T. PRESTON GILLESPIE, Jr.
Vice President
Oconee Nuclear Station

Duke Energy
ON01VP / 7800 Rochester Hwy.
Seneca, SC 29672

864-873-4478
864-873-4208 fax
T.Gillespie@duke-energy.com

10 CFR 50.90

February 22, 2013

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Carolinas, LLC
Oconee Nuclear Station (ONS), Units 1, 2, and 3
Docket Numbers 50-269, 50-270, and 50-287
License Amendment Request to Update Pressure-Temperature Limit Curves
License Amendment Request (LAR) No. 2012-10

In accordance with 10 CFR 50.90, Duke Energy Carolinas, LLC (Duke Energy) proposes to amend Renewed Facility Operating License Nos. DPR-38, DPR-47, and DPR-55 for ONS Units 1, 2, and 3. This LAR proposes to replace the current ONS Units 1, 2, and 3 pressure-temperature (P-T) limit curves in Technical Specification (TS) 3.4.3 with new P-T limit curves applicable to 54 effective full power years (EFPY). Also, changes are proposed to the operational requirements for unit heatup and cooldown in TS Tables 3.4.3-1 and 3.4.3-2. The low temperature overpressure protection (LTOP) requirements, which are based on P-T limits, will also be applicable to 54 EFPY. No changes are required to LTOP requirements.

The P-T limits for ONS Units 1, 2, and 3 reactor pressure vessels were developed in accordance with the requirements of 10 CFR 50, Appendix G, using the analytical methods and flaw acceptance criteria of ASME Code Section XI, Appendix G and AREVA Topical Report BAW-10046A, Revision 2. The reference temperature for nil-ductility transition (RT_{NDT}) values of the reactor vessel beltline welds (Linde 80 welds) were determined using methods provided in Topical Report BAW-2308, "Initial RT_{NDT} of Linde 80 Weld Materials," Revisions 1-A and 2-A, rather than the methodology described within Topical Report BAW-10046A, Revision 2, which was used to evaluate the other beltline components. Exemptions from 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," and 10 CFR 50, Appendix G, "Fracture Toughness Requirements" were required to allow use of the alternate initial RT_{NDT} values provided in BAW-2308, Revisions 1-A and 2-A. The NRC approved exemptions for ONS from these requirements by letter dated April 26, 2012. The projected fluence values at 54 EFPY are based on Topical Report BAW-2241 P-A, Revision 2, which adheres to the guidance contained in NRC Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence."

An evaluation of the proposed change is provided in the Enclosure 1. A No Significant Hazards Consideration Evaluation and the Environmental Impact Analysis are also included in the Enclosure. The marked up and revised TS pages are provided in Attachments 1 and 2, respectively. Enclosure 2, AREVA Topical Report ANP-3127, Revision 1, "Oconee Nuclear

A001
NRR

Station Units 1, 2, & 3 Pressure-Temperature Limits at 54 EFPY, January 2013," provides the technical basis for the proposed change.

In accordance with Duke Energy administrative procedures and the Quality Assurance Program Topical Report, the proposed TS change has been reviewed and approved by the Plant Operations Review Committee. Additionally, a copy of this LAR is being sent to the State of South Carolina in accordance with 10 CFR 50.91 requirements.

The current 33 EFPY P-T limit curves are projected to expire in March 2014. Duke Energy requests approval of the proposed LAR by January 31, 2014, effective immediately on issuance with implementation within 60 days. Duke Energy will also update applicable sections of the ONS Updated Final Safety Analysis Report (UFSAR), as necessary, and submit these per 10 CFR 50.71(e). There are no new commitments being made as a result of this proposed change.

If there are any additional questions, please contact Boyd Shingleton, ONS Regulatory Affairs, at (864) 873-4716.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 22, 2013.

Sincerely,

TP Gillespie

T. Preston Gillespie, Jr., Vice President
Oconee Nuclear Station

Enclosures:
1. Evaluation of Proposed Change
2. AREVA Topical Report ANP-3127, Revision 1, "Oconee Nuclear Station Units 1, 2, & 3 Pressure-Temperature Limits at 54 EFPY, January 2013

Attachments:
1. Marked up TS Pages
2. Revised TS Pages

cc w/Enclosures and Attachments:

Mr. Victor McCree, Regional Administrator
U. S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Mr. John Boska, Project Manager
(by electronic mail only)
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-8G9A
Rockville, MD 20852

Mr. Ed Crowe
Senior Resident Inspector
Oconee Nuclear Site

Ms. Susan E. Jenkins, Manager
Radioactive & Infectious Waste Management
Division of Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull St.
Columbia, SC 29201

License Amendment Request No. 2012-10
February 22, 2013

ENCLOSURE 1

EVALUATION OF PROPOSED CHANGE

License Enclosure - Evaluation of Proposed Change
Amendment Request No. 2012-10
February 22, 2013

Subject: License Amendment Request to Update Pressure-Temperature Limit Curves
License Amendment Request (LAR) No. 2012-10

1.0 SUMMARY DESCRIPTION

This License Amendment Request (LAR) proposes to replace the current Oconee Nuclear Station (ONS) Units 1, 2, and 3 pressure/temperature (P-T) limit curves in Technical Specification (TS) 3.4.3 with new P-T limit curves applicable to 54 effective full power years (EFPY). Also, changes are proposed to the operational requirements for unit heatup and cooldown in TS Tables 3.4.3-1 and 3.4.3-2. The low temperature overpressure protection (LTOP) requirements, which are based on P-T limits, will also be applicable to 54 EFPY. No changes are required to LTOP requirements.

The P-T limits for ONS Units 1, 2, and 3 reactor pressure vessels were developed in accordance with the requirements of 10 CFR 50, Appendix G, using the analytical methods and flaw acceptance criteria of ASME Code Section XI, Appendix G and AREVA Topical Report BAW-10046A, Revision 2. The reference temperature for nil-ductility transition (RT_{NDT}) values of the reactor vessel beltline welds (Linde 80 welds) were determined using methods provided in Topical Report BAW-2308, "Initial RT_{NDT} of Linde 80 Weld Materials," Revisions 1-A and 2-A, rather than the methodology described within Topical Report BAW-10046A, Revision 2, which was used to evaluate the other beltline components. Exemptions from 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," and 10 CFR 50, Appendix G, "Fracture Toughness Requirements" were required to allow use of the alternate initial RT_{NDT} values provided in BAW-2308, Revisions 1-A and 2-A. The NRC approved exemptions for ONS from these requirements by letter dated April 26, 2012. The projected fluence values at 54 EFPY are based on Topical Report BAW-2241 P-A, Revision 2, which adheres to the guidance contained in NRC Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence."

An evaluation of the proposed change is provided in Section 3.0. The marked up and revised TS pages are provided in Attachments 1 and 2, respectively. Enclosure 2, AREVA Topical Report ANP-3127, "Oconee Nuclear Station Units 1, 2, & 3 Pressure-Temperature Limits at 54 EFPY, January 2013," provides the technical basis for the proposed change.

The current 33 EFPY P-T limit curves are projected to expire in March 2014. Duke Energy requests approval of the proposed LAR by January 31, 2014, effective immediately on issuance with implementation within 60 days. There are no new commitments being made as a result of this proposed change.

2.0 DETAILED DESCRIPTION

2.1 Background

The proposed amendment extends the Reactor Coolant Pressure Boundary (RCPB) Technical Specification Pressure-Temperature (P-T) operating limits of Oconee Nuclear Station Units 1, 2, and 3 (ONS-1, ONS-2 and ONS-3) from 33 EFPY to 54 EFPY. The proposed P-T limits are established in accordance with the requirements of 10 CFR Part 50, Appendix G. These P-T limits are generated for normal operation heatup, normal operation cooldown, inservice leak and hydrostatic (ISLH) test conditions, and reactor core operations. These limits are expressed in the form of curves of allowable pressure versus temperature. The uncorrected P-T limits for the three

ONS units were determined for 54 effective full power years (EFPY) of operation. Pressure correction factors were determined between the pressure sensor locations (pressure tap in the Decay Heat Removal System (DHRS) drop line and two pressure taps in the Reactor Coolant System (RCS) hot leg) and various regions of the reactor vessel. The TS pressure-temperature operating limits applicable to ONS-1, ONS-2, and ONS-3 are developed for 54 EFPY of reactor operation. In addition, the minimum temperature for core criticality is determined to satisfy the regulatory requirements of 10 CFR Part 50, Appendix G.

The ability of the reactor pressure vessel to resist fracture is the primary factor in ensuring the safety of the primary system in light water-cooled reactors. The three areas of the reactor pressure vessel addressed in the present report are the beltline shell region, the reactor coolant nozzles, and the closure head flange region.

A method for guarding against brittle fracture in reactor pressure vessels is described in Appendix G of the American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." This method utilizes fracture mechanics concepts and the reference temperature for nil-ductility transition (RT_{NDT}). The RT_{NDT} is defined as the greater of the drop weight nil-ductility transition temperature (per American Society for Testing and Materials (ASTM) E208) or the temperature at which the material exhibits 50 ft-lbs absorbed energy and 35 mils lateral expansion minus 60°F. The RT_{NDT} of a given material is used to index that material to a reference stress intensity factor curve (K_{Ic}). The K_{Ic} curve appears in Appendix G of ASME Code Section XI. When a given material is indexed to the K_{Ic} curve, allowable stress intensity factors can be obtained for this material as a function of temperature. Plant operating limits can then be determined using these allowable stress intensity factors.

The beltline region of the reactor vessel is the most highly exposed to neutron irradiation. The general effects of fast neutron irradiation on the mechanical properties of low-alloy ferritic steels such as SA-302, Grade B, modified and SA-508, Class 2 forging material used in the fabrication of the ONS Units reactor vessels and inlet and outlet nozzles, are well characterized and documented in the literature. The effects of irradiation on these steels include an increase in the yield and ultimate strengths and a decrease in ductility. The most significant effect, however, is an increase in the temperature associated with the transition from brittle to ductile fracture and a reduction in the Charpy upper-shelf energy value.

Pressure-temperature limits for the ONS Units reactor vessels are developed in accordance with the requirements of 10 CFR Part 50, Appendix G, utilizing the analytical methods and flaw acceptance criteria of AREVA Topical Report BAW-10046A, Revision 2, "Methods of Compliance with Fracture Toughness and Operational Requirements of 10CFR Appendix G," dated June 1986, and ASME Code Section XI, Appendix G.

The ONS-1 reactor vessel contains both axially and circumferentially oriented welds. Therefore, the P-T limits for ONS-1 are based on the postulation of both axial and circumferential flaws in the most limiting axial and circumferential welds. Since ONS-2 and ONS-3 reactor vessels do not contain any axial welds in their beltline regions, axial flaws are postulated in the most limiting forging materials of these reactor vessels.

2.2 Technical Specification Change Description

The new proposed P-T limits will be applicable to 54 EFPY and will ensure that all RCS components will be able to withstand the effects of transient loads due to system temperature and pressure changes without their functions or performance being impaired. These loads are introduced by normal load transients, reactor trips, and startup and shutdown operations.

The Low Temperature Overpressurization Protection (LTOP) pressure limit (adjusted for location and instrument uncertainty) at 54 EFPY that bounds all three ONS Units is 540 psig (ONS-1). The 54 EFPY LTOP limiting pressure remains above the current Pressurizer Power-Operated Relief Valve (PORV) setpoint of 535 psig. Therefore, the current PORV low-pressure setpoint (535 psig) remains acceptable for plant operation to 54 EFPY for all three ONS units.

The minimum 54 EFPY LTOP enable temperature that bounds all three ONS Units with instrument uncertainty is 276.8°F (ONS-3). This value is lower than the current operationally imposed LTOP enable temperature of 325°F at 33 EFPY. Therefore, the current operationally imposed LTOP temperature of 325°F remains acceptable for plant operation to 54 EFPY for all three ONS units.

The proposed change is as follows:

TS Limiting Condition for Operation (LCO) 3.4.3 currently provides the P-T limits for RCS Normal Operational Heatup Limitations, RCS Normal Operational Cooldown Limitations, and RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations applicable to the first 33 EFPY in Figures 3.4.3-1, 3.4.3-2 & 3.4.3-3 respectively for ONS-1, in Figures 3.4.3-4, 3.4.3-5, & 3.4.3-6 respectively for ONS-2, and in Figures 3.4.3-7, 3.4.3-8, & 3.4.3-9 respectively for ONS-3. The proposed change would replace the existing P-T limits for 33 EFPY with P-T limits for 54 EFPY. Also, changes to the operational requirements for unit heatup and cooldown in TS Tables 3.4.3-1 and 3.4.3-2 are proposed. These changes are supported by the new 54 EFPY P-T limits. The proposed changes are depicted in the TS markup and retype provided in Attachments 1 and 2.

3.0 TECHNICAL EVALUATION

The current P-T limit curves will expire at 33 EFPY. AREVA NP was contracted to update the P-T Limit Curves and LTOP analysis to 54 EFPY based on current ASME methods and regulatory requirements. The new P-T limit curves have been adjusted based on pressure differential between point of system pressure measurement and the point in the reactor vessel that establishes the controlling unadjusted pressure limits. The P-T limit curves do not include margins for instrument error.

The basis for the proposed change is provided in AREVA Topical Report ANP-3127, Revision 1, "Oconee Nuclear Station Units 1, 2, & 3 Pressure-Temperature Limits at 54 EFPY," January 2013. The Topical Report, which is provided in Enclosure 2, provides the methodology for determining the new P-T limits, provides an evaluation of the adjusted reference temperatures for each ONS unit, describes the essential analytical parameters used in the preparation of ONS-1, 2, and 3 P-T limits, and provides the technical basis for the P-T limits. The P-T limits were developed in accordance with the requirements of 10 CFR 50, Appendix G, using the analytical methods and flaw acceptance criteria of ASME Code Section XI, Appendix G and AREVA Topical

Report BAW-10046A, Revision 2. The reference temperature for nil-ductility transition (RT_{NDT}) values of the reactor vessel beltline welds (Linde 80 welds) were determined using methods provided in Topical Report BAW-2308, "Initial RT_{NDT} of Linde 80 Weld Materials," Revisions 1-A and 2-A, rather than the methodology described within Topical Report BAW-10046A, Revision 2, which was used to evaluate the other beltline components. Exemptions from 10 CFR 50.61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," and 10 CFR 50, Appendix G, "Fracture Toughness Requirements" were required to allow use of the alternate initial RT_{NDT} values provided in BAW-2308, Revisions 1-A and 2-A. The NRC approved exemptions for ONS from these requirements by letter dated April 26, 2012. The projected fluence values at 54 EFPY are based on Topical Report BAW-2241 P-A, Revision 2, which adheres to the guidance contained in NRC Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence."

4.0 REGULATORY EVALUATION

4.1 Significant Hazards Consideration

Duke Energy Carolinas, LLC, has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   No. The proposed amendment replaces the current Oconee Nuclear Station (ONS) Units 1, 2, and 3 pressure/temperature (P-T) limit curves applicable to 33 effective full power years (EFPY) in Technical Specification (TS) 3.4.3 with new P-T limit curves applicable to 54 EFPY. The proposed changes also revise the Reactor Coolant System heatup and cooldown rates and allowable reactor coolant pump combinations of TS Tables 3.4.3-1 and 3.4.3-2. The pressure-temperature (P-T) limit curves in the TSs were conservatively generated in accordance with fracture toughness requirements of ASME Code Section XI, Appendix G, and the minimum pressure and temperature requirements as listed in Table 1 of 10 CFR 50, Appendix G. The proposed changes do not impact the capability of the reactor coolant pressure boundary (i.e., no change in operating pressure, materials, seismic loading, etc.). Therefore, the proposed changes do not increase the potential for the occurrence of a loss of coolant accident (LOCA). The changes do not modify the reactor coolant system pressure boundary, nor make any physical changes to the facility design, material, or construction standards. The probability of any design basis accident (DBA) is not affected by this change, nor are the consequences of any DBA affected by this change. The proposed P-T limits, heatup and cooldown rates and allowable operating reactor coolant pump combinations are not considered to be an initiator or contributor to any accident analysis addressed in the ONS Updated Final Safety Analyses Report (UFSAR).

   The proposed changes will not impact assumptions and conditions previously used in the radiological consequence evaluations nor affect the mitigation of these consequences due to an accident described in the UFSAR. Also, the proposed

changes will not impact a plant system such that previously analyzed SSCs might be more likely to fail. The initiating conditions and assumptions for accidents described in the UFSAR remain as analyzed.

Therefore, the probability or consequences of an accident previously evaluated is not significantly increased.

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

No. The requirements for P-T limit curves have been in place since the beginning of plant operation. The revised curves are based on a later edition to Section XI of the ASME Code that incorporates current industry standards for P-T curves. The revised curves are based on reactor vessel irradiation damage predictions using Regulatory Guide 1.99 methodology. No new failure modes are identified nor are any SSCs required to be operated outside the design bases. Therefore, the possibility of a new or different kind of accident from any kind of accident previously evaluated is not created.

3) Does the proposed amendment involve a significant reduction in a margin of safety?

No. The proposed P-T curves continue to maintain the safety margins of 10 CFR 50, Appendix G, by defining the limits of operation which prevent non-ductile failure of the reactor pressure vessel. Analyses have demonstrated that the fracture toughness requirements are satisfied and that conservative operating restrictions are maintained for the purpose of low temperature overpressure protection. The P-T limit curves provide assurance that the RCS pressure boundary will behave in a ductile manner and that the probability of a rapidly propagating fracture is minimized. Therefore, this request does not involve a significant reduction in a margin of safety.

4.2 Applicable Regulatory Requirements/Criteria

10 CFR 50, Appendix G, "Fracture Toughness Requirements"

10 CFR 50, Appendix G requires P-T limits and minimum temperature requirements be established for the reactor pressure vessel. These limits are defined by the various plant operating conditions, whether or not fuel is in the vessel, whether or not the core is critical, and the reactor vessel pressure. The operating conditions include, but are not limited to, hydrostatic pressure and leak testing and normal operation including anticipated operational occurrences. The regulation also requires the P-T limits be at least as conservative as the limits obtained by following the methods of analysis and margins contained in the ASME Code, Section XI, Appendix G.

Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials"

Regulatory Guide (RG) 1.99, Revision 2, contains methodologies for determining the change in RT_{NDT} resulting from neutron radiation. The use of the RG provides an acceptable means of ensuring the requirements of 10 CFR 50, Appendix G are satisfied. The RG also indicates that other methodologies could be used for complying with the specified portions of the regulation.

American Society *of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Appendix G, "Fracture Toughness Criteria for Protection Against Failure"*

As indicated in the description for 10 CFR 50, Appendix G, above, the proposed changes to the Technical Specifications and Operating License meet the requirements of the ASME Code, Section XI, Appendix G as modified by the NRC-accepted ASME Code Cases N-588 and N-640.

4.3 Precedence

1. First Energy Nuclear Operating Company letter to Nuclear Regulatory Commission dated April 15, 2009, "License Amendment Request to Incorporate the Use of Alternate Methodology for the Development of Reactor Pressure Vessel Pressure-Temperature Limit Curves and Request for Exemption from Certain Requirements Contained in 10 CFR 50.61 and 10 CFR 50 Appendix G."
2. First Energy Nuclear Operating Company letter to Nuclear Regulatory Commission dated December 18, 2009, "Supplemental Information Related to the License Amendment Request to Incorporate the Use of Alternate Methodology for the Development of Reactor Pressure Vessel Pressure-Temperature Limit Curves and Request for Exemption from Certain Requirements Contained in 10 CFR 50.61 and 10 CFR 50 Appendix G."
3. Nuclear Regulatory Commission Letter to First Energy Nuclear Operating Company dated January 18, 2011, "DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 -ISSUANCE OF AMENDMENT RE: REQUEST TO INCORPORATE THE USE OF ALTERNATIVE METHODOLOGIES FOR THE DEVELOPMENT OF REACTOR PRESSURE VESSEL PRESSURE-TEMPERATURE LIMIT CURVES (TAC NO. ME1127)."

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be adverse to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

Duke Energy Carolinas, LLC, has evaluated this license amendment request against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. Duke Energy Carolinas, LLC has determined that this license amendment request meets the criteria for a categorical exclusion set forth in 10 CFR 51.22(c)(9). This determination is based on the fact that this change is being proposed as an amendment to a license issued pursuant to 10 CFR 50 that changes a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or that changes an inspection or a surveillance requirement, and the amendment meets the following specific criteria:

(i) The amendment involves no significant hazards consideration.

As demonstrated in Section 4.1, the proposed Technical Specification change does not involve a significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

This LAR will not change the types or amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

This LAR will not increase the individual or cumulative occupational radiation exposure.

6.0 REFERENCES

1. AREVA Topical Report ANP-3127, Revision, "Oconee Nuclear Station Units 1, 2, & 3 Pressure-Temperature Limits at 54 EFPY," January 2013.
2. AREVA Topical Report BAW-10046A, Rev. 2, "Methods of Compliance with Fracture Toughness and Operational Requirements of 10CFR Appendix G," dated June 1986.
3. AREVA Document 43-2308-002, "Initial RT NDT of Linde 80 Weld Materials," (BAW-2308, Revision 1-A).
4. AREVA Document 43-2308-004, "Initial RT NDT of Linde 80 Weld Materials," (BAW-2308, Revision 2-A).
5. AREVA Topical Report BAW-2241 P-A, Revision 2, "Fluence and Uncertainty Methodologies," 2006.

License Amendment Request No. 2012-10
February 22, 2012

ATTACHMENT 1

TECHNICAL SPECIFICATION

MARK UPS

Table 3.4.3-1 (page 1 of 1)
Operational Requirements for Unit Heatu

≤ 30°F in any ½ hr period

CONSTRAINT	RC TEMPERATURE[a]	~~MAXIMUM~~ HEATUP RATE	ALLOWED PUMP COMBINATION
RC Temperature[a]	T < ~~280~~°F	~~50°F/hr~~	NA
	T ≥ ~~280~~°F (270)	~~100°F/hr~~	NA
100°F ≤ T < 300°F RC Pumps	T < ~~250°F~~	NA	≤ two pumps
(300)	T ≥ ~~250~~°F	NA	Any
T < 100°F		NA	No pumps

≤ 50°F in any ½ hr period

(a) RC Temperature is cold leg temperature if one or more RC pumps are in operation; otherwise it is the LPI cooler outlet temperature.

Table 3.4.3-2 (page 1 of 1)
Operational Requirements for Unit Cooldown

CONSTRAINT	RC TEMPERATURE[a]	~~MAXIMUM~~ COOLDOWN RATE[b]	ALLOWED PUMP COMBINATION
RC Temperature[a]	T ≥ ~~280~~°F	≤ 50°F in any 1/2 hour period	NA
	~~150~~°F ≤ T < ~~280~~°F	≤ 25°F in any 1/2 hour period	NA
	T < ~~150~~°F	≤ ~~10~~°F in any one hour period	NA
	RCS depressurized[c]	≤ 50°F in any one hour period	NA
100°F ≤ T < 300°F			
RC Pumps	T ≥ ~~250~~°F	NA	Any
	T < ~~250~~°F	NA	≤ two pumps
T < 100°F		NA	No pumps

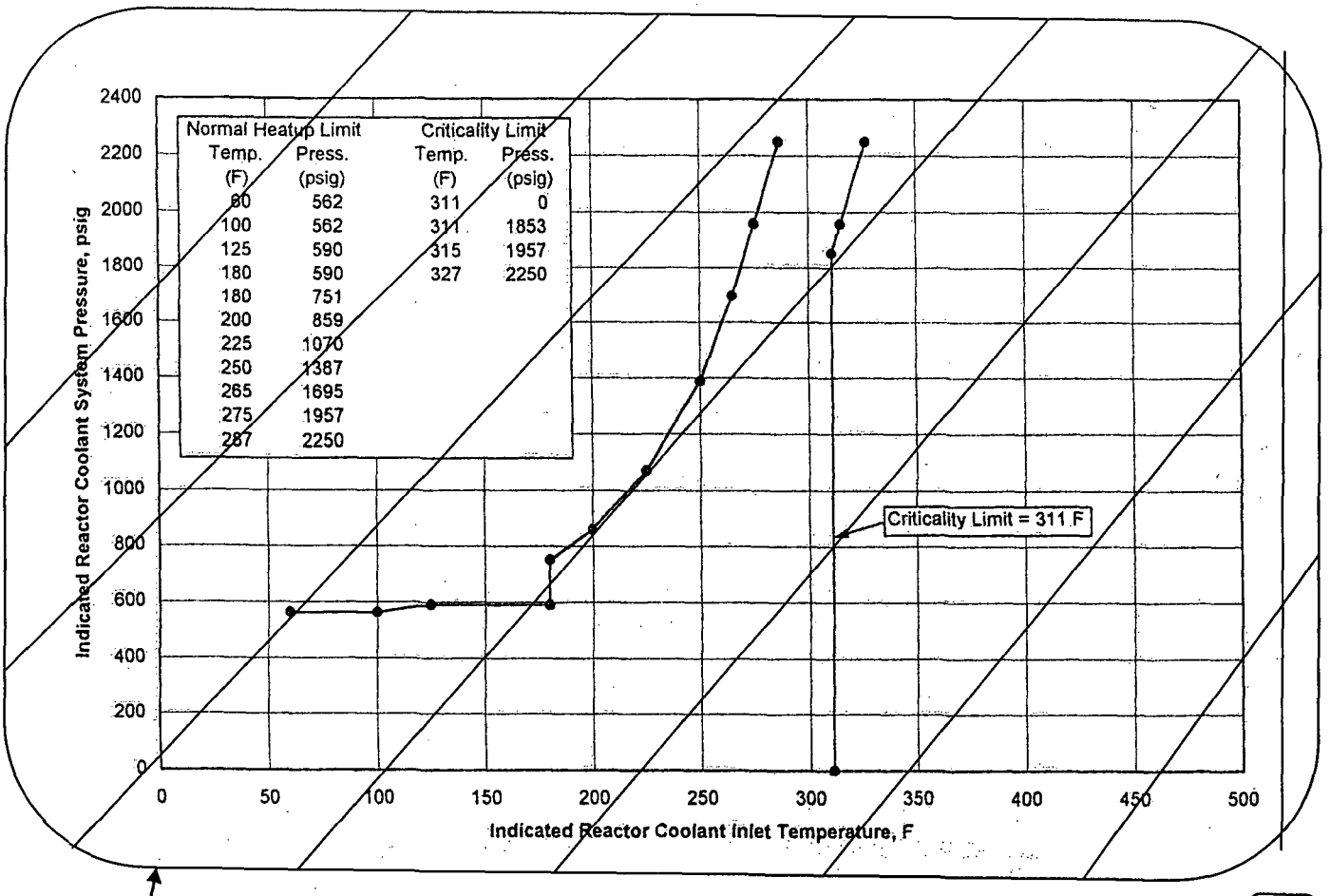
(a) RC Temperature is cold leg temperature if one or more RC pumps are in operation or if on natural circulation cooldown; otherwise it is the LPI cooler outlet temperature.

(b) These rate limits must be applied to the change in temperature indication from cold leg temperature to LPI cooler outlet temperature per Note (a).

(c) When the RCS is depressurized such that all three of the following conditions exist:

a) RCS temperature < 200°F,
b) RCS pressure < 50 psig,
c) All RC Pumps off,

the maximum cooldown rate shall be relaxed to ≤ 50°F in any 1 hour period.



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

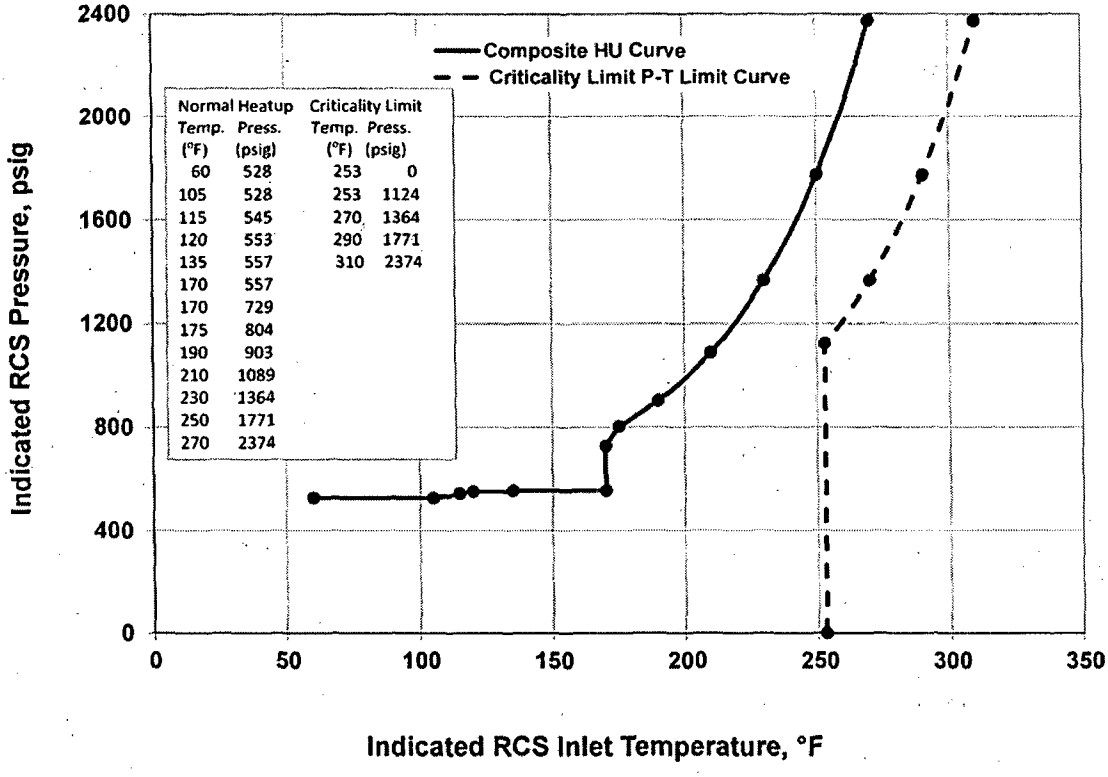
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

INSERT A

Figure 3.4.3-1 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 1

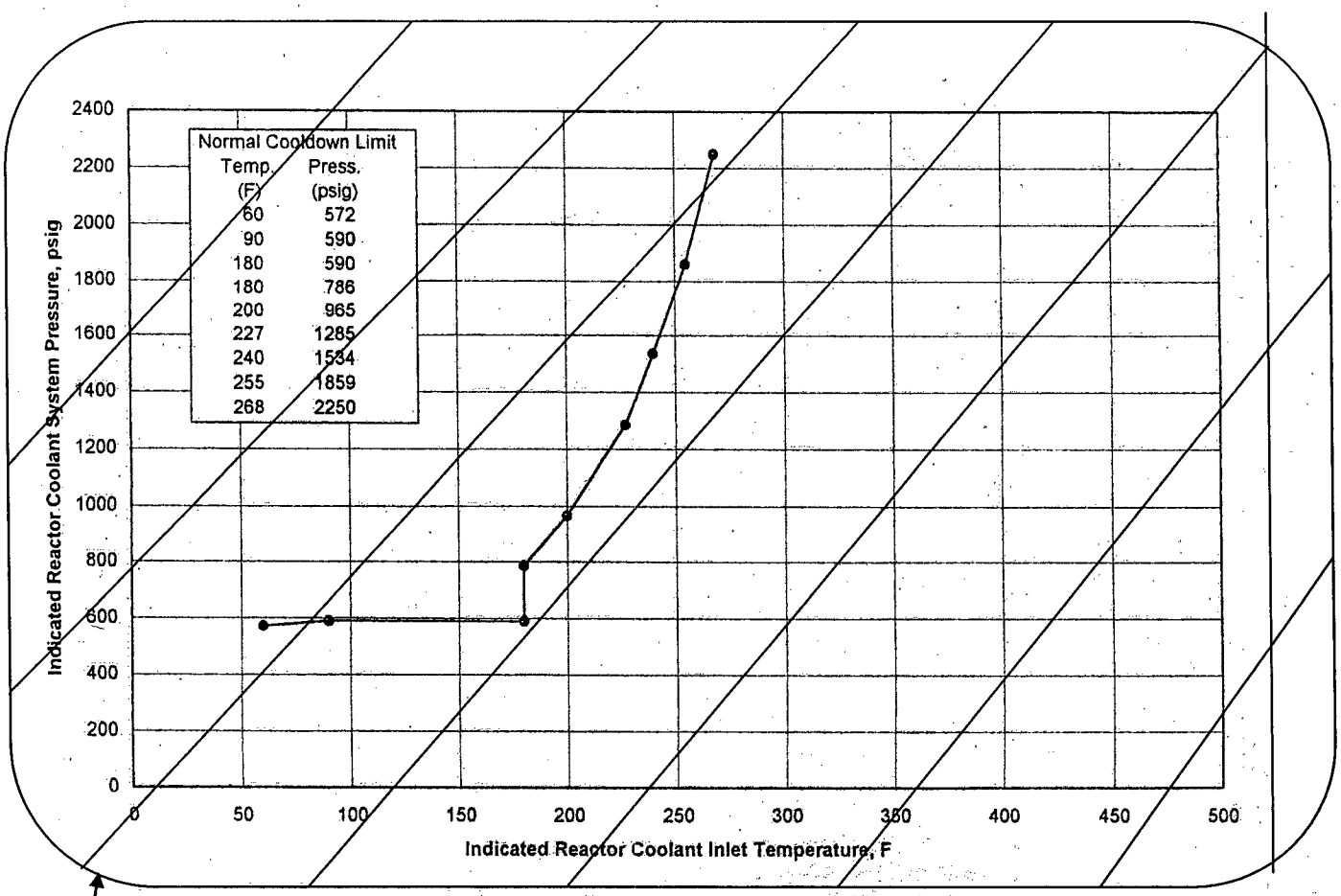
54

INSERT A



Normal Heatup Temp. (°F)	Press. (psig)
60	528
105	528
115	545
120	553
135	557
170	557
170	729
175	804
190	903
210	1089
230	1364
250	1771
270	2374

Criticality Limit Temp. (°F)	Press. (psig)
253	0
253	1124
270	1364
290	1771
310	2374



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

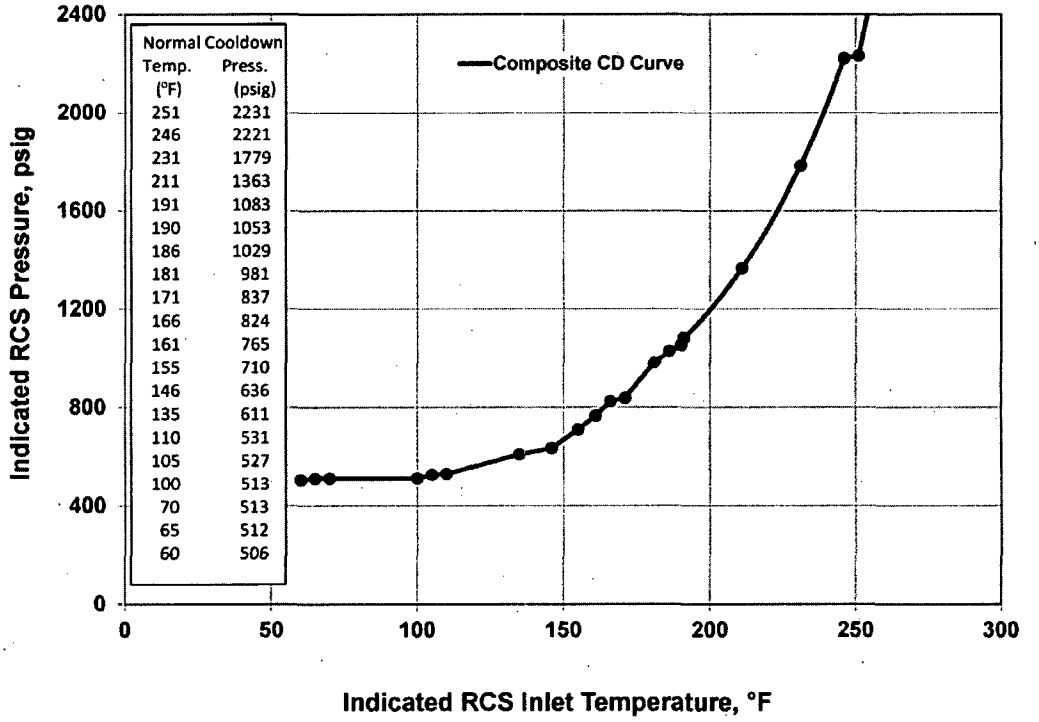
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

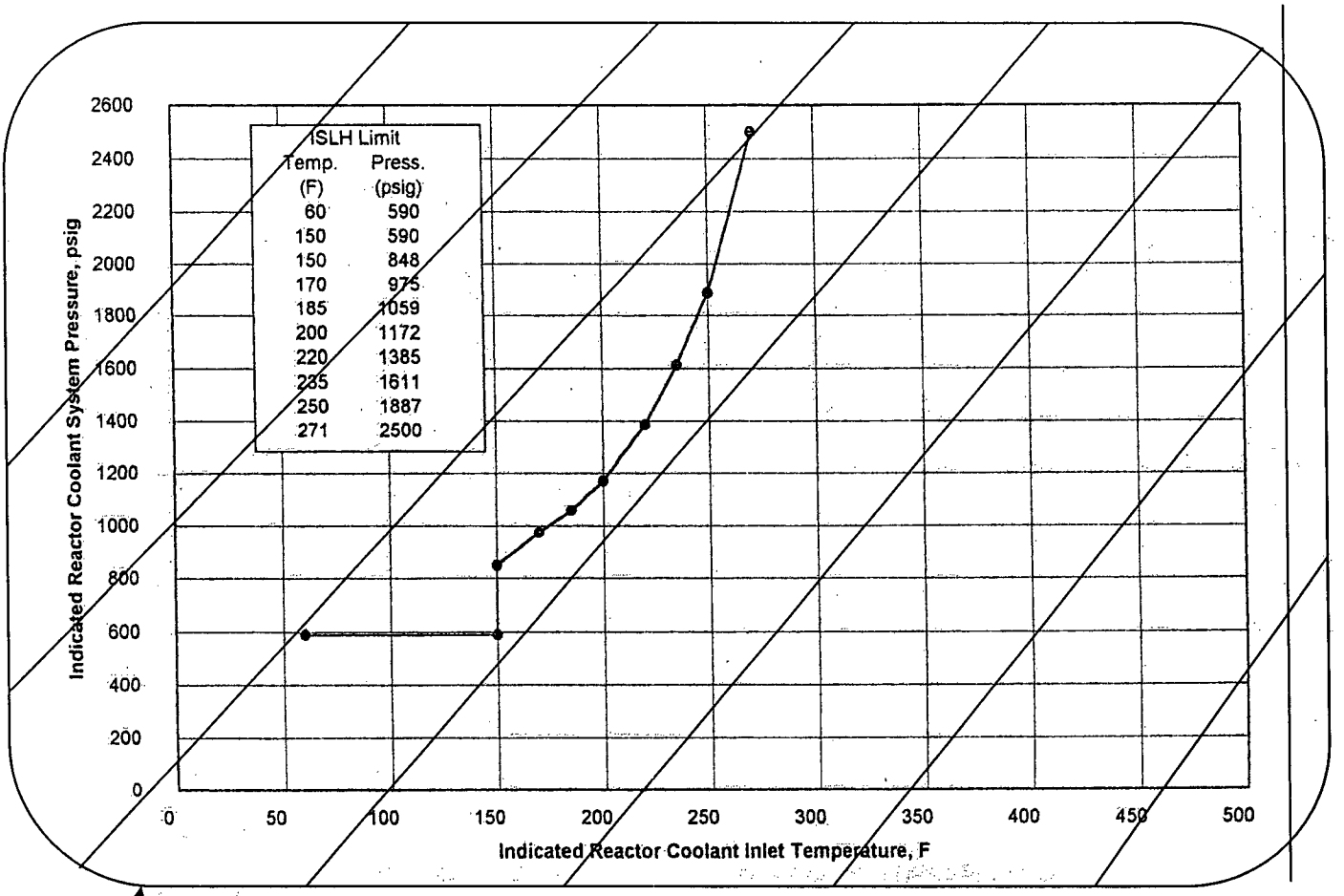
INSERT B

Figure 3.4.3-2 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 1

54

INSERT B


Normal Cooldown
Temp. (°F) Press. (psig)
251 2231
246 2221
231 1779
211 1363
191 1083
190 1053
186 1029
181 981
171 837
166 824
161 765
155 710
146 636
135 611
110 531
105 527
100 513
70 513
65 512
60 506
Composite CD Curve
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
Indicated RCS Inlet Temperature, °F



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

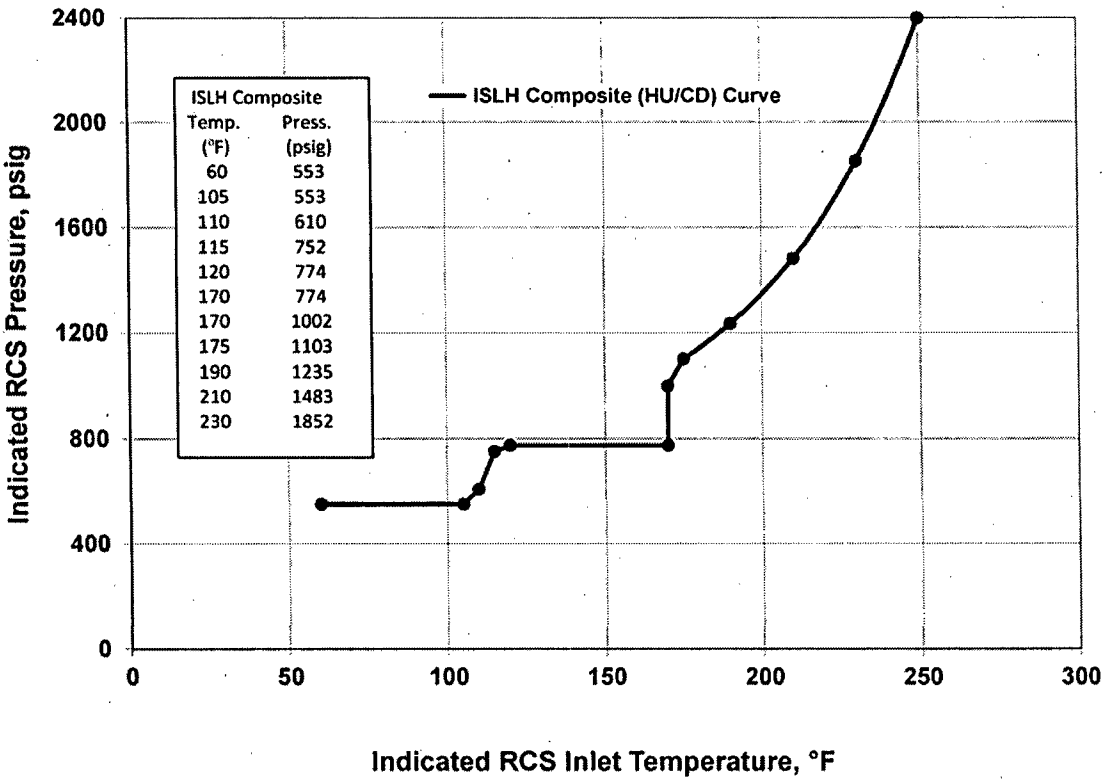
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

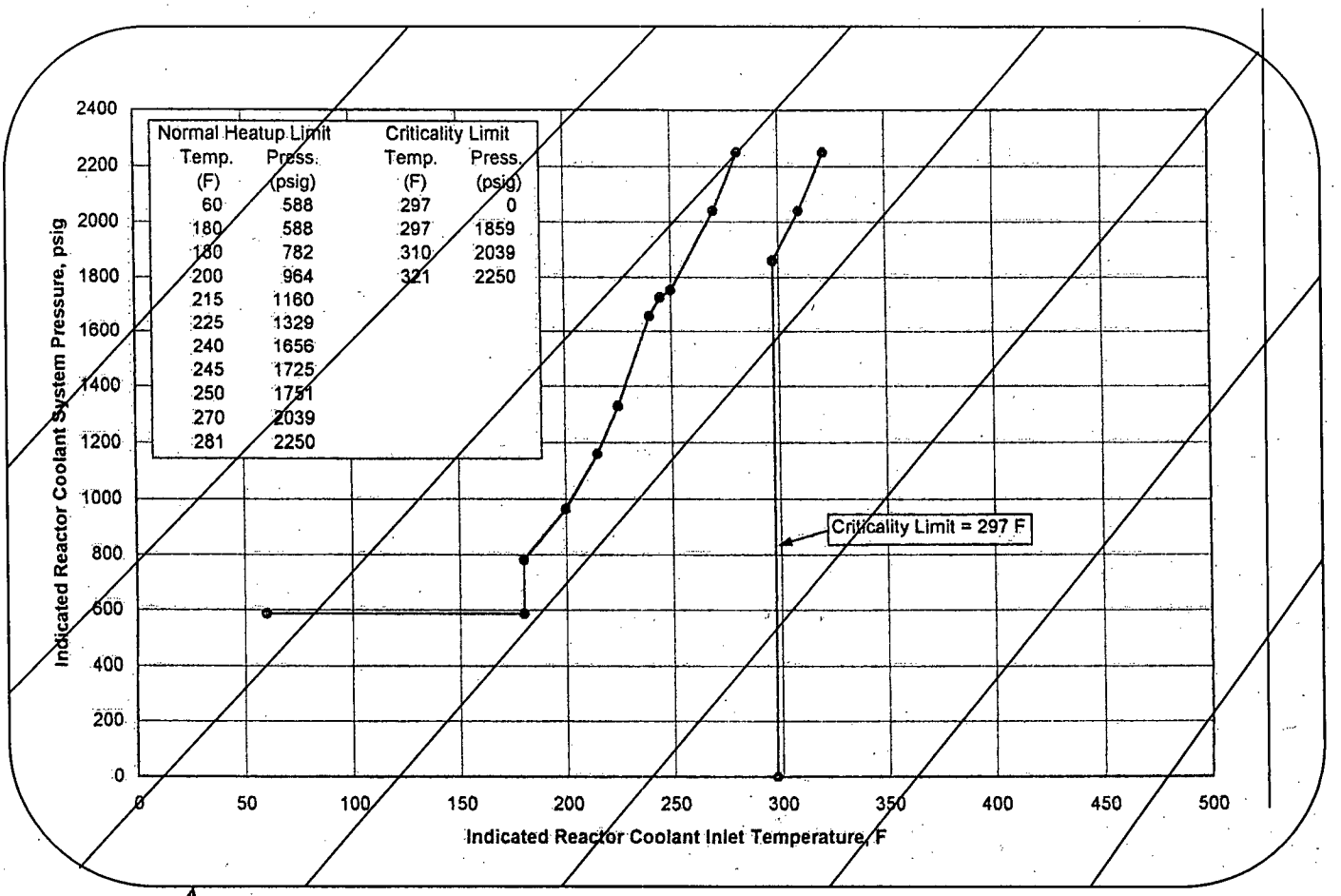
INSERT C

Figure 3.4.3-3 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 1

54

INSERT C


ISLH Composite
Temp. (°F) Press. (psig)
60 553
105 553
110 610
115 752
120 774
170 774
170 1002
175 1103
190 1235
210 1483
230 1852
ISLH Composite (HU/CD) Curve
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
Indicated RCS Inlet Temperature, °F



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

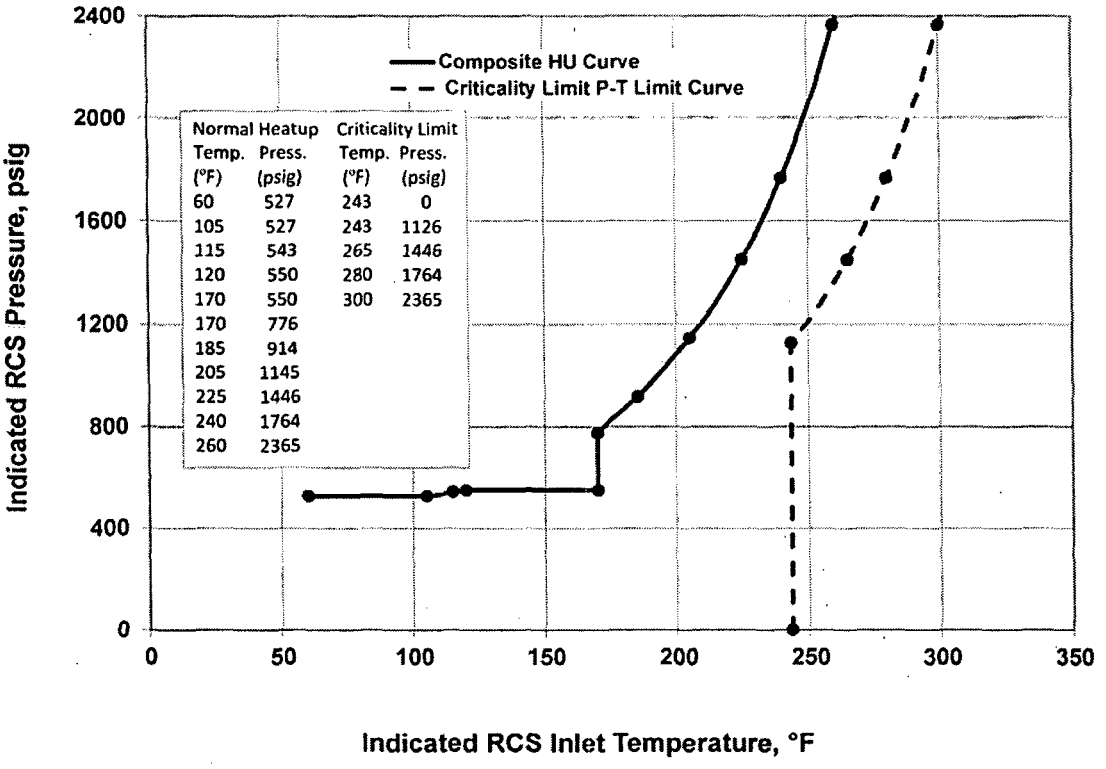
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

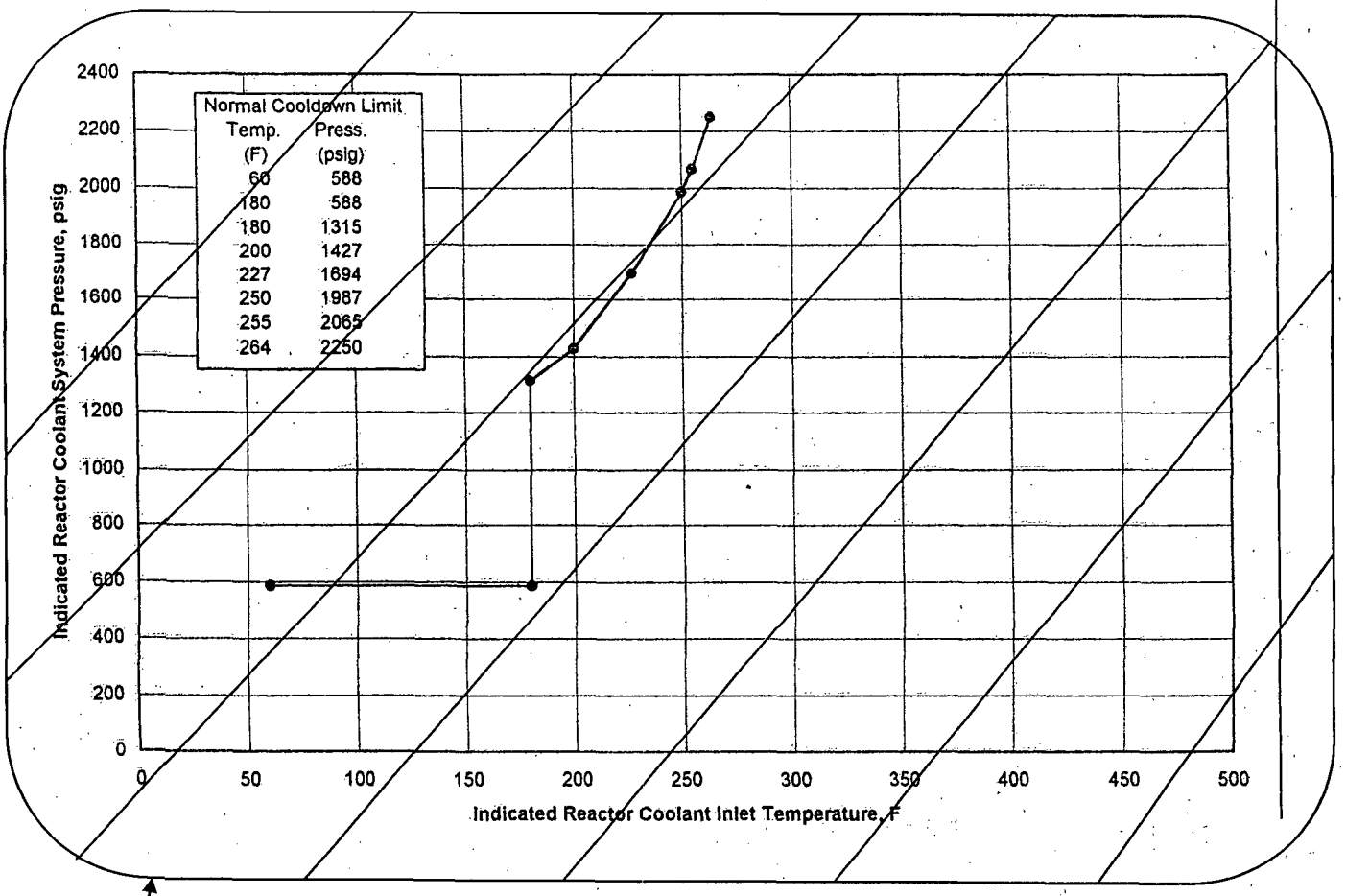
INSERT D

Figure 3.4.3-4 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 2

54

INSERT D


Composite HU Curve
Criticality Limit P-T Limit Curve
Normal Heatup Temp. (°F) Press. (psig)
60 527
105 527
115 543
120 550
170 550
170 776
185 914
205 1145
225 1446
240 1764
260 2365
Criticality Limit Temp. (°F) Press. (psig)
243 0
243 1126
265 1446
280 1764
300 2365
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
350
Indicated RCS Inlet Temperature, °F



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

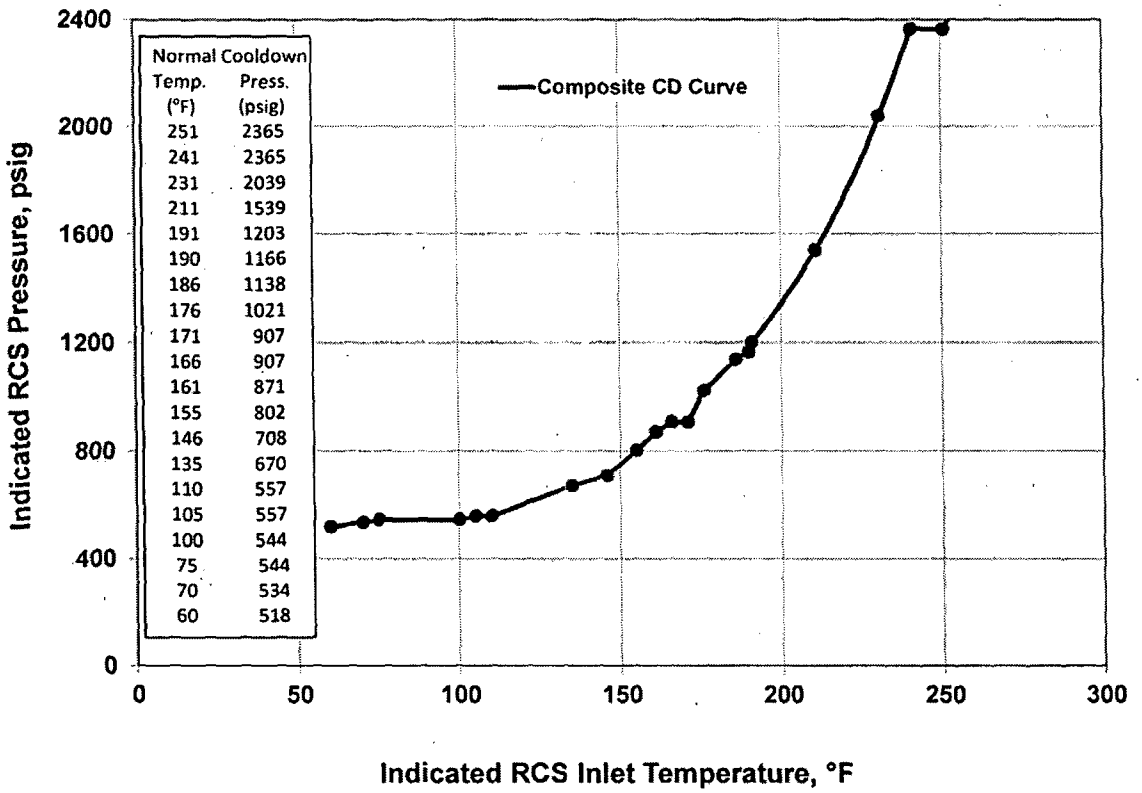
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

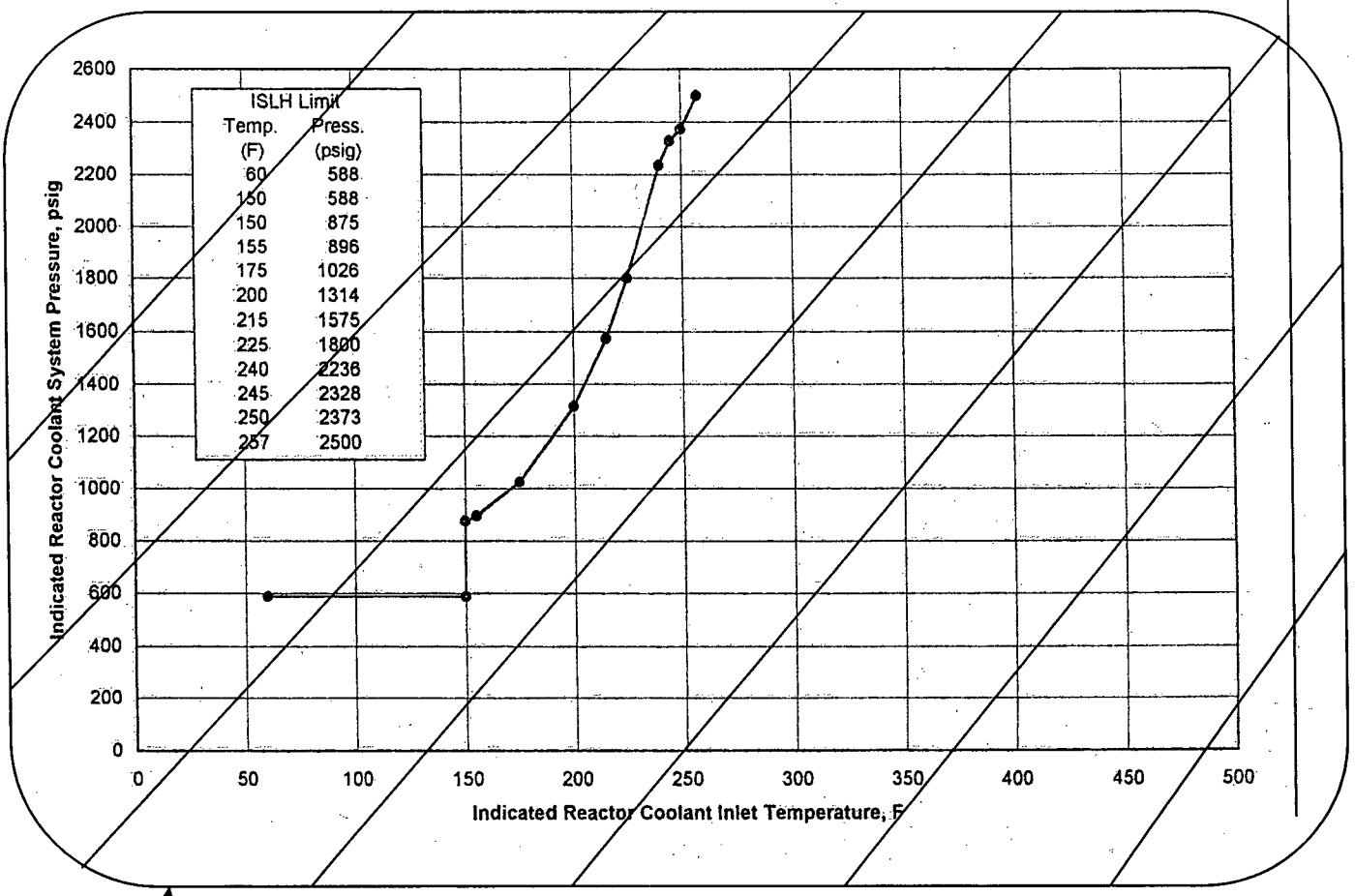
INSERT E

Figure 3.4.3-5 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 2

54

INSERT E


Normal Cooldown
Temp. (°F) Press. (psig)
251 2365
241 2365
231 2039
211 1539
191 1203
190 1166
186 1138
176 1021
171 907
166 907
161 871
155 802
146 708
135 670
110 557
105 557
100 544
75 544
70 534
60 518
Composite CD Curve
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
Indicated RCS Inlet Temperature, °F



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

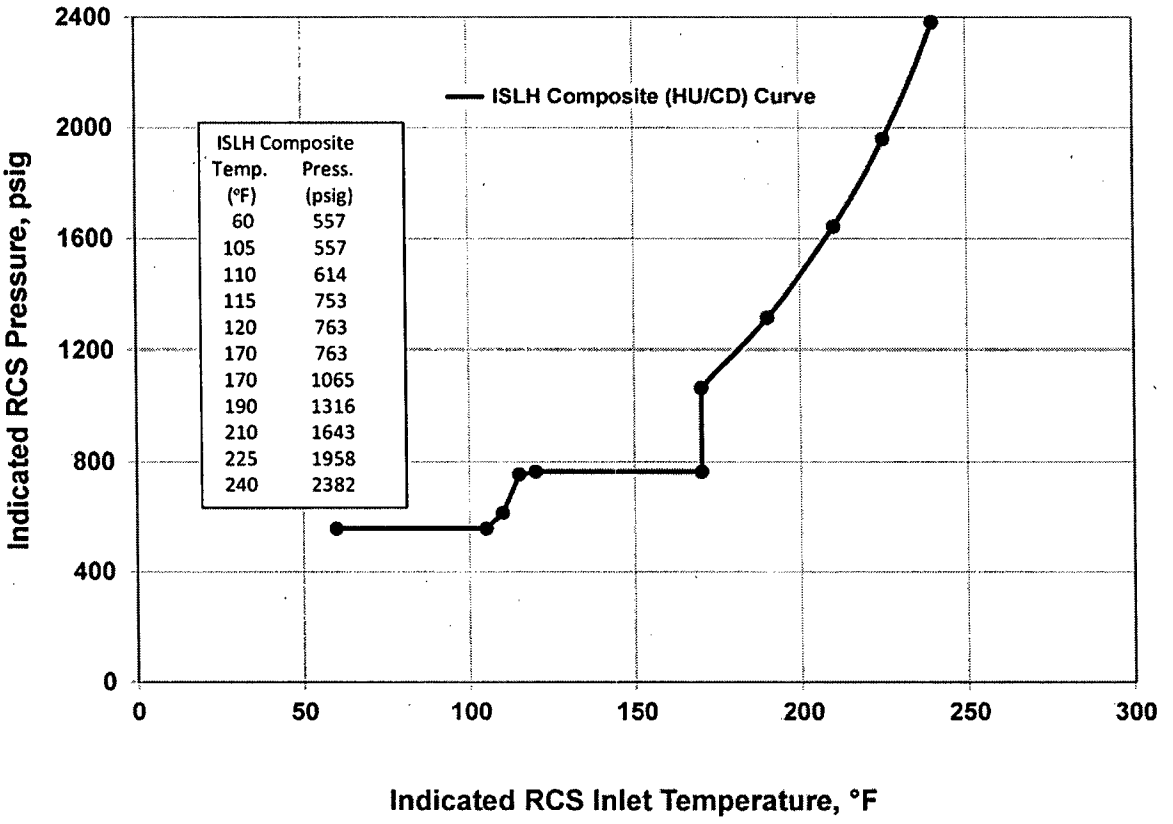
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

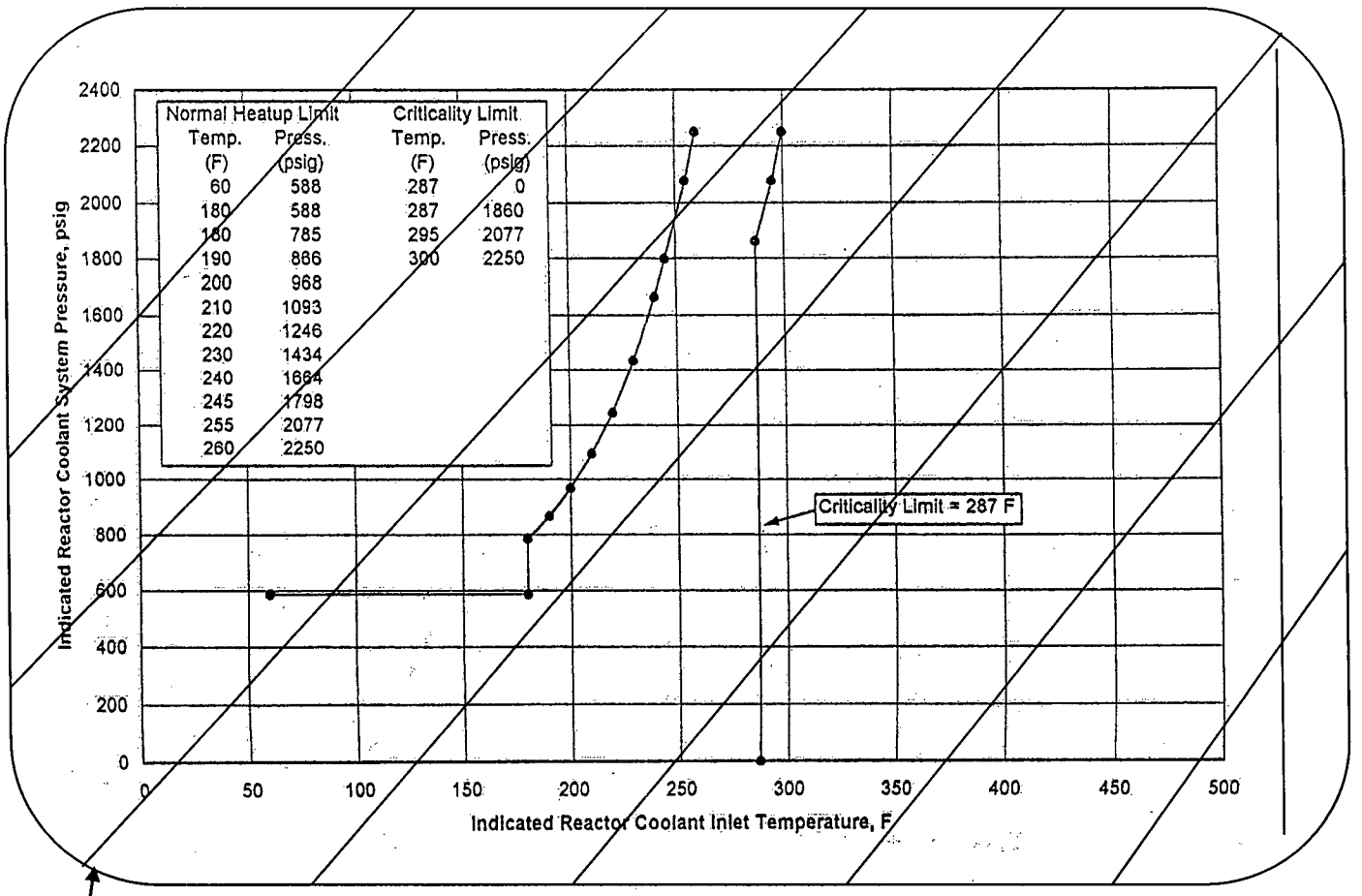
INSERT F

Figure 3.4.3-6 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 2

54

INSERT F


ISLH Composite (HU/CD) Curve
ISLH Composite
Temp. (°F) Press. (psig)
60 557
105 557
110 614
115 753
120 763
170 763
170 1065
190 1316
210 1643
225 1958
240 2382
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
Indicated RCS Inlet Temperature, °F



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

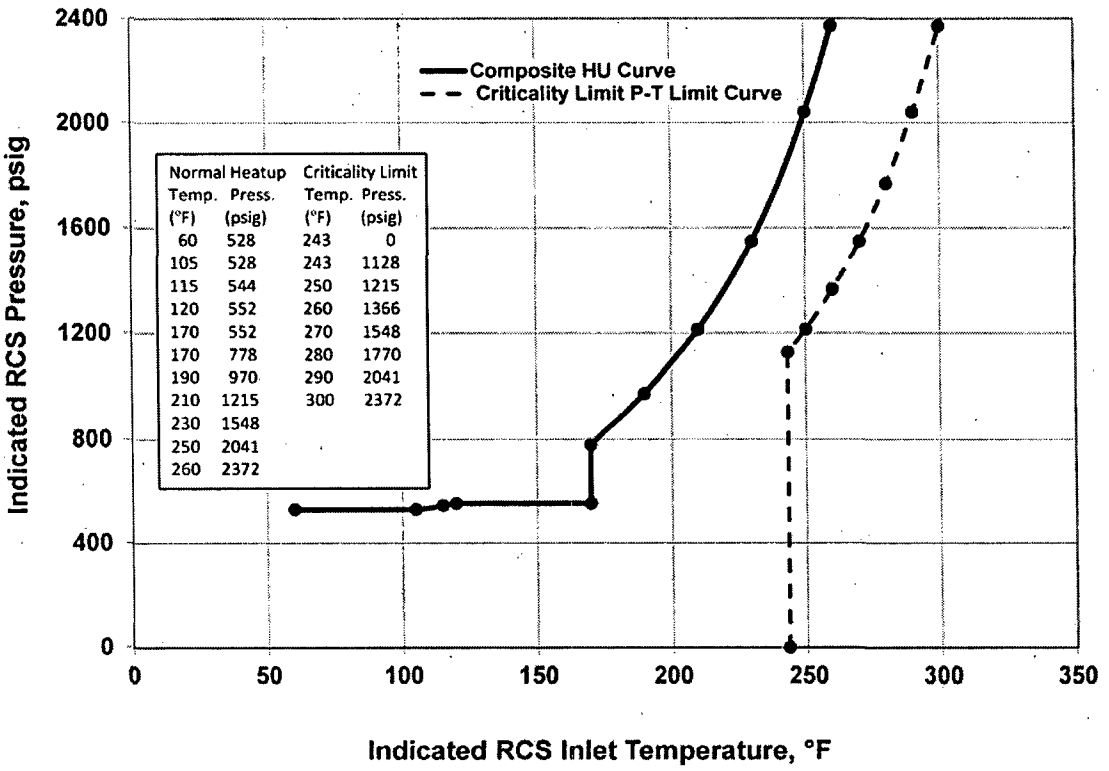
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

INSERT G

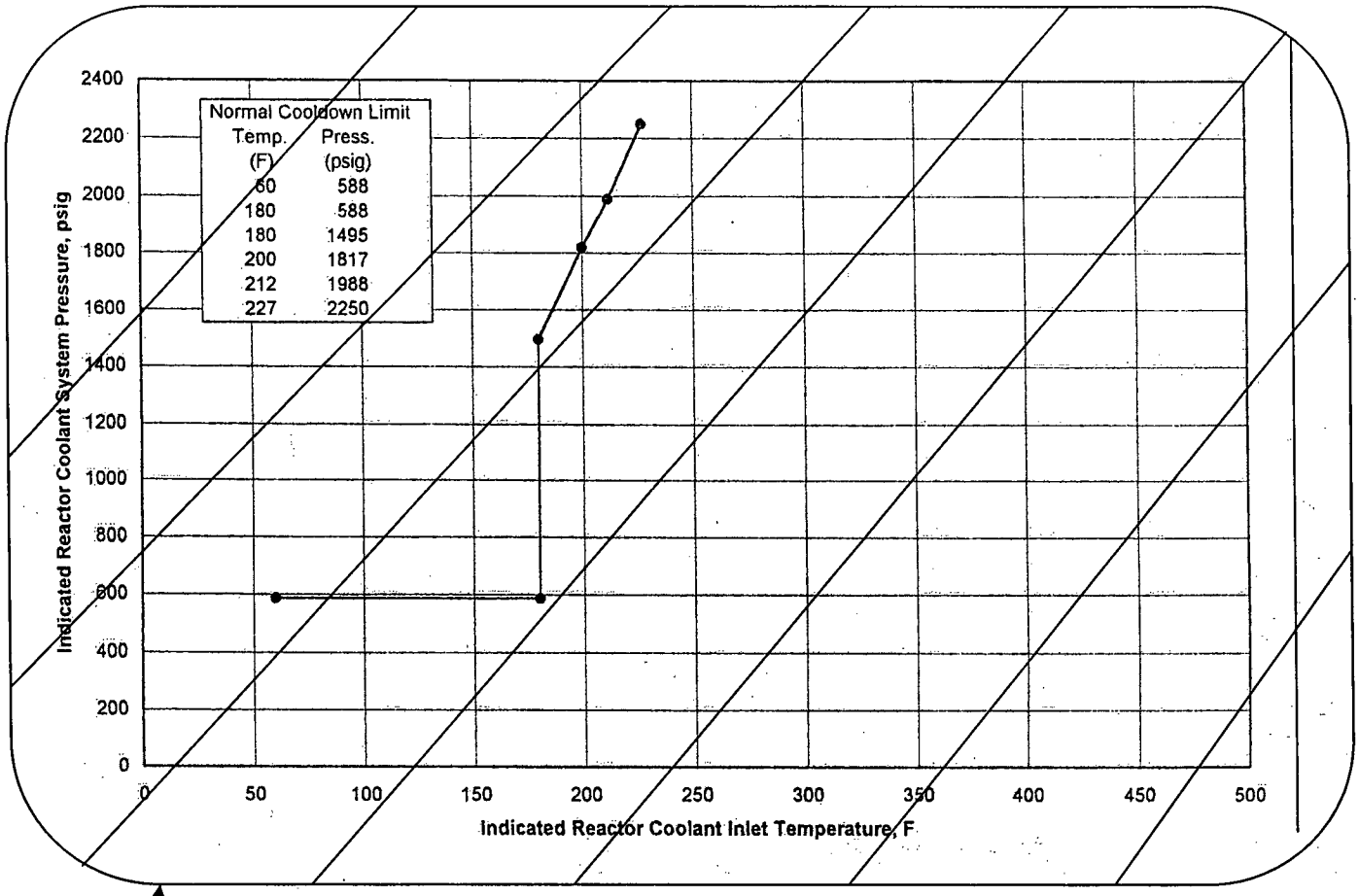
Figure 3.4.3-7 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 3

54

INSERT G



Normal Heatup		Criticality Limit	
Temp. (°F)	Press. (psig)	Temp. (°F)	Press. (psig)
60	528	243	0
105	528	243	1128
115	544	250	1215
120	552	260	1366
170	552	270	1548
170	778	280	1770
190	970	290	2041
210	1215	300	2372
230	1548		
250	2041		
260	2372		



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

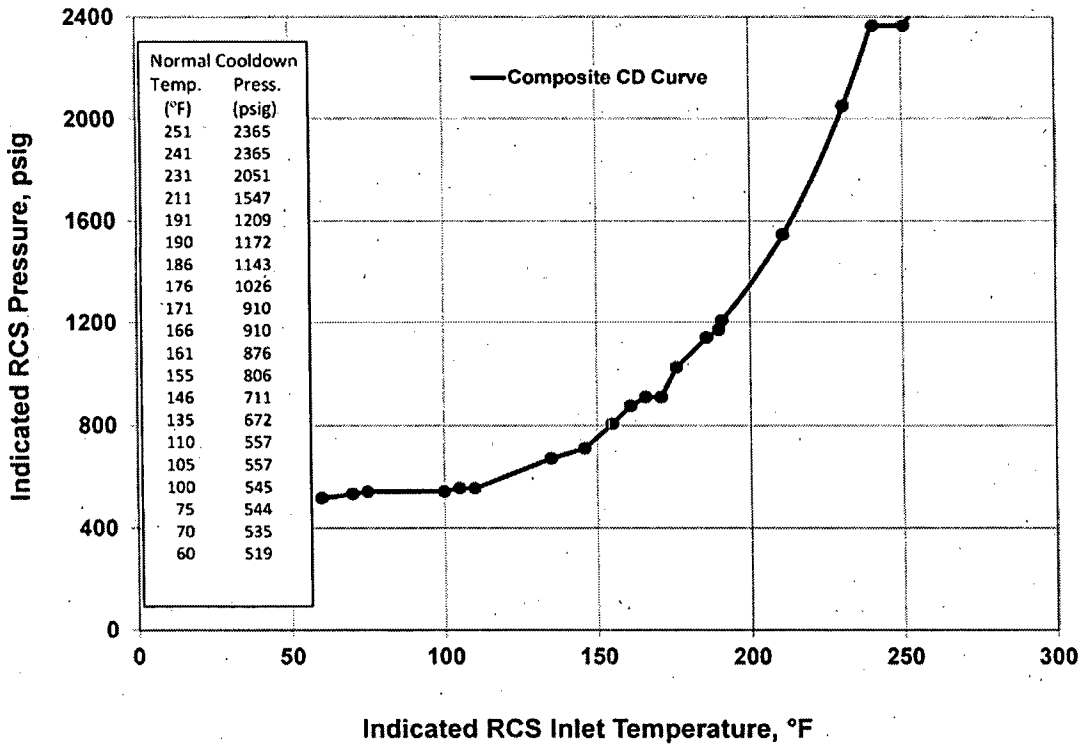
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

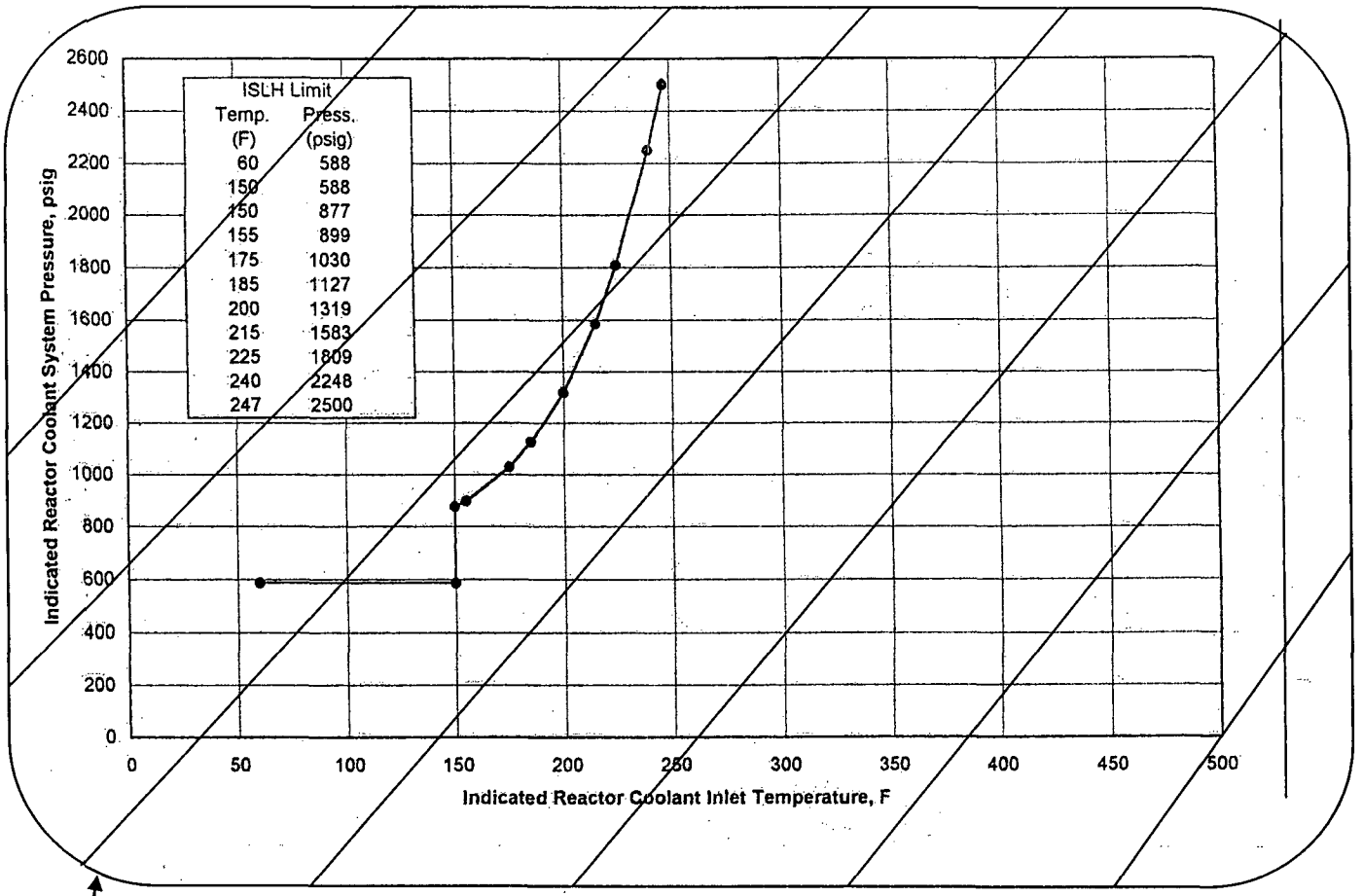
INSERT H

Figure 3.4.3-8 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 3

54

INSERT H


Normal Cooldown
Temp. (°F) Press. (psig)
251 2365
241 2365
231 2051
211 1547
191 1209
190 1172
186 1143
176 1026
171 910
166 910
161 876
155 806
146 711
135 672
110 557
105 557
100 545
75 544
70 535
60 519
Composite CD Curve
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
Indicated RCS Inlet Temperature, °F



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

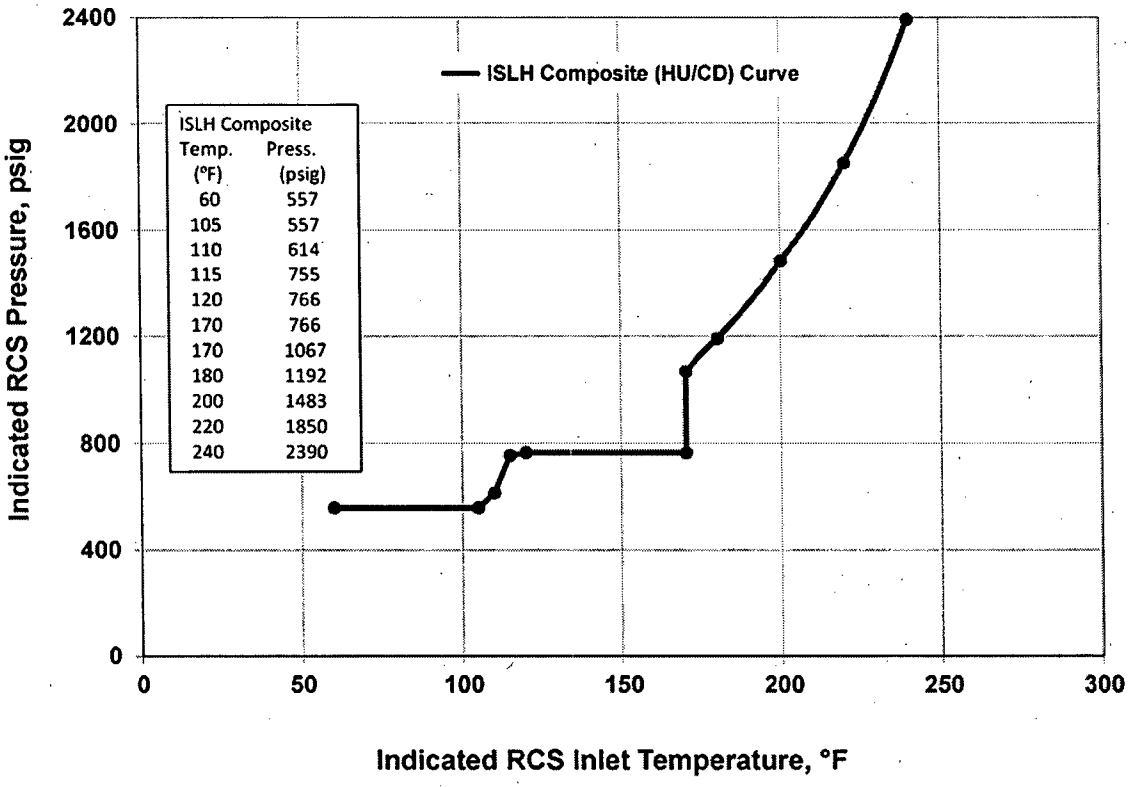
Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

INSERT I

Figure 3.4.3-9 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First ~~33~~ EFPY - Oconee Nuclear Station Unit 3

54

INSERT I


ISLH Composite (HU/CD) Curve
ISLH Composite
Temp. (°F) Press. (psig)
60 557
105 557
110 614
115 755
120 766
170 766
170 1067
180 1192
200 1483
220 1850
240 2390
Indicated RCS Pressure, psig
2400
2000
1600
1200
800
400
0
0
50
100
150
200
250
300
Indicated RCS Inlet Temperature, °F

License Amendment Request No. 2012-10
February 22, 2012

ATTACHMENT 2

TECHNICAL SPECIFICATION

RETYPE

Table 3.4.3-1 (page 1 of 1)
Operational Requirements for Unit Heatup

CONSTRAINT	RC TEMPERATURE[a]	HEATUP RATE	ALLOWED PUMP COMBINATION
RC Temperature[a]	T < 270°F	≤ 30°F in any ½ hr period	NA
	T ≥ 270°F	≤ 50°F in any ½ hr period	NA
RC Pumps	T < 100°F	N/A	No pumps
	100°F ≤ T < 300°F	NA	≤ two pumps
	T ≥ 300°F	NA	Any

(a) RC Temperature is cold leg temperature if one or more RC pumps are in operation; otherwise it is the LPI cooler outlet temperature.

Table 3.4.3-2 (page 1 of 1)
Operational Requirements for Unit Cooldown

CONSTRAINT	RC TEMPERATURE[a]	COOLDOWN RATE[b]	ALLOWED PUMP COMBINATION
RC Temperature[a]	T ≥ 270°F	≤ 50°F in any 1/2 hour period	NA
	140°F ≤ T < 270°F	≤ 25°F in any 1/2 hour period	NA
	T< 140°F	≤ 50°F in any one hour period	NA
	RCS depressurized[c]	≤ 50°F in any one hour period	NA
RC Pumps	T ≥ 300°F	NA	Any
	100°F ≤ T < 300°F	NA	≤ two pumps
	T < 100°F	NA	No pumps

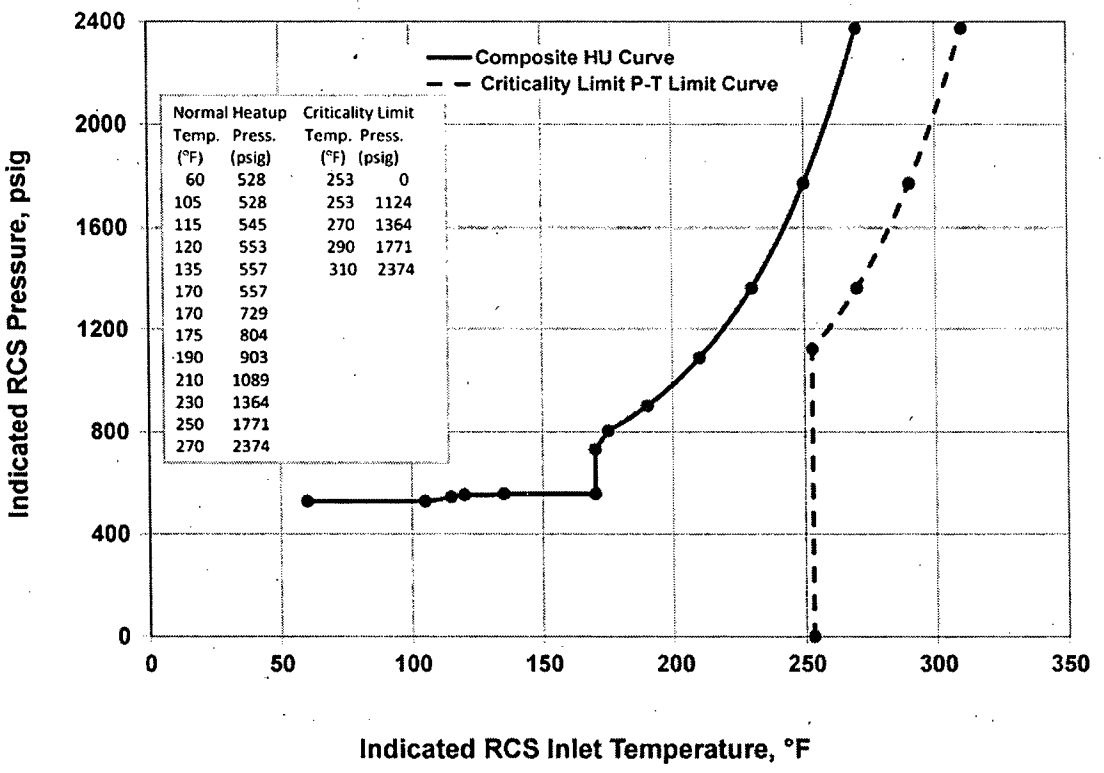
(a) RC Temperature is cold leg temperature if one or more RC pumps are in operation or if on natural circulation cooldown; otherwise it is the LPI cooler outlet temperature.

(b) These rate limits must be applied to the change in temperature indication from cold leg temperature to LPI cooler outlet temperature per Note (a).

(c) When the RCS is depressurized such that all three of the following conditions exist:

a) RCS temperature < 200°F,
b) RCS pressure < 50 psig,
c) All RC Pumps off,

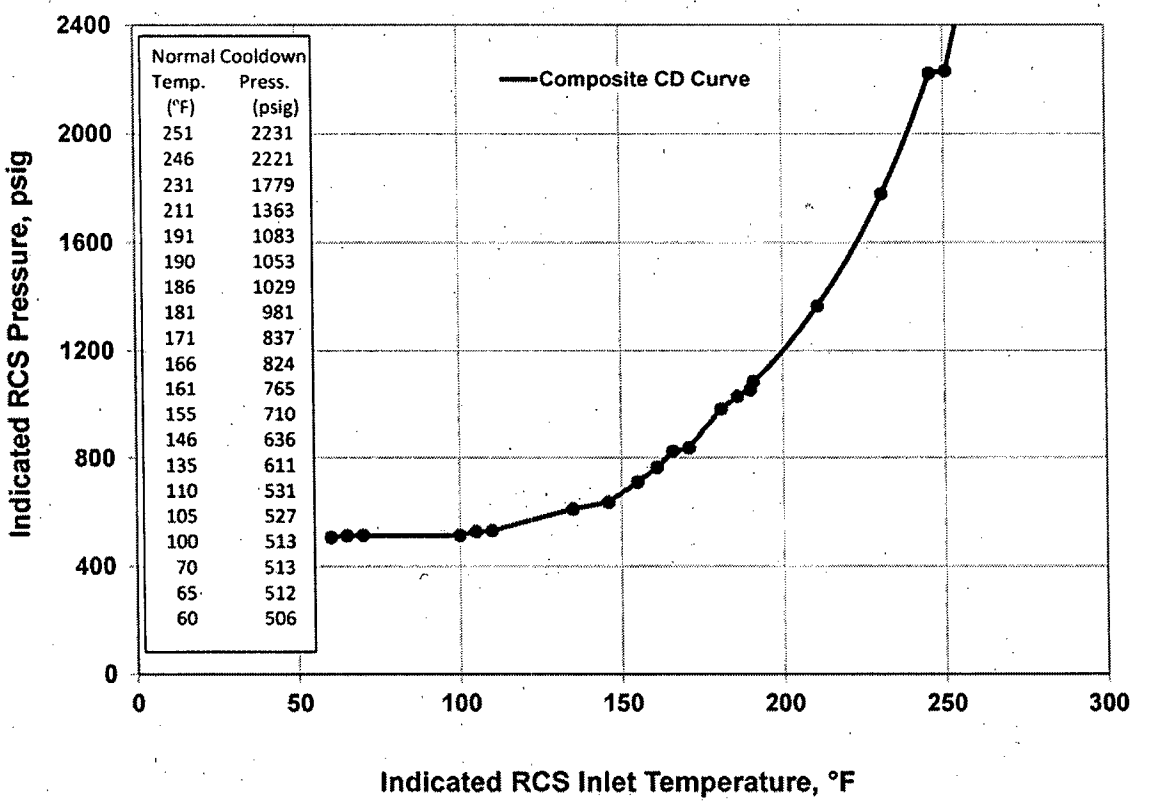
the maximum cooldown rate shall be relaxed to ≤ 50°F in any 1 hour period.



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

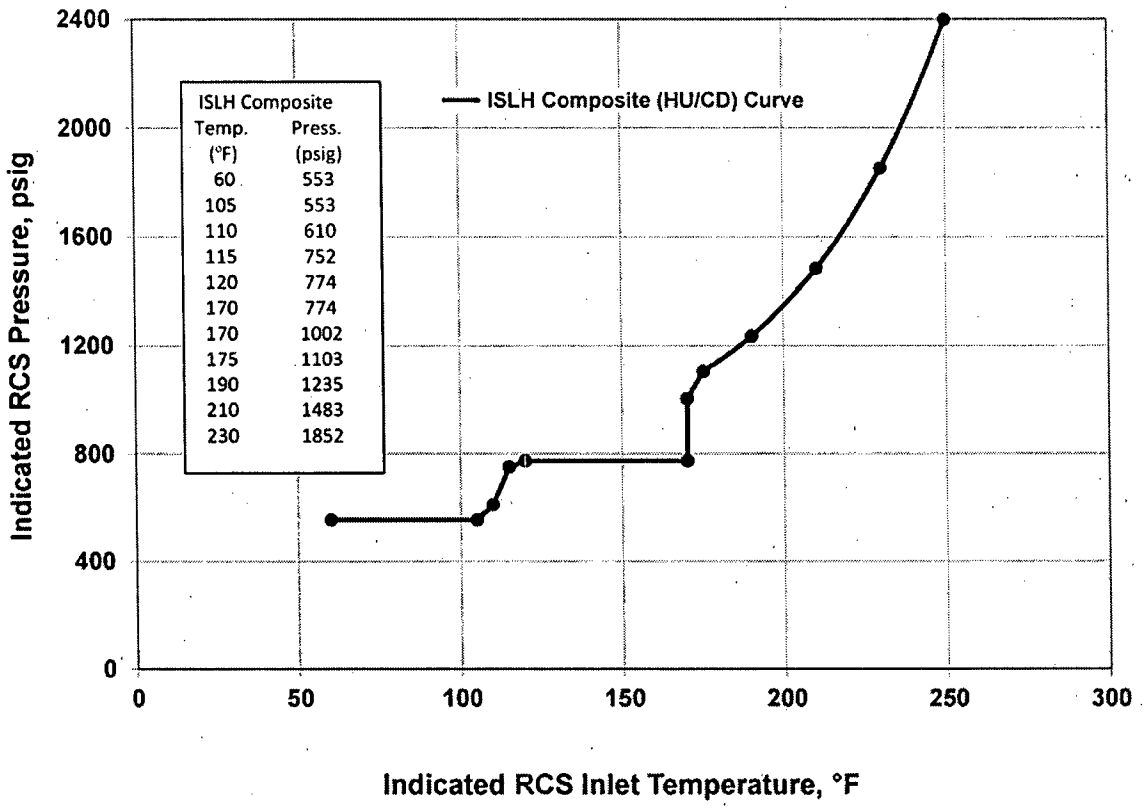
Figure 3.4.3-1 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 1



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

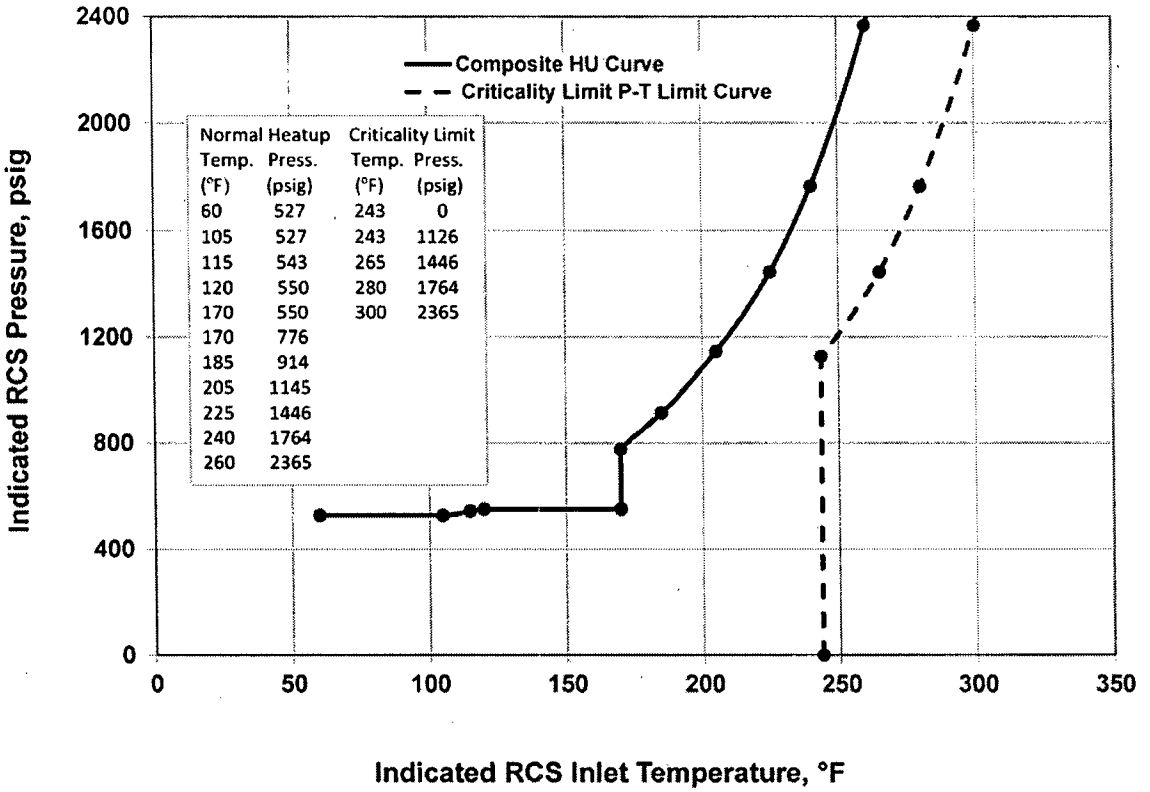
Figure 3.4.3-2 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 1



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

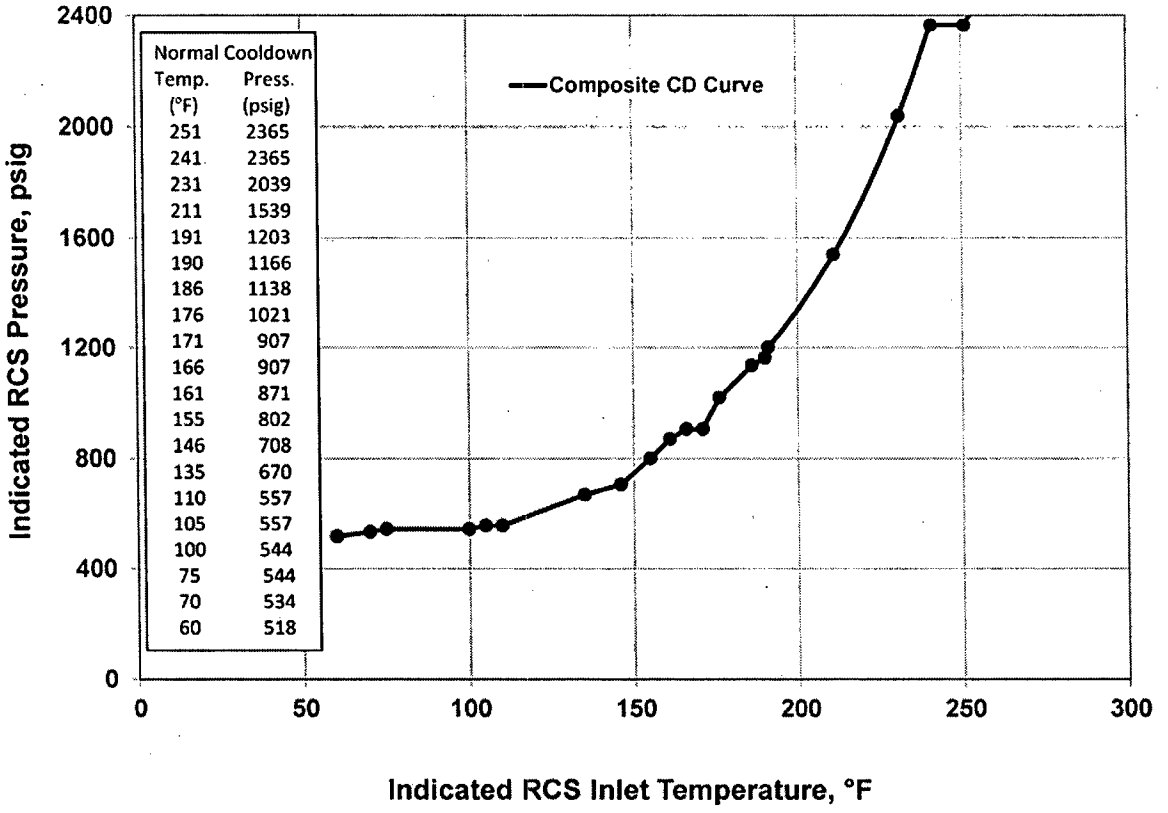
Figure 3.4.3-3 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 1



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

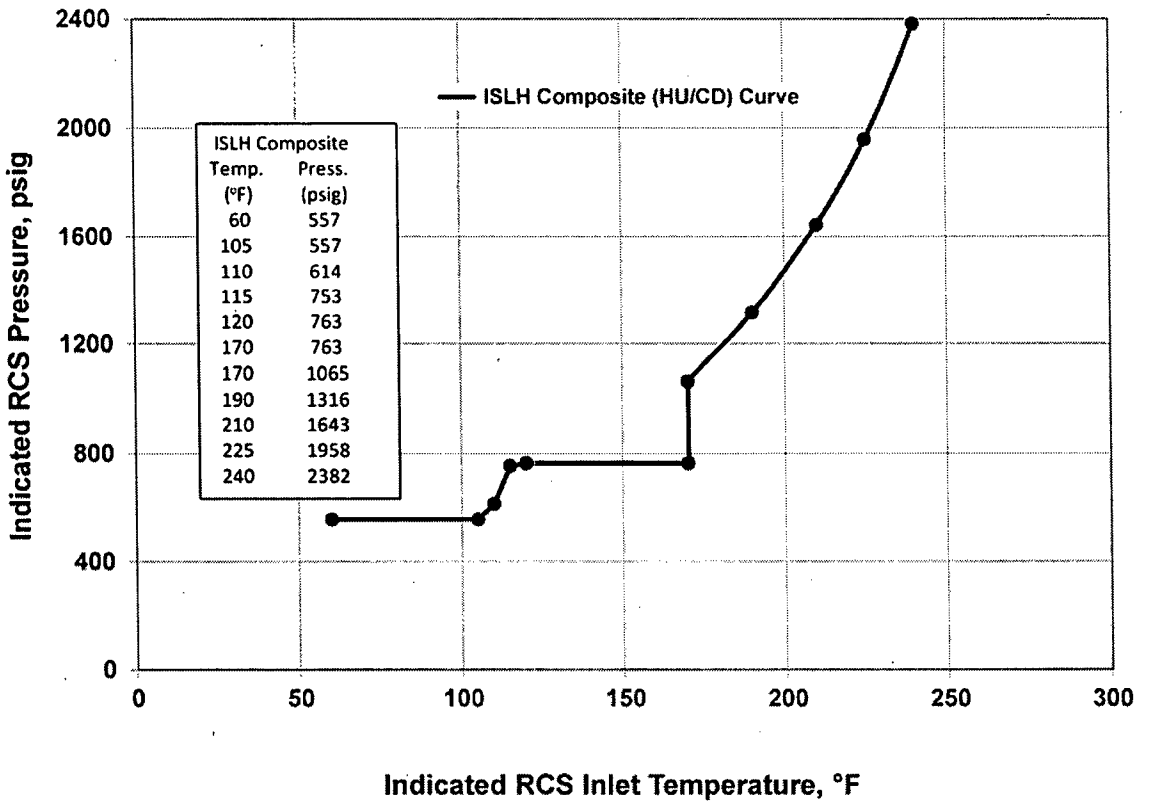
Figure 3.4.3-4 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 2



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

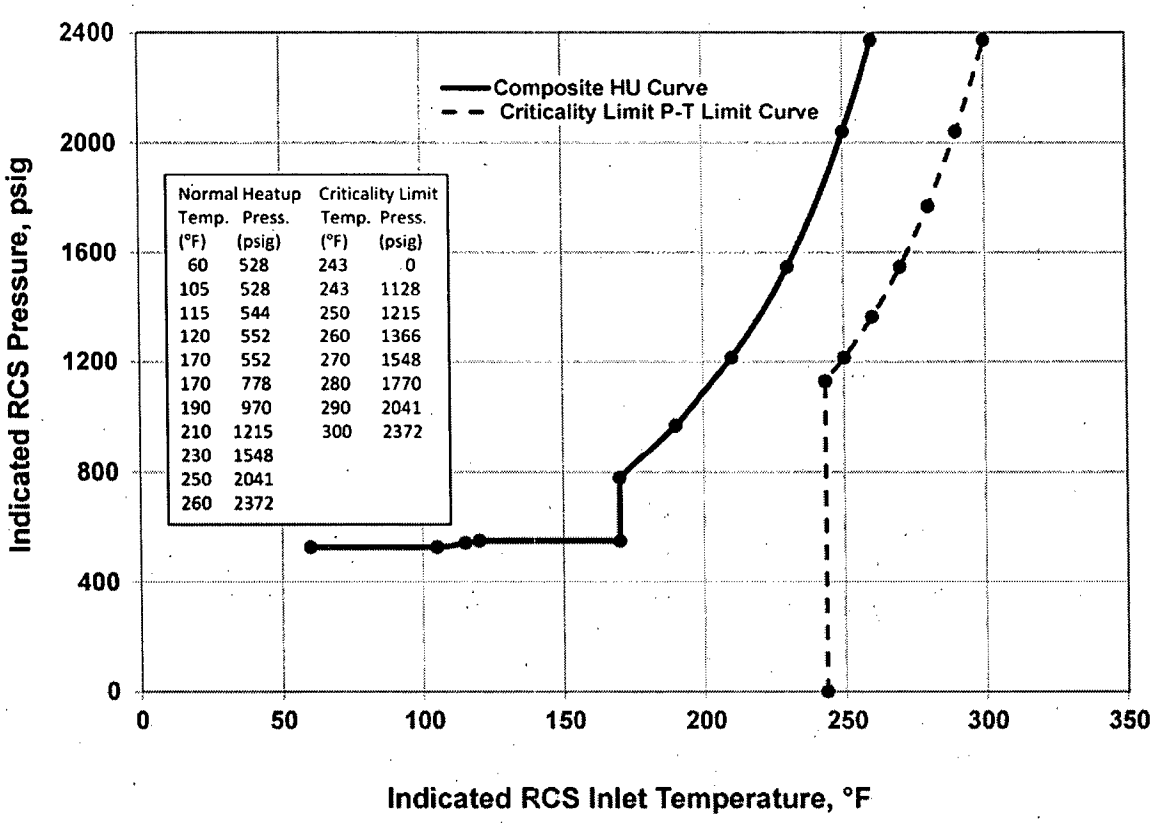
Figure 3.4.3-5 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 2



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

Figure 3.4.3-6 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 2

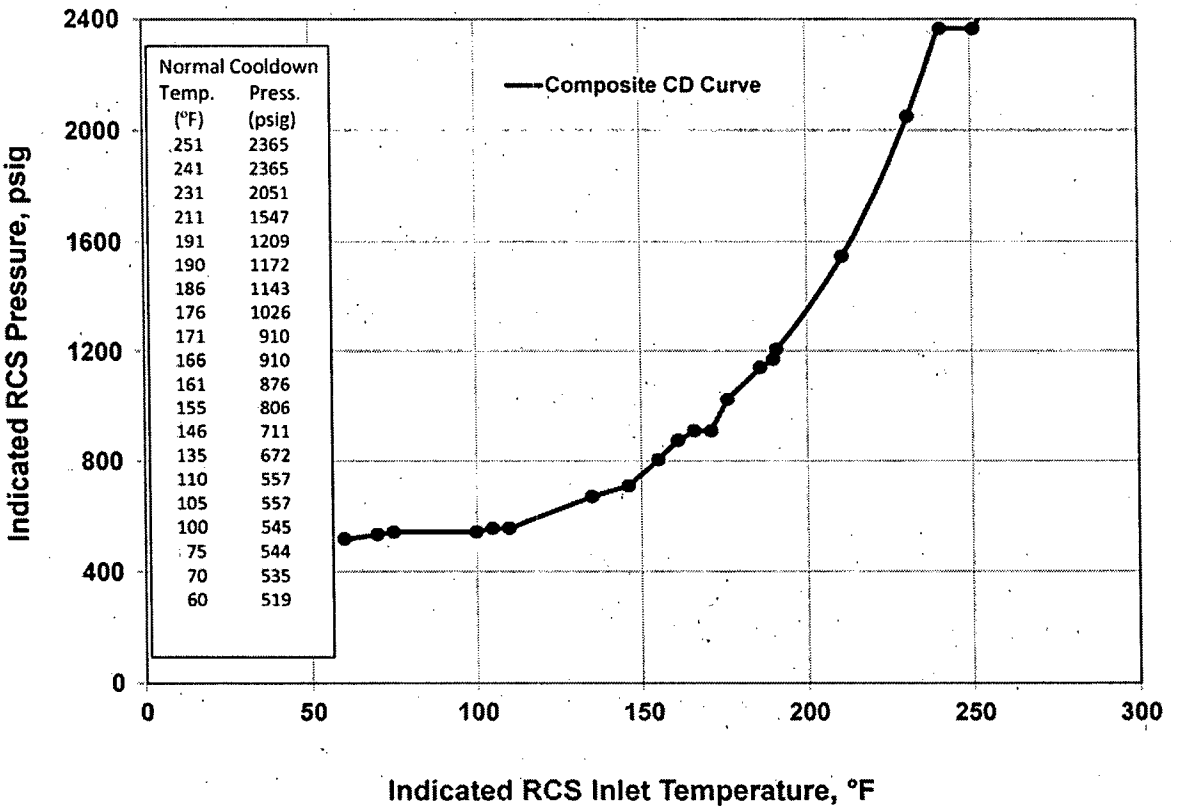


Normal Heatup Temp. (°F)	Normal Heatup Press. (psig)	Criticality Limit Temp. (°F)	Criticality Limit Press. (psig)
60	528	243	0
105	528	243	1128
115	544	250	1215
120	552	260	1366
170	552	270	1548
170	778	280	1770
190	970	290	2041
210	1215	300	2372
230	1548		
250	2041		
260	2372		

The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

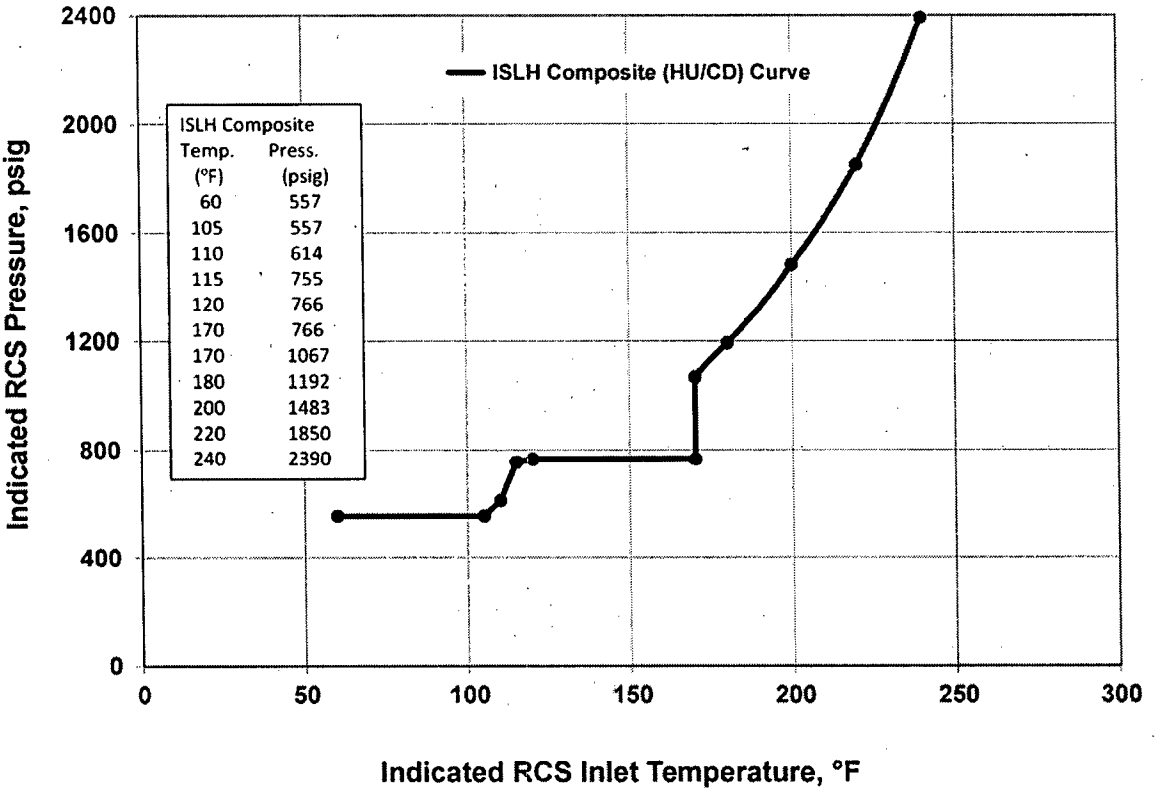
Figure 3.4.3-7 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 3



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

Figure 3.4.3-8 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 3



The regions of acceptable operation are below and to the right of the limit curves. Margins are included for the pressure differential between point of system pressure measurement and the pressure on the reactor vessel region controlling the limit curve. Margins for instrument error are not included.

Note: Heatup and Cooldown rate restrictions and Reactor Coolant Pump combination restrictions during Heatup and Cooldown are required, as identified in text.

Figure 3.4.3-9 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First 54 EFPY - Oconee Nuclear Station Unit 3