capsules have already been installed at the A and C locations. A prime (') is used to indicate a re-insertion capsule. The withdrawal schedule for the re-insertion capsules is as follows:

- Fourth capsule (A') - 24 EFPY
- Fifth capsule (C') - 32 EFPY
- Sixth capsule (B') - 40 EFPY



NINE MILE POINT UNIT 1
HEATUP CORE NOT CRITICAL

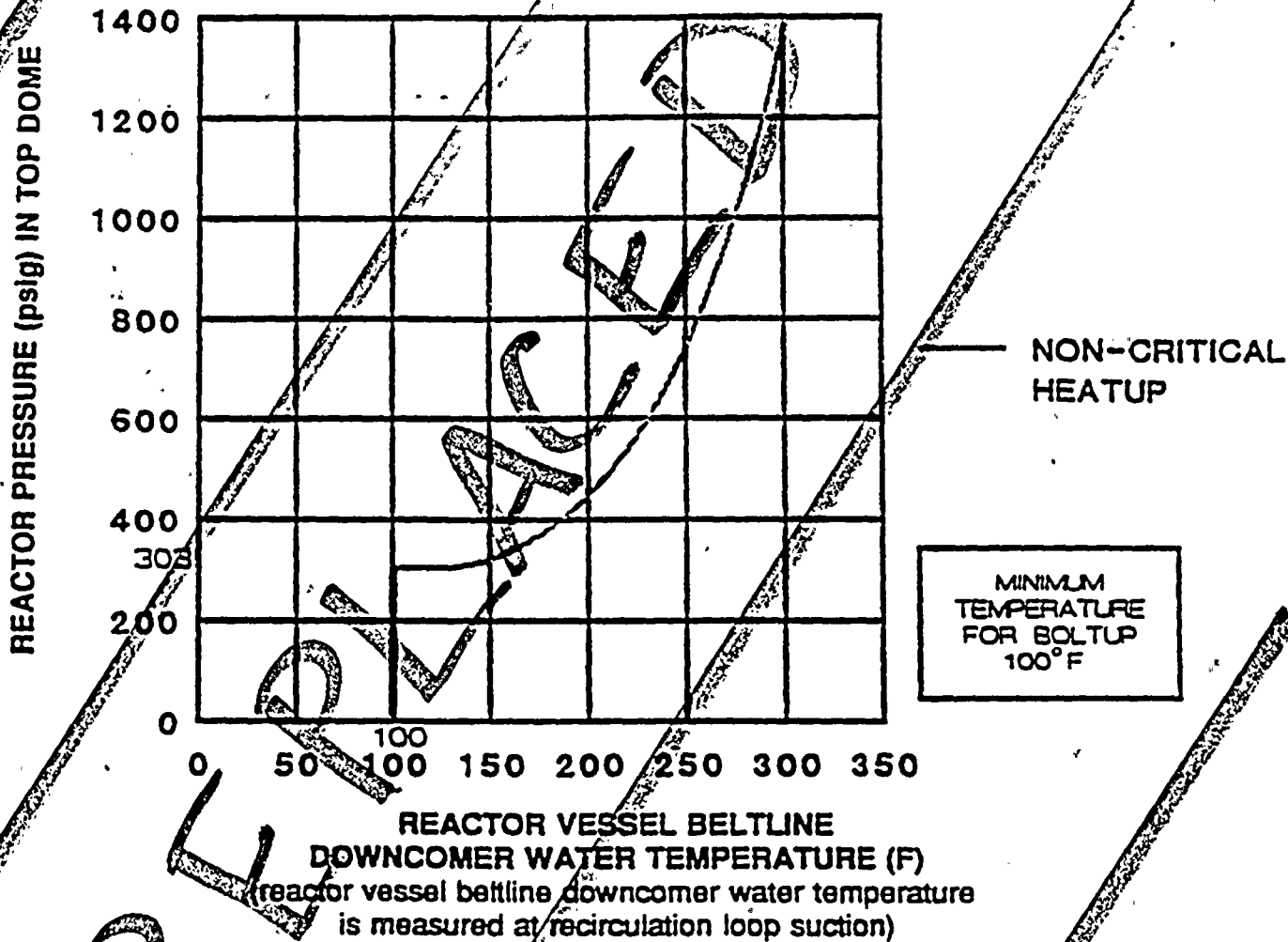


FIGURE 3.2.2.a

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING HEATUP AND LOW-POWER PHYSICS TESTS (REACTOR NOT CRITICAL) (HEATING RATE $\leq 100^\circ\text{F}/\text{HR}$) FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR NON-CRITICAL OPERATION
HEATUP AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
303	100
303	110
303	120
303	130
308	140
319	150
334	160
354	170
379	180
409	180
445	200
488	210
538	220
596	230
664	240
743	250
830	260
940	270
1061	280
1202	290
1363	300

REPLACED

TABLE 3.2.2.a

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
HEAT-UP (REACTOR NOT CRITICAL) (HEATING RATE ≤ 100°F/HR)
FOR UP TO EIGHTEEN EFFECTIVE FULL POWER YEARS OF CORE OPERATION**

(reactor vessel beltline downcomer water temperature is
measured at recirculation loop suction)



NINE MILE POINT UNIT 1
COOLDOWN CORE NOT CRITICAL

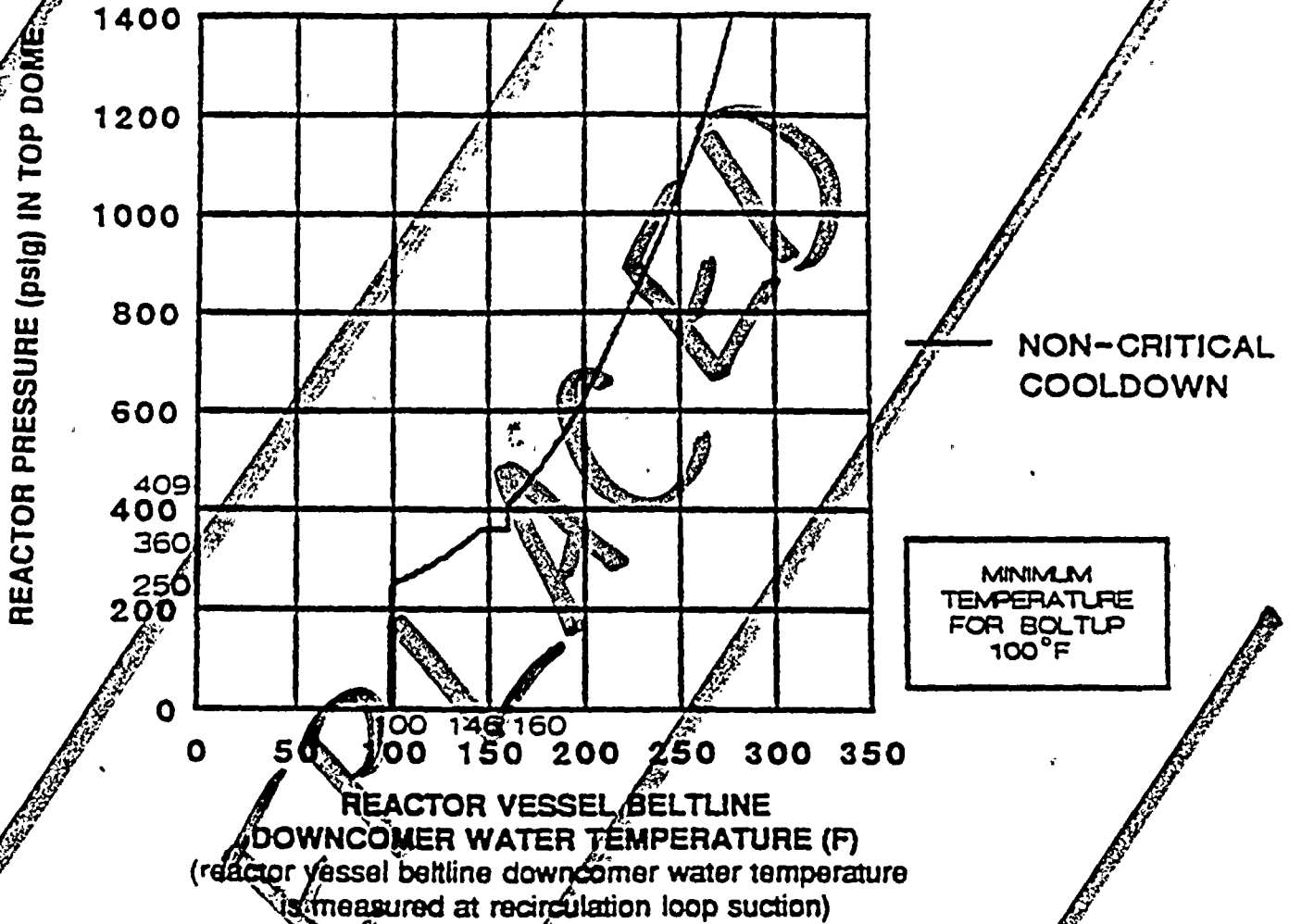


FIGURE 3.2.2.b

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR
 PRESSURIZATION DURING COOLDOWN AND LOW-POWER
 PHYSICS TESTS (REACTOR NOT CRITICAL) (COOLING RATE $\leq 100^\circ\text{F}/\text{HR}$)
 FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR NON-CRITICAL OPERATION
COOLDOWN AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psia) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
250	100
268	110
288	120
312	130
340	140
360	150
409	160
451	170
501	180
558	190
624	200
701	210
784	220
868	230
953	240
1049	250
1161	260
1289	270
1437	280

REPLACED

TABLE 3.2.2.b

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
COOLDOWN (REACTOR NOT CRITICAL) (COOLING RATE ≤ 100°F/HR)
FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF CORE OPERATION**

(reactor vessel beltline downcomer water temperature is
measured at recirculation loop suction)



NINE MILE POINT UNIT 1 CORE OPERATION (HEATUP)

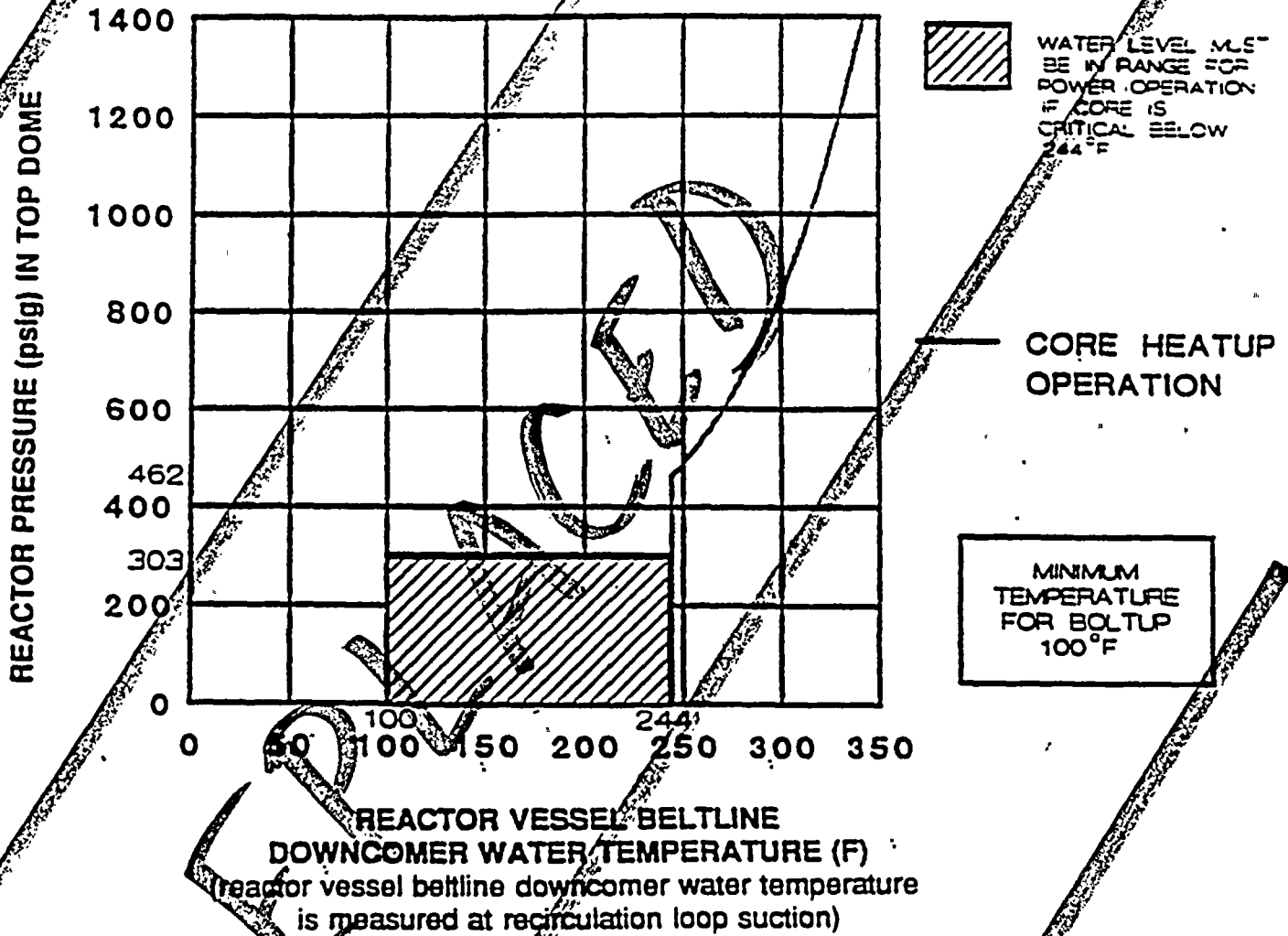


FIGURE 3.2.2.c

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING CORE OPERATION (CORE CRITICAL) (HEATUP AT A HEATING RATE $\leq 100^\circ\text{F}/\text{HR}$) FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR POWER OPERATION (CORE CRITICAL)
HEATUP AT UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
303	100
303	110
303	120
303	130
303	140
303	150
303	160
303	170
303	180
303	190
303	200
303	210
303	220
303	230
303	240
488	250
538	260
596	270
664	280
743	290
834	300
940	310
1061	320
1202	330
1363	340

REPLACED

TABLE 3.2.2.c

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
HEATUP (REACTOR CRITICAL) (HEATING RATE \leq 100°F/HR)
FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF CORE OPERATION**

(reactor vessel beltlime downcomer water temperature is
measured at recirculation loop suction)



NINE MILE POINT UNIT 1

CORE OPERATION (COOLDOWN)

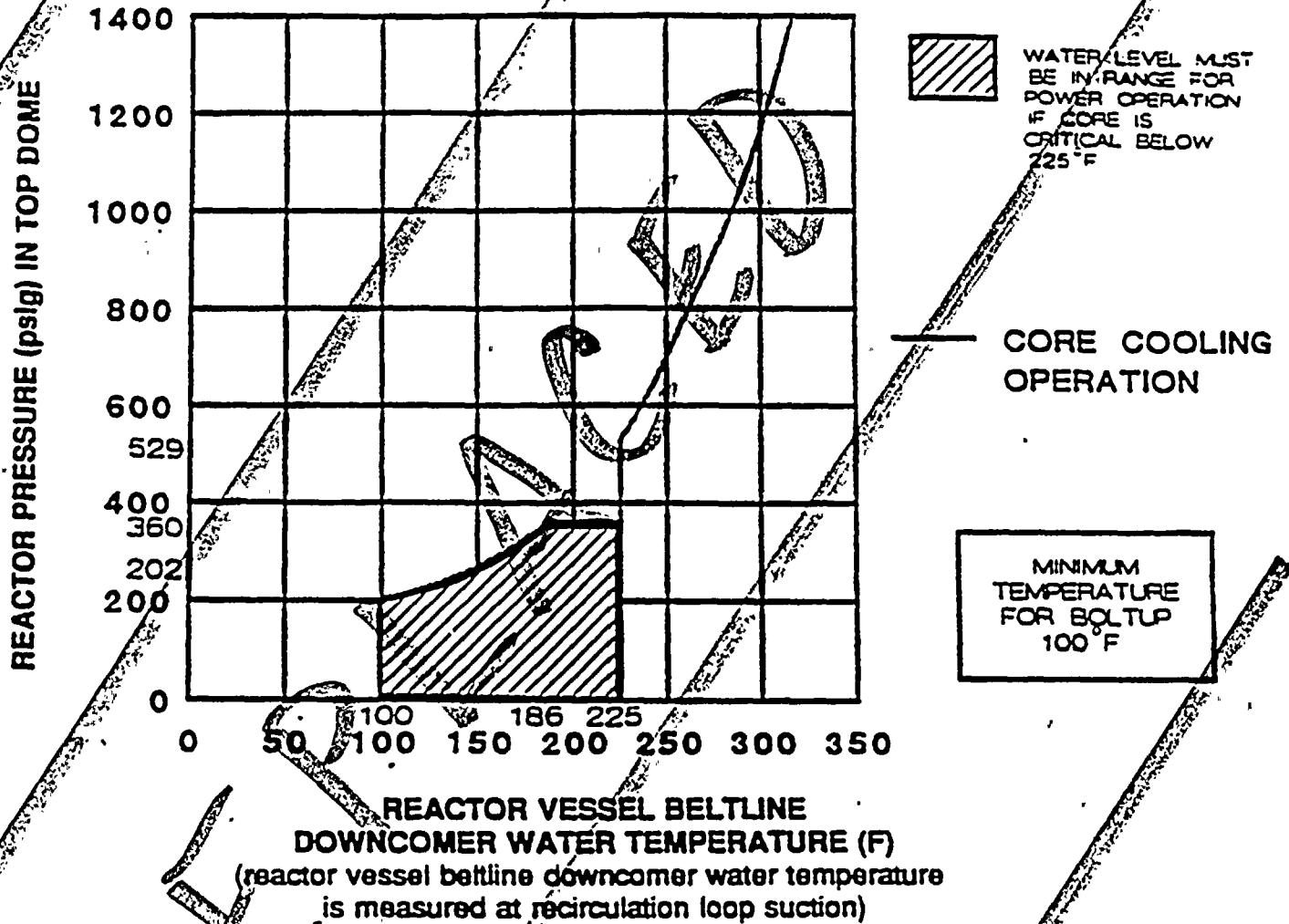


FIGURE 3.2.2.d

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING CORE OPERATION (CORE CRITICAL) (COOLDOWN) AT A COOLDOWN RATE $\leq 100^\circ\text{F}/\text{HR}$ FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR POWER OPERATION (CORE CRITICAL)
COOLDOWN AT/UP TO 100°F/HR**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
202	100
210	110
222	120
235	130
250	140
268	150
288	160
312	170
340	180
380	190
360	200
360	210
360	220
558	230
624	240
701	250
784	260
868	270
958	280
1049	290
1161	300
1289	310
1437	320

REPLACED

TABLE 3.2.2.d

**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
COOLDOWN (REACTOR CRITICAL) (COOLING RATE ≤ 100°F/HR)
FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF CORE OPERATION**

(reactor vessel beltline downcomer water temperature is
measured at recirculation loop suction)



NINE MILE POINT UNIT 1

NON-CRITICAL HYDROTEST

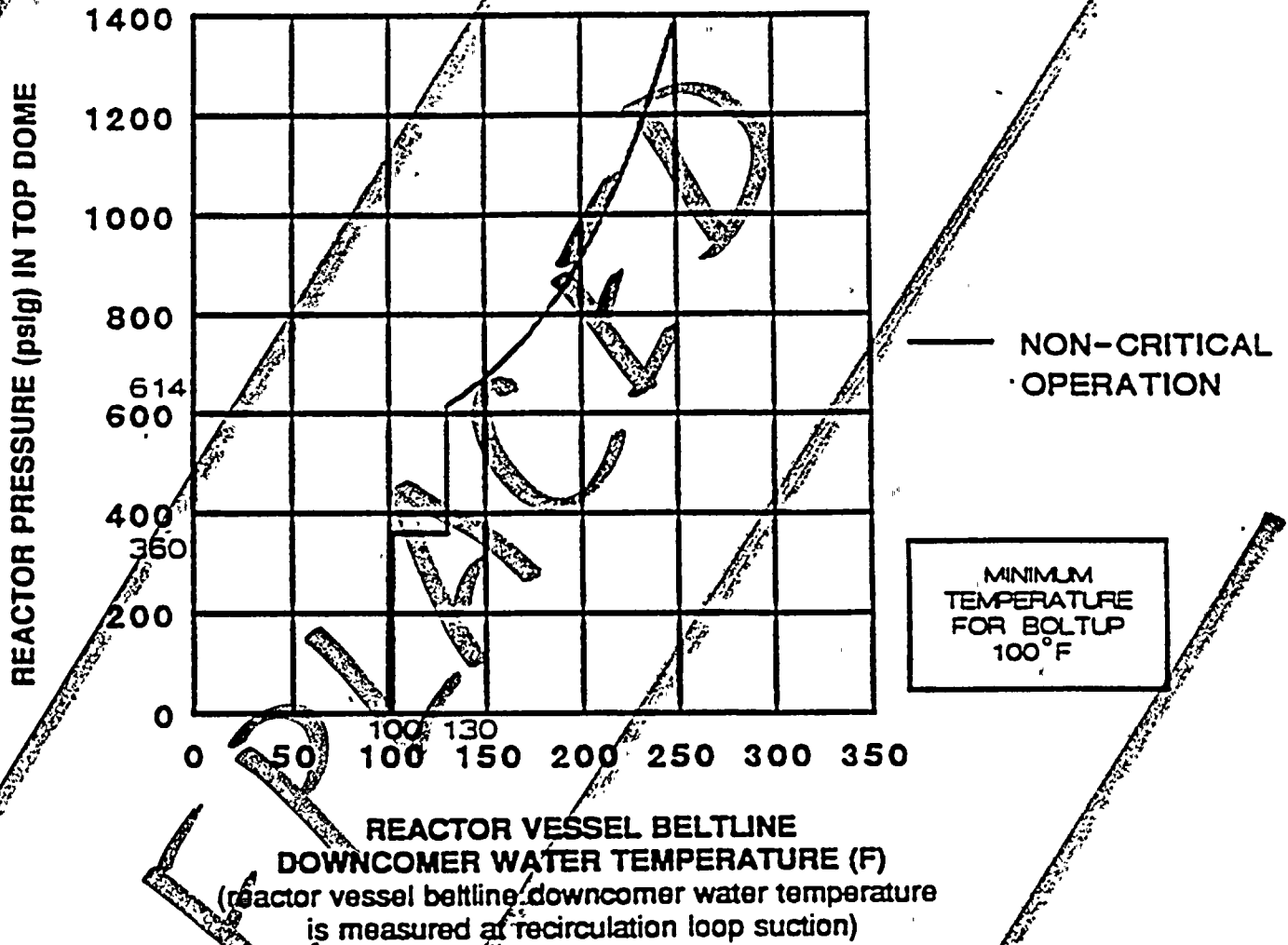


FIGURE 3.2.2.e

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING IN-SERVICE HYDROSTATIC TESTING AND LEAK TESTING (REACTOR NOT CRITICAL) FOR UP TO 16 EFFECTIVE FULL POWER YEARS OF OPERATION



**LIMIT FOR IN-SERVICE TEST
(CORE NOT CRITICAL, FUEL IN VESSEL)**

<u>REACTOR PRESSURE (psig) IN TOP DOME</u>	<u>REACTOR VESSEL BELTLINE DOWNCOMER WATER TEMPERATURE (F)</u>
360	100
360	110
360	120
614	130
641	140
671	150
706	160
747	170
794	180
848	190
911	200
983	210
1066	220
1162	230
1273	240
1401	250

REPLACED

TABLE 3.2.2.e
**MINIMUM TEMPERATURE FOR PRESSURIZATION DURING
 HYDROSTATIC TESTING (REACTOR NOT CRITICAL)
 FOR UP TO 18 EFFECTIVE FULL POWER YEARS OF CORE OPERATION**

(reactor vessel beltline downcomer water temperature is measured at recirculation loop suction)



3.2.2.f and 3.2.2.g are

When the minimum temperature for leakage and hydrostatic testing is reached, a thermal soak be performed to ensure that the thermal gradient across the vessel wall is negligible.

BASES FOR 3.2.2 AND 4.2.2 MINIMUM REACTOR VESSEL TEMPERATURE FOR PRESSURIZATION

leakage and

Figures 3.2.2.a, 3.2.2.b, 3.2.2.c, and 3.2.2.d are plots of pressure versus temperature for heatup and cooldown rates of up to 100°F/hr. maximum (Specification 3.2.1). Figures 3.2.2.e and 3.2.2.f are plots of pressure versus temperature for hydrostatic testing. These curves are based on calculations of stress intensity factors according to Appendix G of Section III of the ASME Boiler and Pressure Vessel Code 1980 Edition with Winter 1982 Addenda. In addition, temperature shifts due to fast neutron fluence at eighteen effective full power years of operation were incorporated into the figures. These shifts were calculated using the procedure presented in Regulatory Guide 1.99, Revision 2. Twenty-eight Since the surveillance materials have a slightly lower copper content than the limiting plate material, a chemistry correction factor was applied to the measured data prior to determining the chemistry factor. These curves are applicable to the beltline region at low and elevated temperatures and the vessel flange at intermediate temperatures. Reactor vessel flange/reactor head flange boltup is governed by other criteria as stated in Specification 3.2.2.d. The pressure readings on the figures have been adjusted to reflect the calculated elevation head difference between the pressure sensing instrument locations and the pressure sensitive area of the core beltline region. The temperature readings on the figures have been adjusted to account for instrument uncertainties.

The reactor vessel head flange and vessel flange in combination with the double "O" ring type seal are designed to provide a leak-tight seal when bolted together. When the vessel head is placed on the reactor vessel, only that portion of the head flange near the inside of the vessel rests on the vessel flange. As the head bolts are replaced and tensioned, the vessel head is flexed slightly to bring together the entire contact surfaces adjacent to the "O" rings of the head and vessel flanges. Both the head and vessel flanges have an NDT temperature of 40°F and they are not subject to any appreciable neutron radiation exposure. Therefore, the minimum vessel flange and head flange temperature for bolting is established at 40°F + 60°F or 100°F.

3.2.2.f and 3.2.2.g

Figures 3.2.2.a, 3.2.2.b, 3.2.2.c, 3.2.2.d, and 3.2.2.e have incorporated a temperature shift due to the calculated fast neutron fluence. The neutron flux at the vessel wall is calculated from core physics data and has been determined using flux monitors installed inside the vessel. The curves are applicable for up to eighteen effective full power years of operation.

twenty-eight

Vessel material surveillance samples are located within the core region to permit periodic monitoring of exposure and changes in material properties. The material sample program conforms with ASTM E185-66 except for the material withdrawal schedule which is specified in Specification 4.2.2.b.

except for 3.2.2.f and 3.2.2.g,

account for instrument uncertainties and to

Curves 3.2.2.f and 3.2.2.g are applicable for up to 20 and 24 effective full power years, respectively.



ATTACHMENT C

NIAGARA MOHAWK POWER CORPORATION LICENSE NO. DPR-63 DOCKET NO. 50-220

Supporting Information and No Significant Hazards Consideration Analysis

INTRODUCTION

Reactor pressure vessel (RPV) materials undergo a transition in fracture behavior from brittle to ductile as the test temperature of the material is increased. Charpy V-notch tests are conducted in the nuclear industry to monitor changes in the fracture behavior during irradiation. Neutron irradiation to fluences above $\sim 5 \times 10^{16}$ n/cm² causes an upward shift in the Charpy curve and in the ductile-to-brittle transition temperature (DBTT). In order to ensure safe operation of a nuclear power plant during heatup, cooldown, and leakage and hydrostatic test conditions, it is necessary to conservatively calculate allowable stress loadings for the ferritic RPV materials. These allowable loadings can be conveniently presented as a plot of measured coolant pressure versus measured coolant temperature (P-T curves). Appendix G to 10CFR50 and Appendix G to Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code present a procedure for obtaining the allowable loadings for ferritic pressure-retaining materials in Class 1 components. Neutron damage within the RPV during plant operation is accounted for in the allowable pressure loading by calculating an adjusted reference temperature (ART). Regulatory Guide 1.99, Revision 2 (RG1.99(2)) defines the ART as the sum of the initial unirradiated nil-ductility reference temperature (RT_{NDT}) plus the RT_{NDT} irradiation induced shift (ΔRT_{NDT}) plus a margin term. Within the nuclear industry, the ΔRT_{NDT} is determined from the Charpy transition curve shift indexed at 30 ft-lbs of absorbed energy.

Previous Pressure-Temperature (P-T) limits for Nine Mile Point Unit 1 (NMP1) were calculated up to 18 effective full power years (EFPYs) which is estimated to be reached on December 21, 1998. At the time the previous P-T limits were calculated, three plate surveillance data points were available. In March 1997, the 210 degree surveillance capsule (Capsule B) was withdrawn and subsequently tested. As a result of this work, a fourth plate surveillance data point has become available. These data have been used to re-evaluate the ART values for the vessel beltline materials and to update and extend the operating P-T limit curves using projected vessel fluence levels. The proposed Technical Specification (TS) change has been prepared to extend the valid operating period to 28 EFPYs. In addition to the leakage/hydrostatic test curve for 28 EFPYs, leakage/hydrostatic test curves have been prepared for exposures up to 20 EFPYs and up to 24 EFPYs to shorten outage time for startups conducted prior to these exposures. Attachment D documents the calculations and analyses performed in support of the proposed TS changes. Since invalid P-T curves would require a plant shutdown, NMPC requests approval of this Application for Amendment by



December 1, 1998 to provide time to implement the amendment prior to reaching 18 EFPYs (i.e., December 21, 1998).

EVALUATION

The proposed changes include replacement of the existing P-T curves, revisions to TS 3.2.2c, as well as changes to the subject Bases section.

Attachment D to this Application contains Report No. MPM-59838, Pressure-Temperature Operating Curves for Nine Mile Point Unit 1, prepared by MPM Technologies, Inc., for NMPC. This report documents the methods used to obtain the revised P-T curves. Section 2.0 of the report presents the methodology used for the P-T curve calculation. Section 3.0 presents the results of neutron transport calculations which were performed to more accurately determine the Capsule B exposure and to calculate the peak flux at the vessel ID surface. Section 4.0 presents the plant data used in the calculations and the resulting P-T curves while Section 5.0 briefly summarizes key features of the new P-T curves. This report provides the bases for our responses to the No Significant Hazards Consideration Analysis provided below.

The proposed change to TS 3.2.2c describes requirements concerning the control of reactor vessel temperature and pressure when performing leakage or hydrostatic testing. These requirements are consistent with the report included as Attachment D and with current methods of performing a leakage or hydrostatic test. The word "leakage" was added to clarify that this specification applies to both leakage and hydrostatic tests. Therefore, this change will not have an adverse affect on the current method of performing a leakage or hydrostatic test. The Bases changes reflect that the new curves are valid up to 28 EFPYs, note that the pressure/temperature readings account for instrument uncertainties, also note that a thermal soak is performed to ensure that the thermal gradient across the vessel wall is negligible, and delete information applicable to the existing curves.

CONCLUSIONS

The changes to the P-T curves are being proposed to preclude brittle fracture of RPV materials for up to 28 EFPYs. In addition to the leakage/hydrostatic test curve for 28 EFPYs, leakage/hydrostatic test curves have been prepared for exposures up to 20 EFPYs and up to 24 EFPYs to shorten outage time for startups conducted prior to these exposures. All three curves provide adequate protection against brittle fracture during leakage/hydrostatic testing. As detailed in Attachment D, safety margins specified in 10CFR50, Appendix G and Appendix G to Section III of the ASME Code will continue to be met. Therefore, operation of NMP1 in accordance with the proposed changes will not endanger the health or safety of the public.



NO SIGNIFICANT HAZARDS CONSIDERATION ANALYSIS

10CFR50.91 requires that at the time a licensee requests an amendment, it must provide to the Commission its analysis using the standards in 10CFR50.92 concerning the issue of no significant hazards consideration. Therefore, in accordance with 10CFR50.91, the following analysis has been performed:

The operation of Nine Mile Point Unit 1, in accordance with the proposed amendment, will not involve a significant increase in the probability or consequences of an accident previously evaluated.

The changes to the P-T curves are being proposed to preclude brittle fracture of RPV materials for up to 28 EFPYs. In addition to the leakage/hydrostatic test curve for 28 EFPYs, leakage/hydrostatic test curves have been prepared for exposures up to 20 EFPYs and up to 24 EFPYs to shorten outage time for startups conducted prior to these exposures. Safety margins specified in 10CFR50, Appendix G and Appendix G to Section III of the ASME Code will continue to be met for each of these curves. Also, the proposed changes do not affect the probability of any accident precursors. Therefore, operation in accordance with the proposed change will not involve a significant increase in the probability of an accident previously evaluated.

The RPV, as part of the reactor coolant system, provides a barrier to the release of reactor coolant and subsequent radiological consequences. Operation in accordance with the proposed amendment will preclude brittle fracture of the RPV consistent with current requirements, and consequently, not affect the consequences of any accidents. Therefore, operation of NMP1 in accordance with the proposed amendment will not involve a significant increase in the consequences of an accident previously evaluated.

The operation of Nine Mile Point Unit 1, in accordance with the proposed amendment, will not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed change does not involve any physical alterations to plant configurations or introduce any new accident precursors which could initiate a new or different kind of accident. The proposed change does not affect the intended function of the RPV nor does it affect the operation of the RPV in a way which would create a new or different kind of accident. The changes to the P-T curves are being proposed to preclude brittle fracture of RPV materials for up to 28 EFPYs. Safety margins specified in 10CFR50, Appendix G and Appendix G to Section III of the ASME Code will continue to be met. Therefore, operation of NMP1 in accordance with the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.



The operation of Nine Mile Point Unit 1, in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety.

The existing NMP1 P-T curves were developed using safety margins for brittle fracture found in 10CFR50 Appendix G and Appendix G to Section III of the ASME Code. The proposed NMP1 P-T operation curves, which are valid for up to 28 EFPYs of operation, were also developed using the safety margins for brittle fracture found in 10CFR50, Appendix G and Appendix G to Section III of the ASME Code. Accordingly, operation of NMP1 in accordance with the revised P-T operating limits will continue to preclude brittle fracture of the RPV materials during plant heatup, cooldown, and leakage/hydrostatic test conditions with the same margin of safety that currently exists. Therefore, operation of NMP1 in accordance with the proposed amendment will not involve a significant reduction in a margin of safety.



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MPM Technologies, Inc.

M. P. Manahan, Sr.
M. P. Manahan, Sr.
President



ATTACHMENT D

REPORT NO. MPM-59838
PRESSURE-TEMPERATURE OPERATING CURVES FOR
NINE MILE POINT UNIT 1
MPM TECHNOLOGIES, INC.

