March 30, 1999

Mr. William R. McCollum, Jr.
Vice President, Oconee Site
Duke Energy Corporation
P. O. Box 1439
Seneca, SC 29679

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SUBJECT: ISSUANCE OF AMENDMENTS - OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 (TAC NOS. MA3826, MA3827 AND MA3828)

Dear Mr. McCollum:

The Nuclear Regulatory Commission has issued the enclosed Amendment Nos. 302 , 302 , and 302 to Facility Operating Licenses DPR-38, DPR-47, and DPR-55, respectively, for the Oconee Nuclear Station, Units 1, 2, and 3. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated October 15, 1998, supplemented December 17, 1998, and January 11 and 21, 1999.

The amendments revise the heatup, cooldown, and inservice test limitations for the reactor coolant system of each unit to a maximum of 26 effective full-power years. The amendments also revise the TSs for low temperature overpressure protection to reflect the revised pressure-temperature limits of the reactor vessels.

In your original submittal, you included TS page changes in both the Improved TS (ITS) and the current TS formats because implementation was needed at the same time or before ITS implementation was scheduled. This was to ensure that these amendments would be applicable in whichever format was in effect at the time. However, since the ITS has been implemented prior to approval and issuance of these amendments, only changes in the ITS format are addressed by these amendments, per discussion with Mr. Robert Douglas of your staff. In addition, an exemption from 10 CFR Part 50, Appendix G was processed in conjunction with these amendments and issued separately.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

David E. LaBarge, Senior Project Manager
Project Directorate II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

9904090172 990330
PDR ADOCK 05000269
P PDR

Docket Nos. 50-269, 50-270, and 50-287

Enclosures:
1. Amendment No. 302 to DPR-38
2. Amendment No. 302 to DPR-47
3. Amendment No. 302 to DPR-55
4. Safety Evaluation

cc w/encls: See next page

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NAME	D.LABARGE:cn	CHawes	APH	H.BERKOW	
DATE	3/26/99	3/26/99	3/24/99	3/26/99	

*See previous concurrence **OFFICIAL RECORD COPY**

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 30, 1999

Mr. William R. McCollum, Jr.
Vice President, Oconee Site
Duke Energy Corporation
P. O. Box 1439
Seneca, SC 29679

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Sincerely,

David E. LaBarge, Senior Project Manager
Project Directorate II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosures:
1. Amendment No. 302 to DPR-38
2. Amendment No. 302 to DPR-47
3. Amendment No. 302 to DPR-55
4. Safety Evaluation

cc w/encls: See next page

cc:

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Suite 500
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY CORPORATION

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 302
License No. DPR-38

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Oconee Nuclear Station, Unit 1 (the facility) Facility Operating License No. DPR-38 filed by the Duke Energy Corporation (the licensee) dated October 15, 1998, as supplemented December 17, 1998, and January 11 and 21, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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P PDR

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-38 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 302 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 30, 1999

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY CORPORATION

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.302
License No. DPR-47

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Oconee Nuclear Station, Unit 2 (the facility) Facility Operating License No. DPR-47 filed by the Duke Energy Corporation (the licensee) dated October 15, 1998, as supplemented December 17, 1998, and January 11 and 21, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-47 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 302 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 30, 1999

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE ENERGY CORPORATION

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 302
License No. DPR-55

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Oconee Nuclear Station, Unit 3 (the facility) Facility Operating License No. DPR-55 filed by the Duke Energy Corporation (the licensee) dated October 15, 1998, as supplemented December 17, 1998, and January 11 and 21, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-55 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 302 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: March 30, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 302

FACILITY OPERATING LICENSE NO. DPR-38

DOCKET NO. 50-269

TO LICENSE AMENDMENT NO. 302

FACILITY OPERATING LICENSE NO. DPR-47

DOCKET NO. 50-270

AND

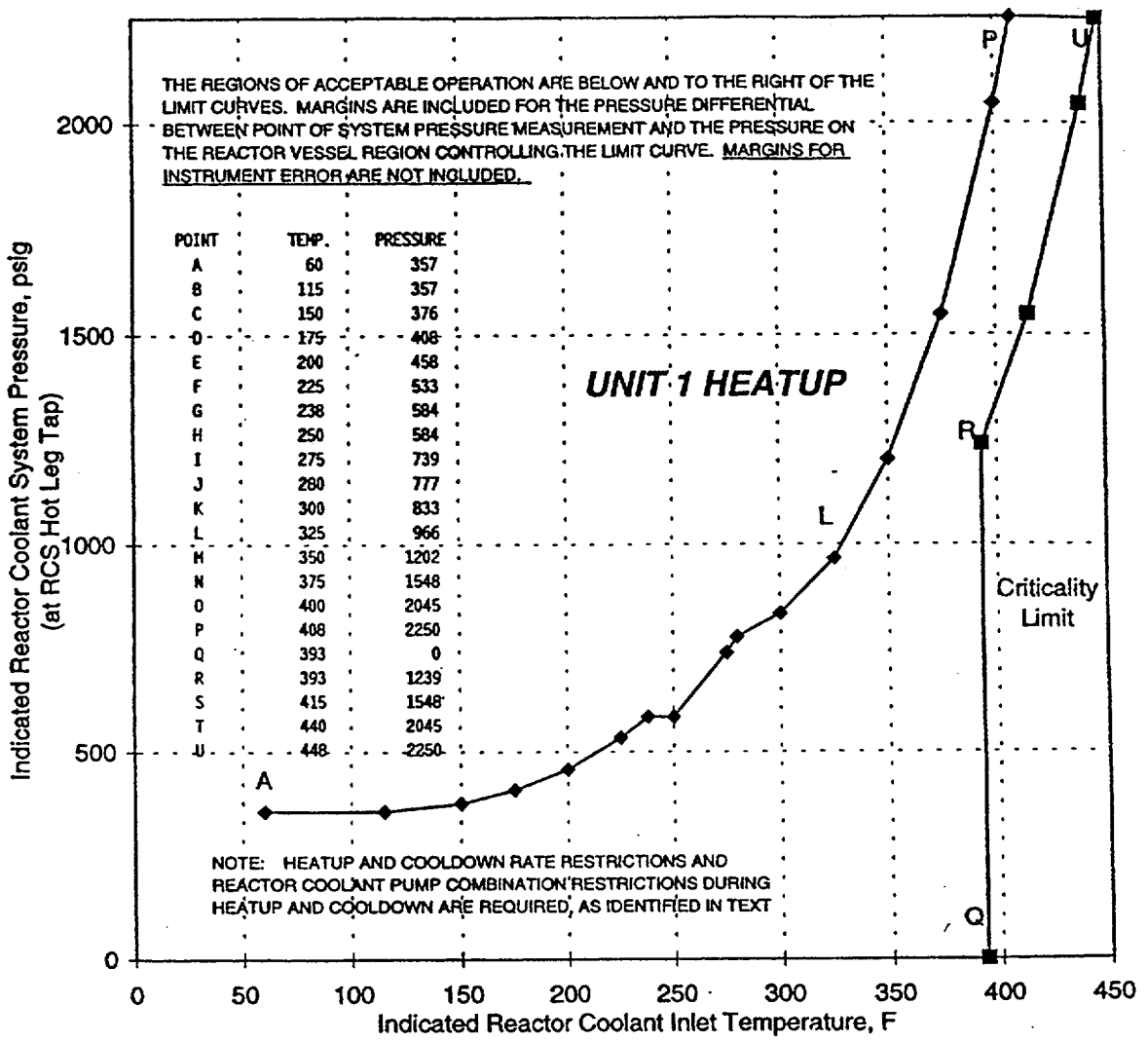
TO LICENSE AMENDMENT NO. 302

FACILITY OPERATING LICENSE NO. DPR-55

DOCKET NO. 50-287

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

Remove	Insert
3.4.3-5	3.4.3-5
3.4.3-6	3.4.3-6
3.4.3-7	3.4.3-7
3.4.3-8	3.4.3-8
3.4.3-9	3.4.3-9
3.4.3-10	3.4.3-10
3.4.3-11	3.4.3-11
3.4.3-12	3.4.3-12
3.4.3-13	3.4.3-13
3.4.12-1	3.4.12-1
3.4.12-5	3.4.12-5
B 3.4.12-1	B 3.4.12-1
B 3.4.12-2	B 3.4.12-2
B 3.4.12-3	B 3.4.12-3
B 3.4.12-4	B 3.4.12-4
B 3.4.12-5	B 3.4.12-5
B 3.4.12-6	B 3.4.12-6
B 3.4.12-7	B 3.4.12-7
B 3.4.12-8	B 3.4.12-8
B 3.4.12-9	B 3.4.12-9
B 3.4.12-10	B 3.4.12-10
B 3.4.12-11	B 3.4.12-11
B 3.4.12-12	B 3.4.12-12



POINT	TEMP.	PRESSURE
A	60	357
B	115	357
C	150	376
D	175	408
E	200	458
F	225	533
G	238	584
H	250	584
I	275	739
J	280	777
K	300	833
L	325	966
M	350	1202
N	375	1548
O	400	2045
P	408	2250
Q	393	0
R	393	1239
S	415	1548
T	440	2045
U	448	2250

Figure 3.4.3-1 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 1

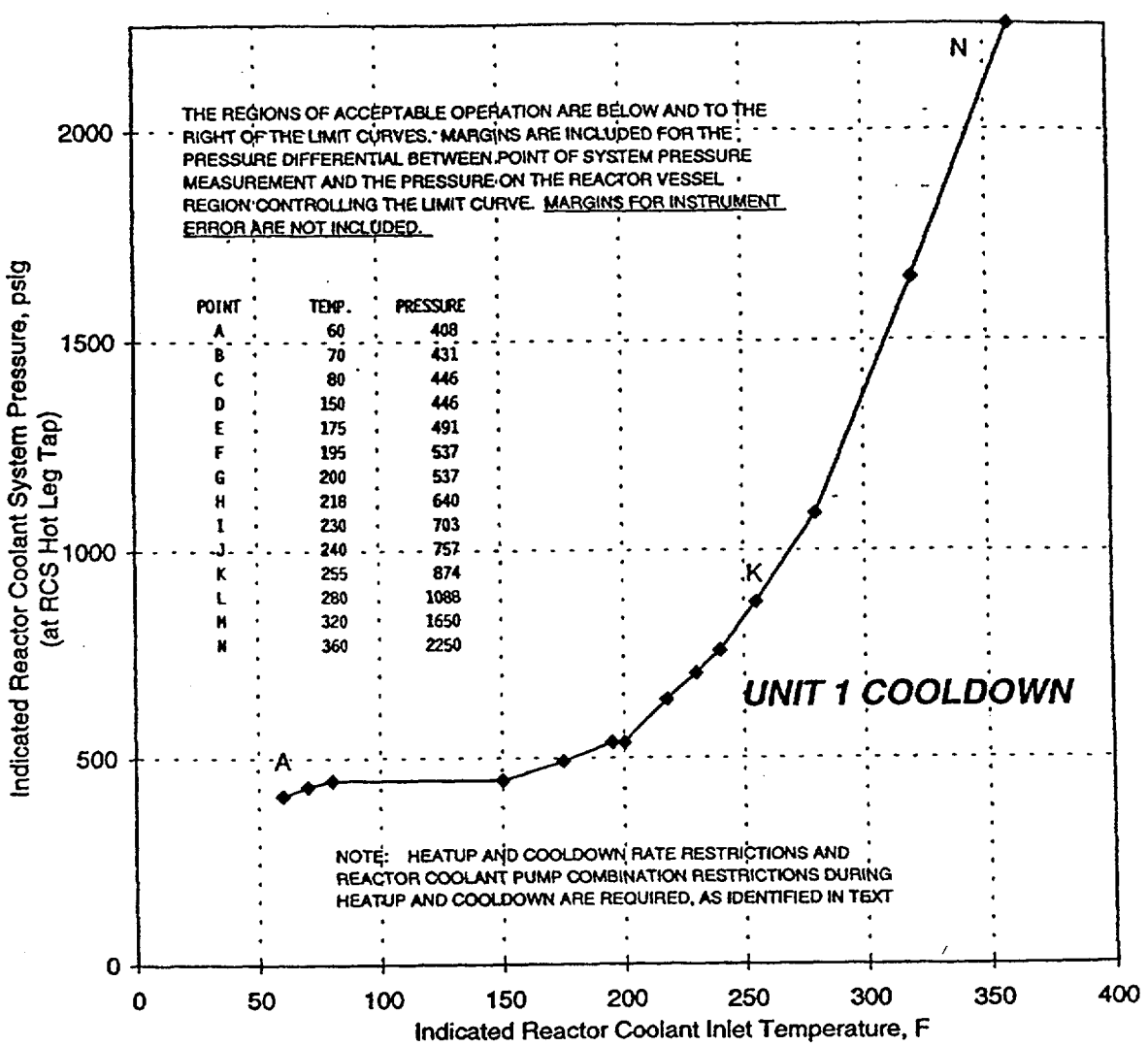


Figure 3.4.3-2 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 1

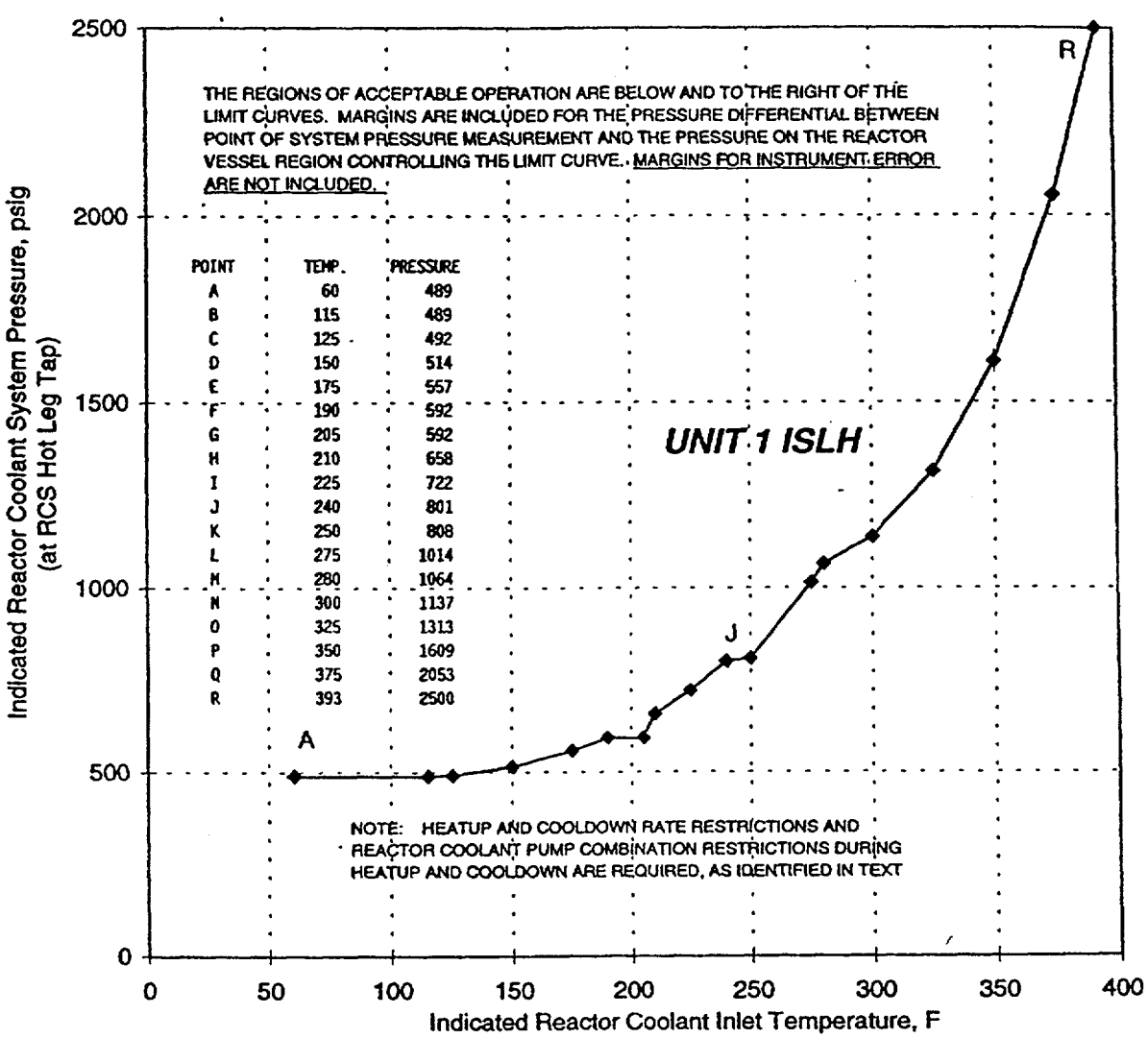
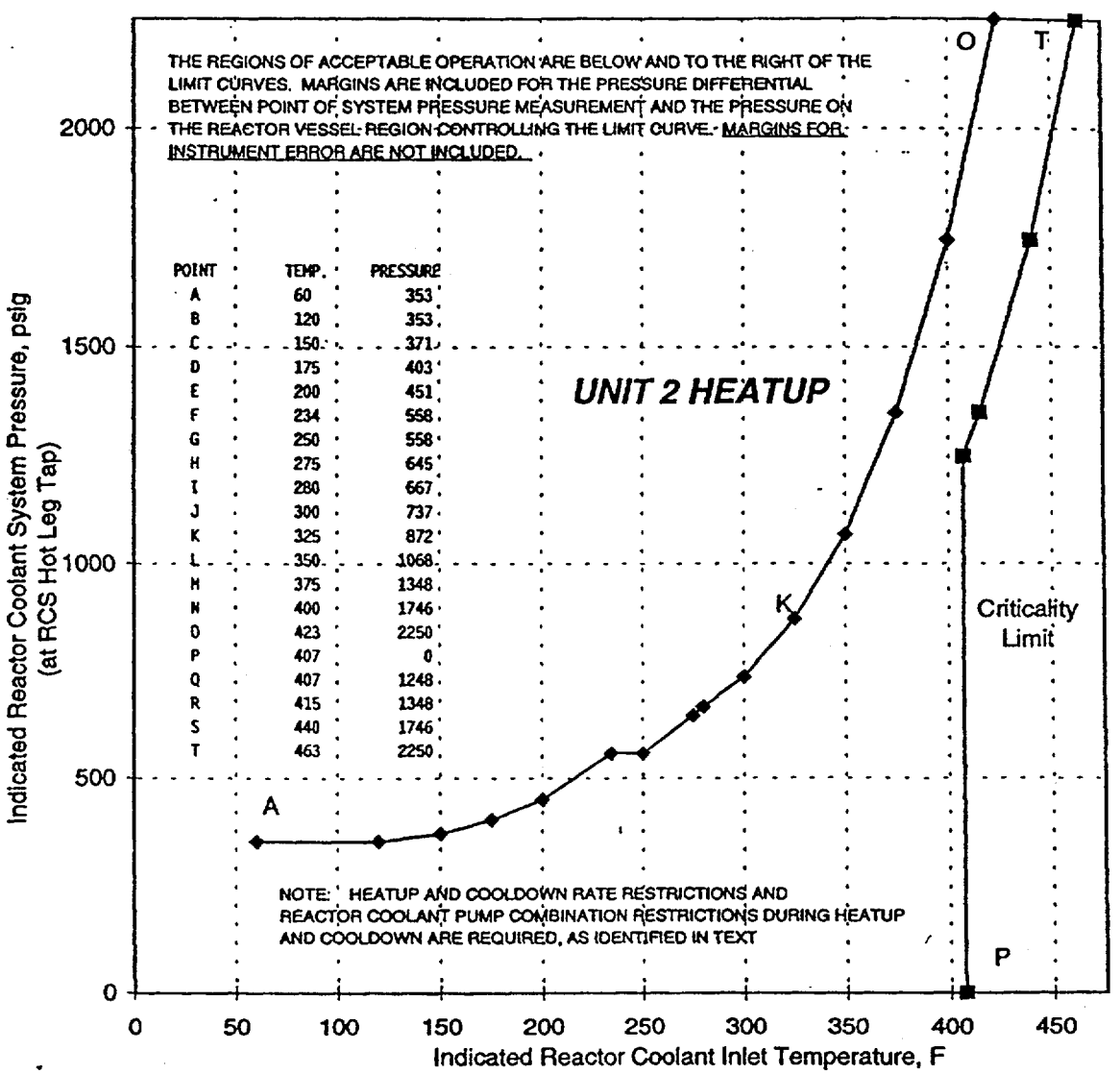


Figure 3.4.3-3 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 1



POINT	TEMP.	PRESSURE
A	60	353
B	120	353
C	150	371
D	175	403
E	200	451
F	234	558
G	250	558
H	275	645
I	280	667
J	300	737
K	325	872
L	350	1068
M	375	1348
N	400	1746
O	423	2250
P	407	0
Q	407	1248
R	415	1348
S	440	1746
T	463	2250

Figure 3.4.3-4 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 2

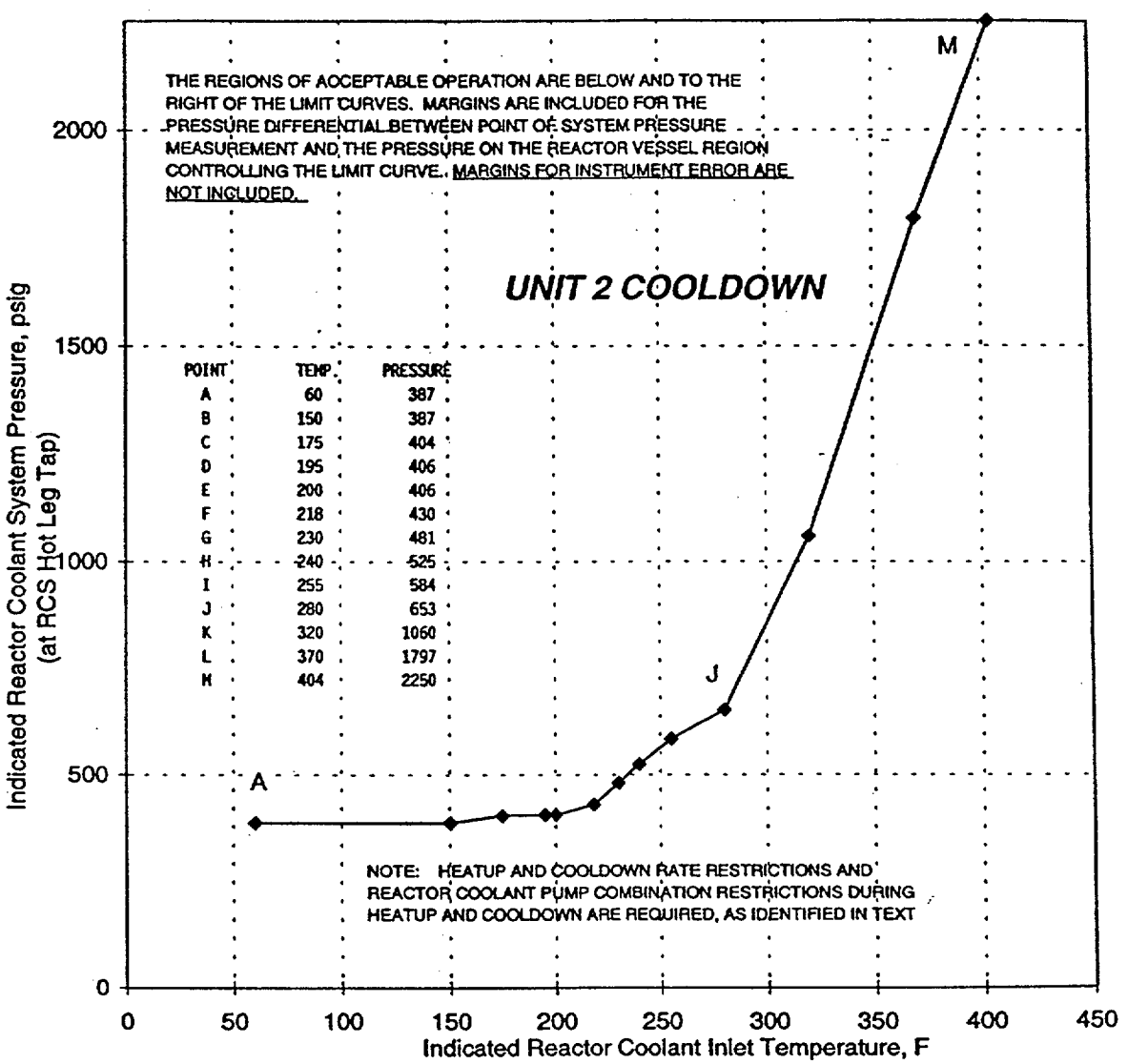


Figure 3.4.3-5 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 2

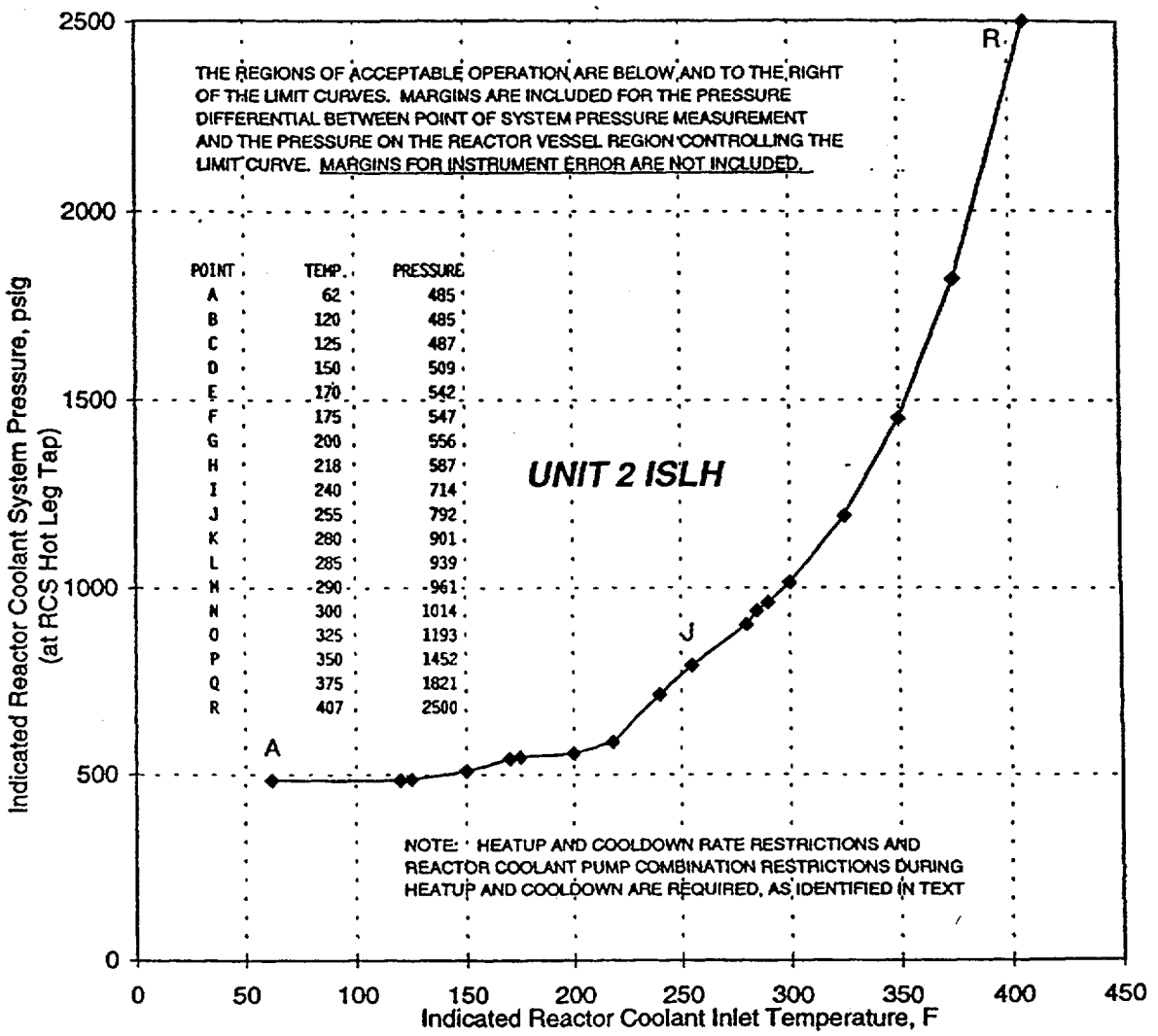
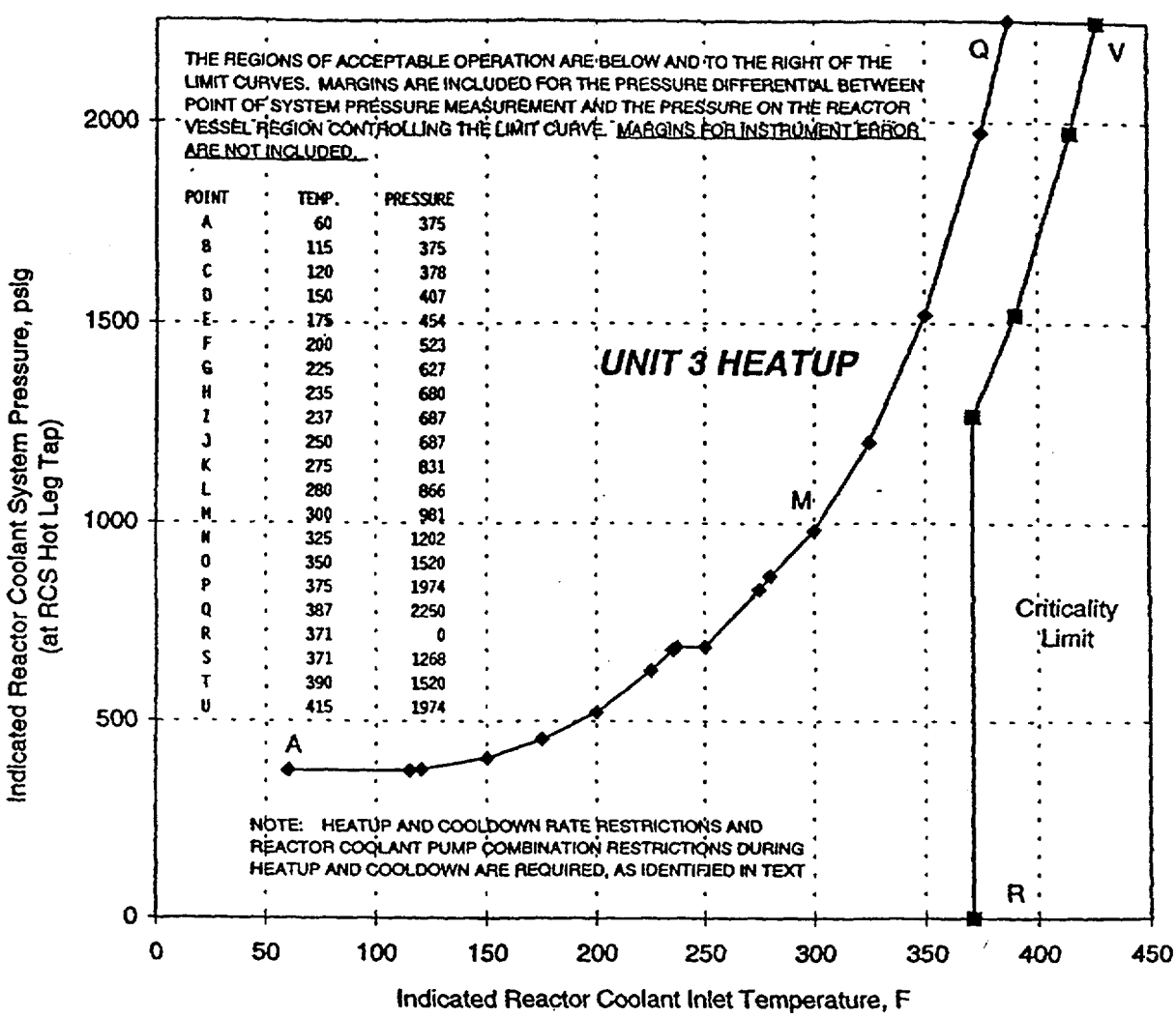


Figure 3.4.3-6 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 2



POINT	TEMP.	PRESSURE
A	60	375
B	115	375
C	120	378
D	150	407
E	175	454
F	200	523
G	225	627
H	235	680
I	237	687
J	250	687
K	275	831
L	280	866
M	300	981
N	325	1202
O	350	1520
P	375	1974
Q	387	2250
R	371	0
S	371	1268
T	390	1520
U	415	1974

Figure 3.4.3-7 (page 1 of 1)
RCS Normal Operational Heatup Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 3

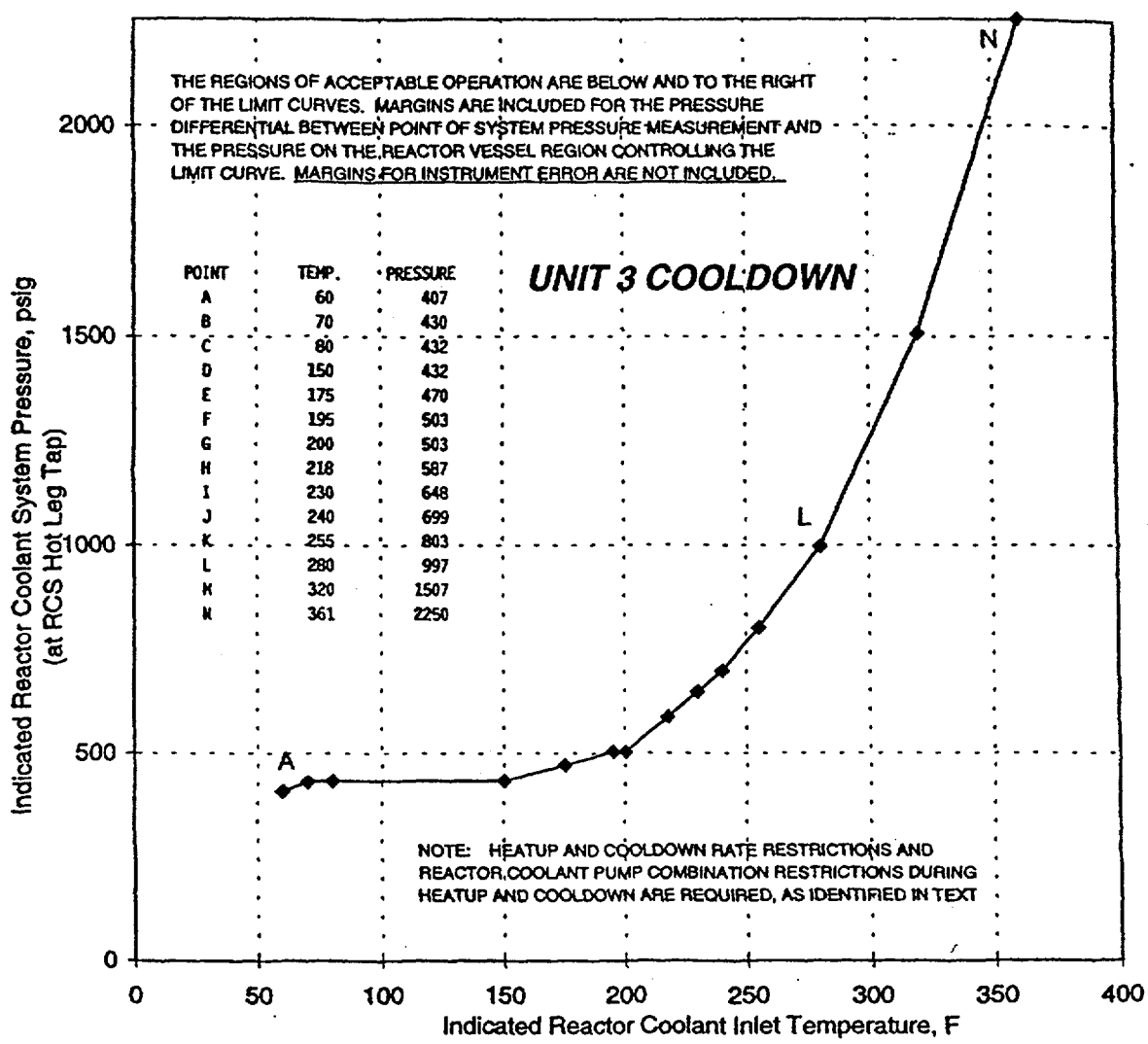


Figure 3.4.3-8 (page 1 of 1)
RCS Normal Operational Cooldown Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 3

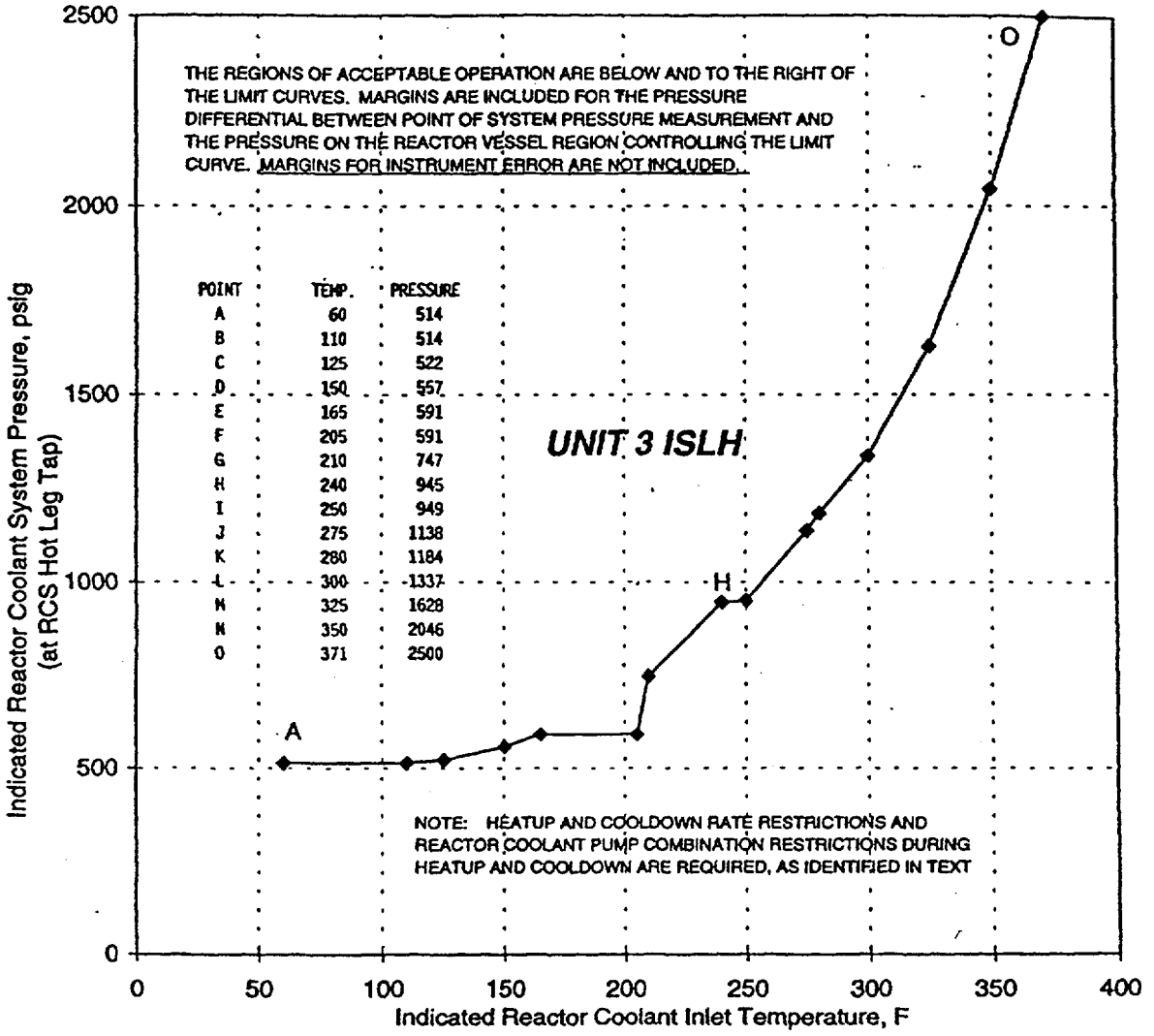


Figure 3.4.3-9 (page 1 of 1)
RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations
Applicable for the First 26 EFPY - Oconee Nuclear Station Unit 3

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with high pressure injection (HPI) deactivated, and the core flood tanks (CFTs) isolated and:

a. An OPERABLE power operated relief valve (PORV) with a lift setpoint of ≤ 460 psig; and

b. Administrative controls implemented that assure ≥ 10 minutes are available for operator action to mitigate an LTOP event.

APPLICABILITY: MODE 3 when any RCS cold leg temperature is ≤ 325°F, MODES 4, 5, and 6 when an RCS vent path capable of mitigating the most limiting LTOP event is not open.

----------NOTES----------

1. CFT isolation is only required when CFT pressure is greater than or equal to the maximum RCS pressure for the existing RCS temperature allowed by the pressure and temperature limit curves provided in Specification 3.4.3.

2. The PORV is not required to be OPERABLE when no HPI pumps are running and RCS pressure < 100 psig.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.12.6	Verify Administrative Controls, other than limits for pressurizer level, that assure ≥ 10 minutes are available for operator action to mitigate an LTOP event are implemented for the following: a. RCS pressure when RCS temperature is < 325°F; b. Makeup flow rate; c. Alarms; d. High pressure Nitrogen System; and e. Verify pressurizer heater bank 3 or 4 is deactiviated.	12 hours
SR 3.4.12.7	Perform CHANNEL CALIBRATION for PORV.	18 months

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.12 Low Temperature Overpressure Protection (LTOP) System

BASES

BACKGROUND

The LTOP System limits RCS pressure at low temperatures so the integrity of the reactor coolant pressure boundary (RCPB) is not compromised by violating the pressure and temperature (P/T) requirements of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for providing such protection. LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," provides the allowable combinations for operational pressure and temperature during cooldown, shutdown, and heatup to keep from violating the Reference 1 limits.

The reactor vessel material is less ductile at reduced temperatures than at normal operating temperature. Also, as vessel neutron irradiation accumulates, the material becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure must be maintained low when temperature is low and may be increased only as temperature is increased.

Operational maneuvering during cooldown, heatup, or related anticipated transients must be controlled to not violate LCO 3.4.3. Exceeding these limits could lead to brittle fracture of the reactor vessel. LCO 3.4.3 presents requirements for administrative control of RCS pressure and temperature to prevent exceeding the P/T limits.

This LCO provides RCS overpressure protection in the applicable MODES by ensuring an adequate pressure relief capacity and a limit on coolant addition capability. The pressure relief capacity requires the power operated relief valve (PORV) lift setpoint to be reduced and administrative controls implemented which assure ≥ 10 minutes available for operator action to mitigate an LTOP event. The administrative controls include limits on pressurizer level, limits on RCS pressure when RCS temperature is < 325°F, limits on RCS makeup flow, the number of available pressurizer heater banks, requirements for alarms and restrictions upon use of the High Pressure Nitrogen System.

(continued)

BASES

BACKGROUND (continued)

The LTOP approach to protecting the vessel by limiting coolant addition capability requires administrative controls upon RCS makeup flow, the number of available pressurizer heater banks, and requires deactivating HPI, and isolating the core flood tanks (CFTs).

Should an HPI pump inject on an HPI actuation, the pressurizer level and PORV may not prevent overpressurizing the RCS.

The administrative controls upon pressurizer level provides a compressible vapor space or cushion (either steam or nitrogen) that can accommodate a coolant insurge and prevent a rapid pressure increase, allowing the operator time to stop the increase. The PORV, with reduced lift setting, is the overpressure protection device that acts as backup to the operator in terminating an increasing pressure event.

With HPI deactivated, the ability to provide RCS coolant addition is restricted. To balance the possible need for coolant addition, the LCO does not require the makeup system to be deactivated. Due to the lower pressures associated with the LTOP MODES and the expected decay heat levels, the makeup system can provide flow with the HPI pumps providing RCS makeup through the makeup control valve.

PORV Requirements

As required for the LTOP, the PORV is signaled to open if the RCS pressure approaches a limit set in the LTOP actuation circuit. The LTOP actuation circuit monitors RCS pressure and determines when an overpressure condition is approached. When the monitored pressure meets or exceeds the setting, the PORV is signaled to open. Maintaining the setpoint within the limits of the LCO ensures the Reference 1 limits will be met in any event analyzed for LTOP.

When a PORV is opened in an increasing pressure transient, the release of coolant causes the pressure increase to slow and reverse. As the PORV releases steam, the RCS pressure decreases until a reset pressure is reached and the valve is

(continued)

BASES

BACKGROUND (continued)

signaled to close. The pressure continues to decrease below the reset pressure as the valve closes.

Administrative Control Requirements

Administrative controls are necessary to assure the operator has at least ten minutes available to mitigate the most limiting LTOP event. These administrative controls include the following:

1) Limits on RCS pressure based on RCS temperature;

2) Limits upon pressurizer level;

3) Limits upon makeup flow capability;

4) OPERABLE Alarms;

5) Controls upon use of the High Pressure Nitrogen System; and

6) Restricting the number of available pressurizer heater banks.

Limiting RCS pressure based on RCS temperature provides a minimum margin to the RCS P/T limit. Restricting RCS makeup flow capability and pressurizer level and controls on the use of high pressure nitrogen limit the pressurization rate during an LTOP event. Restricting the number of available pressurizer heater banks limits the pressurization rate during an LTOP event. Alarms ensure early operator recognition of the occurrence of an LTOP event. The combination of minimum margin to the limit, limited pressurization rate and OPERABLE alarms ensure ten minutes are available for operator action to mitigate an LTOP event.

APPLICABLE SAFETY ANALYSES

Safety analyses (Ref. 3) demonstrate that the reactor vessel can be adequately protected against overpressurization transients during shutdown. In MODES 1, 2, and in MODE 3 with RCS temperature exceeding 325°F, the pressurizer safety valves will prevent RCS pressure from exceeding the

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Reference 1 limits. At nominally 325°F and below, overpressure prevention falls to an OPERABLE PORV, a restricted coolant level in the pressurizer and other administrative controls.

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as vessel material toughness decreases due to neutron embrittlement. Each time the P/T limit curves are revised, the LTOP System will be re-evaluated to ensure that its functional requirements can still be met with the PORV and pressurizer level/administrative controls method.

Transients that are capable of overpressurizing the RCS have been identified and evaluated. These transients relate to either mass input or heat input: actuating the HPI System, discharging the CFTs, energizing the pressurizer heaters, failing the makeup control valve open, losing decay heat removal, starting a reactor coolant pump (RCP) with a large temperature mismatch between the primary and secondary coolant systems, and adding nitrogen to the pressurizer.

HPI actuation and CFT discharge are the transients that may result in exceeding P/T limits within < 10 minutes in which time no operator action is assumed to take place. Starting an RCP and adding nitrogen to the pressurizer are self limiting events. In the rest, operator action after that time precludes overpressurization. The analyses demonstrate that the time allowed for operator action is adequate, or the events are self limiting and do not exceed P/T limits.

The following are required during the LTOP MODES to ensure that transients do not occur, which either of the LTOP overpressure protection means cannot handle:

a. Limiting RCS makeup flow capability;

b. Deactivating HPI;

c. Immobilizing CFT discharge isolation valves in their closed positions; and

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

d. Limiting the number of available pressurizer heater banks.

The Reference 3 analyses demonstrate the PORV can maintain RCS pressure below limits when both makeup flow capability and the number of available pressurizer heater banks is restricted. Consequently, the administrative controls require makeup flow capability and the number of available pressurizer heater banks to be limited in the LTOP MODES.

Since the PORV cannot do this for one HPI pump, or discharging the CFTs, the LCO also requires the HPI actuation circuits deactivated and the CFTs isolated. The isolated CFTs must have their discharge valves closed and the valve power breakers fixed in their open positions.

Fracture mechanics analyses established the temperature of LTOP Applicability at 325°F. Above this temperature, the pressurizer safety valves provide the reactor vessel pressure protection. The vessel materials were assumed to have a neutron irradiation accumulation equal to 26 effective full power years (EFPYs) of operation for Units 1, 2, and 3.

This LCO will deactivate the HPI actuation when the RCS temperature is ≤ 325°F.

Reference 3 contains the acceptance limits that satisfy the LTOP requirements. Any change to the RCS must be evaluated against these analyses to determine the impact of the change on the LTOP acceptance limits.

PORV Performance

The fracture mechanics analyses show that the vessel is protected when the PORV is set to open at ≤ 460 psig. The setpoint is derived by modeling the performance of the LTOP system for different LTOP events. The PORV setpoint at or below the derived limit ensures the Reference 1 limits will be met.

The PORV setpoint is re-evaluated for compliance when the revised P/T limits conflict with the LTOP analysis limits. The P/T limits are periodically modified as the reactor

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

vessel material toughness decreases due to embrittlement induced by neutron irradiation. Revised P/T limits are determined using neutron fluence projections and the results of examinations of the reactor vessel material irradiation surveillance specimens. The Bases for LCO 3.4.3 discuss these examinations.

The PORV is considered an active component. Therefore, its failure represents the worst case LTOP single active failure.

Administrative Controls Performance

Limiting RCS pressure when RCS temperature is < 325 °F provides a minimum margin to the RCS P/T limit. Restricting RCS makeup flow capability, the number of available pressurizer heater banks, pressurizer level, and controls on the use of high pressure nitrogen limit the pressurization rate during an LTOP event. Alarms ensure early operator recognition of the occurrence of an LTOP event. The combination of minimum margin to the limit, limited pressurization rate and OPERABLE alarms ensure ten minutes are available for operator action to mitigate an LTOP event.

The LTOP System satisfies Criterion 2 and Criterion 3 of 10 CFR 50.36 (Ref.6).

LCO

The LCO requires an LTOP System OPERABLE with a limited coolant input capability and a pressure relief capability. The LCO requires HPI to be deactivated and the CFTs to be isolated. For pressure relief, it requires the pressurizer coolant at or below a maximum level and the PORV OPERABLE with a lift setting at the LTOP limit, with other specified administrative controls.

The pressurizer is OPERABLE with a coolant level limited such that ≥ 10 minutes are available for operator action to mitigate the consequences of an LTOP event.

The PORV is OPERABLE when its block valve is open, its lift setpoint is set at ≤ 460 psig and testing has proven its

(continued)

BASES

LCO (continued)

ability to open at that setpoint, and power is available to the two valves and their control circuits.

APPLICABILITY

This LCO is applicable in MODE 3 when any RCS cold leg temperature is ≤ 325°F, and in MODES 4, 5 and 6 when an RCS vent capable of mitigating the most limiting LTOP event is not open. The Applicability temperature of 325°F is established by fracture mechanics analyses. The pressurizer safety valves provide overpressure protection to meet LCO 3.4.3 P/T limits above 325°F. With the vessel head off, overpressurization is not possible. With an RCS vent capable of mitigating the most limiting LTOP event open, an LTOP event (including HPI actuation or CFT discharge) is incapable of pressuring the RCS above the RCS P/T limits.

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the pressurizer safety valves OPERABLE to provide overpressure protection during MODES 1, 2, and 3 above 325°F.

The Applicability is modified by two Notes. Note 1 states that CFT isolation is only required when the CFT pressure is more than or equal to the maximum RCS pressure for the existing RCS temperature, as allowed in LCO 3.4.3. This Note permits the CFT discharge valve surveillance performed only under these pressure and temperature conditions.

Note 2 permits the PORV to be inoperable when no HPI pumps are running and RCS pressure is < 100 psig. PORV operability is not required when RCS pressure is < 100 psig and HPI pumps are not operating since credible LTOP events progress relatively slowly, thus giving the operator ample time to respond.

ACTIONS

A.1

With the HPI activated, immediate actions are required to deactivate HPI. Emphasis is on immediate deactivation

(continued)

BASES

ACTIONS

A.1 (continued)

because inadvertent injection with one or more HPI pump OPERABLE is the event of greatest significance, since these events cause the greatest pressure increase in the shortest time.

The immediate Completion Times reflect the urgency of quickly proceeding with the Required Actions.

B.1, C.1, and C.2

An unisolated CFT requires isolation within 1 hour only when the CFT pressure is at or more than the maximum RCS pressure for the existing temperature allowed in LCO 3.4.3.

If isolation is needed and cannot be accomplished in 1 hour, Required Action C.1 and Required Action C.2 provide two options, either of which must be performed in 12 hours. By placing the unit in MODE 4 with the RCS temperature > 233°F, the CFT pressure of 650 psig cannot exceed the LTOP limits if both tanks are fully injected. Depressurizing the CFTs below the LTOP limit of 373 psig also prevents exceeding the LTOP limits in the same event.

The Completion Times are based on operating experience that these activities can be accomplished in these time periods and on engineering judgement indicating that a limiting LTOP event is not likely in the allowed times.

D.1, E.1, and E.2

With the PORV inoperable, overpressure relieving capability is lost, and restoration of the PORV within 1 hour is required.

If restoration cannot be completed within 1 hour, either Required Action E.1 or Required Action E.2 must be performed. Required Action E.1 requires increasing RCS temperature within 23 hours to exit the Applicability of the specification. With RCS temperature > 325°F, the CFTs are not required to be isolated. Required Action E.2 requires

(continued)

BASES

ACTIONS

D.1, E.1, and E.2 (continued)

the RCS be depressurized to less than 100 psig within 35 hours. With reactor pressure < 100 psig more time is available for operator action to mitigate an LTOP event.

These Completion Times also consider these activities can be accomplished in these time periods. A limiting LTOP event is not likely in these times.

F.1 and G.1

With Administrative Controls that assure ≥ 10 minutes are available to mitigate the consequences of an event not implemented, the capability for operator action to mitigate an LTOP event may be lost. In this circumstance, compensatory measures must be established to monitor for initiation of an LTOP event. Establishing a dedicated operator within 4 hours to monitor for initiation of an LTOP event is sufficient to compensate for inoperability of makeup flow restrictions, having too many pressurizer heater banks available, inoperability of required alarms, or deviation from pressure, temperature or level limits. Establishing a dedicated operator is not sufficient to compensate for not deactivating HPI or isolating CFTs. If the Required Action and associated Completion Time of Condition F is not met, the RCS must be depressurized and an RCS vent path capable of mitigating the most limiting LTOP event must be established within 12 hours. These Completion Times also consider that these activities can be accomplished in these time periods. A limiting LTOP event is not likely in these periods.

H.1 and H.2

With administrative controls which assure ≥ 10 minutes are available to mitigate the consequences of an LTOP event not implemented and the PORV inoperable; or the LTOP System inoperable for any reason other than cited in Condition A through G, the system must be restored to OPERABLE status within one hour. When this is not possible, Required

(continued)

BASES

ACTIONS

H.1 and H.2 (continued)

Action H.2 requires the RCS depressurized and vented within 12 hours.

One or more vents may be used. A vent path capable of mitigating the most limiting LTOP event is specified. Because makeup may be required, the vent size accommodates inadvertent full makeup system operation. Such a vent keeps the pressure from full flow of the makeup pump(s) with a wide open makeup control valve within the LCO limit.

The Completion Time is based on operating experience that these activity can be accomplished in this time period and on engineering judgement indicating that a limiting LTOP transient is not likely in this time.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1 and SR 3.4.12.2

Verifications must be performed that HPI is deactivated, and the CFTs are isolated. These Surveillances ensure the minimum coolant input capability will not create an RCS overpressure condition to challenge the LTOP System. The Surveillances are required at 12 hour intervals. The 12 hour intervals are shown by operating practice to be sufficient to regularly assess conditions for potential degradation and verify operation within the safety analysis.

SR 3.4.12.3

Verification that the pressurizer level is less than the volume necessary to assure ≥ 10 minutes are available for operator action to mitigate an LTOP event by observing control room or other indications ensures a cushion of sufficient size is available to reduce the rate of pressure increase from potential transients.

The 30 minute Surveillance Frequency during heatup and cooldown must be performed for the LCO Applicability period when temperature changes can cause pressurizer level

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.12.3 (continued)

variations. This Frequency may be discontinued when the ends of these conditions are satisfied, as defined in plant procedures. Thereafter, the Surveillance is required at 12 hour intervals.

These Frequencies are shown by operating practice sufficient to regularly assess indications of potential degradation and verify operation within the safety analysis.

SR 3.4.12.4

Verification that the PORV block valve is open ensures a flow path to the PORV. This is required at 12 hour intervals.

The interval has been shown by operating practice to be sufficient to regularly assess conditions for potential degradation and verify operation is within the safety analysis.

SR 3.4.12.5

A CHANNEL FUNCTIONAL TEST is required within 12 hours after decreasing RCS temperature to ≤ 325°F and every 31 days thereafter to ensure the setpoint is proper for using the PORV for LTOP. PORV actuation is not needed, as it could depressurize the RCS.

The 12 hour Frequency considers the unlikelihood of a low temperature overpressure event during the time. The 31 day Frequency is based on industry accepted practice and is acceptable by experience with equipment reliability.

SR 3.4.12.6

Verification that administrative controls, other than limits for pressurizer level, that assure ≥ 10 minutes are available for operator action to mitigate the consequences

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.12.6 (continued)

of an LTOP event are implemented is necessary every 7 days. This verification consists of a combination of administrative checks for alarm availability, verification that pressurizer heater bank 3 or 4 is deactivated, appropriate restrictions on pressurizer level, controls for High Pressure Nitrogen, etc., as well as visual confirmation using available indications that associated physical parameters are within limits.

The Frequency is shown by operating practice sufficient to regularly assess indications of potential degradation and verify operation within the safety analysis.

SR 3.4.12.7

The performance of a CHANNEL CALIBRATION is required every 18 months. The CHANNEL CALIBRATION for the LTOP setpoint ensures that the PORV will be actuated at the appropriate RCS pressure by verifying the accuracy of the instrument string. The calibration can only be performed in shutdown.

The Frequency considers a typical refueling cycle and industry accepted practice.

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. UFSAR, 5.2.3.7.
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. 10 CFR 50.36.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 302 TO FACILITY OPERATING LICENSE DPR-38

AMENDMENT NO. 302 TO FACILITY OPERATING LICENSE DPR-47

AND AMENDMENT NO. 302 TO FACILITY OPERATING LICENSE DPR-55

DUKE ENERGY CORPORATION

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

By letter dated October 15, 1998, as supplemented December 17, 1998, and January 11 and January 21, 1999, Duke Energy Corporation (the licensee) submitted a request for changes to the Oconee Nuclear Station, Units 1, 2, and 3 (Oconee), Technical Specifications (TSs). The requested changes would revise the heatup, cooldown, and inservice test limitations for the reactor coolant system of each unit for a maximum of 26 effective full-power years (EFPY). The letter dated October 15, 1998, also included a request for an exemption from certain requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Section 50.60 and Appendix G that would allow the use of the alternate methodology of the American Society of Mechanical Engineers (ASME) Code Case N-514 in determining the low temperature overpressure protection (LTOP) system setpoints. This was processed separately, but must be implemented in conjunction with these amendments.

The supplements dated December 17, 1998, and January 11 and 21, 1999, provided clarifying information that did not change the scope of the original Federal Register notice and the initial proposed no significant hazards consideration determination.

1.1 Description of Proposed TS Changes

The specific TS changes proposed by the licensee are as follows:

- Figure 3.4.3-1, RCS [Reactor Coolant System] Normal Operational Heatup Limitations, Unit 1, from 21 EFPY to 26 EFPY.
- Figure 3.4.3-2, RCS Normal Operational Cooldown Limitations, Unit 1, from 21 EFPY to 26 EFPY.
- Figure 3.4.3-3, RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations, Unit 1, from 21 EFPY to 26 EFPY.

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- Figure 3.4.3-4, RCS Normal Operational Heatup Limitations, Unit 2, from 19 EFPY to 26 EFPY.
- Figure 3.4.3-5, RCS Normal Operational Cooldown Limitations, Unit 2, from 19 EFPY to 26 EFPY.
- Figure 3.4.3-6, RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations, Unit 2, from 19 EFPY to 26 EFPY.
- Figure 3.4.3-7, RCS Normal Operational Heatup Limitations, Unit 3, from 21 EFPY to 26 EFPY.
- Figure 3.4.3-8, RCS Normal Operational Cooldown Limitations, Unit 3, from 21 EFPY to 26 EFPY.
- Figure 3.4.3-9, RCS Leak and Hydrostatic Test Heatup and Cooldown Limitations, Unit 3, from 21 EFPY to 26 EFPY.
- TS 3.4.12.a, PORV lift setpoint would be changed from ≤ 480 psig to ≤ 460 psig.
- Surveillance Requirement 3.4.12.6.a, RCS temperature specified would be changed from 220 °F to 325 °F.
- Add Surveillance Requirement 3.4.12.6.d and .e, verify that pressurizer heater bank 3 or 4 is deactivated every 12 hours when TS 3.4.12 is applicable.
- Related Bases page changes as appropriate.

2.0 EVALUATION

2.1 Pressure-Temperature Limit Curves

The NRC has established requirements in 10 CFR Part 50 to protect the integrity of the reactor coolant pressure boundary in nuclear power plants. The staff evaluates the pressure-temperature (P-T) limits based on the following NRC regulations and guidance: 10 CFR Part 50, Appendix G; Generic Letter (GL) 88-11; GL 92-01, Revision 1 (Rev. 1); GL 92-01, Revision 1 (Rev. 1), Supplement 1; Regulatory Guide (RG) 1.99, Revision 2 (Rev. 2); and Standard Review Plan (SRP) Section 5.3.2. GL 88-11 advises the licensee that the staff would use RG 1.99, Rev. 2, to review P-T limit curves. RG 1.99, Rev. 2, contains methodologies for determining the increase in transition temperature and the decrease in upper-shelf energy resulting from neutron radiation. GL 92-01, Rev. 1, requests that licensees submit their reactor pressure vessel (RPV) data for their plants to the staff for review. GL 92-01, Rev. 1, Supplement 1, requests that licensees provide and assess data from other licensees that could affect their RPV integrity evaluations. These data are used by the staff as the basis for the staff's review of P-T limit curves, and as the basis for the staff's review of pressurized thermal shock assessments (10 CFR 50.61 assessments). Appendix G to 10 CFR Part 50 requires that P-T limit curves for the RPV be at least as conservative as those obtained by applying the methodology of Appendix G to Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code).

SRP 5.3.2 provides an acceptable method of calculating the P-T limits for ferritic materials in the beltline of the RPV based on the linear elastic fracture mechanics methodology of Appendix G to Section XI of the ASME Code. The basic parameter of this methodology is the stress intensity factor K_I, which is a function of the stress state and flaw configuration. Appendix G requires a safety factor of 2.0 on stress intensities resulting from reactor pressure during normal and transient operating conditions and requires a safety factor of 1.5 during hydrostatic testing.

The methods of Appendix G postulate the existence of a sharp surface flaw in the RPV that is normal to the direction of the maximum stress. This flaw is postulated to have a depth that is equal to one-fourth of the RPV beltline thickness and a length equal to 1.5 times the RPV beltline thickness. The critical locations in the RPV beltline region for calculating heatup and cooldown P-T limit curves are the ¼ thickness (¼T) and ¾ thickness (¾T) locations, which correspond to the depth of the maximum postulated flaw, if initiated and grown from the inside and outside surfaces of the RPV, respectively.

The Appendix G methodology of the ASME Code requires that licensees determine the adjusted reference temperature (ART or RT_{NDT}). The ART is defined as the sum of the initial (unirradiated) reference temperature (initial RT_{NDT}), the mean value of the adjustment in reference temperature caused by irradiation (ΔRT_{NDT}), and a margin term.

The ΔRT_{NDT} is a product of a chemistry factor and a fluence factor. The chemistry factor is dependent upon the amount of copper and nickel in the material and may be determined from tables in RG 1.99, Rev. 2, or from surveillance data. The fluence factor is dependent upon the neutron fluence at the maximum postulated flaw depth. The margin term is dependent upon whether the initial RT_{NDT} is a plant-specific or a generic value and whether the chemistry factor was determined using the tables in RG 1.99, Rev. 2, or surveillance data. The margin term is used to account for uncertainties in the values of initial RT_{NDT}, copper and nickel contents, fluence and calculational procedures. RG 1.99, Rev. 2, describes the methodology to be used in calculating the margin term.

For the Oconee Unit 1 reactor vessel, the licensee determined that the most limiting material at the ¼T location is the circumferential weld of the intermediate shell plate to the upper shell plate, which was fabricated using weld wire heat 71249. The licensee calculated an ART of 194 °F at the ¼T location for 26 EFPY. The neutron fluence used in the ART calculation was 4.3×10^{18} n/cm^2 at the ¼T location. The chemistry factor was 167.6 °F, which was determined using Table 1 of RG 1.99, Rev. 2. The initial RT_{NDT} for the limiting weld was +10 °F. The margin term used in calculating the ART for the limiting weld was 56 °F at the ¼T, as permitted by RG 1.99, Rev. 2.

For the Oconee Unit 1 reactor vessel, the licensee determined that the most limiting material at the ¾T location is the circumferential weld of the intermediate shell plate to the upper shell plate, which was fabricated using weld wire heat 299L44. The licensee calculated an ART of 178 °F at the ¾T location at 26 EFPY. The neutron fluence used in the ART calculation was 1.56×10^{18} n/cm^2 at the ¾T location. The chemistry factor was 220.6 °F, which was determined using Table 1 of RG 1.99, Rev. 2. The initial RT_{NDT} for the limiting weld was -5 °F. The margin term used in calculating the ART for the limiting weld was 68.5 °F at the ¾T location, as permitted by RG 1.99, Rev. 2.

For the Oconee Unit 2 reactor vessel, the licensee determined that the most limiting material at the ¼T and ¾T locations is the circumferential weld of the reactor vessel upper shell forging to the lower shell forging. This weld was fabricated using weld wire heat 299L44. The licensee calculated an ART of 234 °F at the ¼T location and 179.4 °F at the ¾T location at 26 EFPY. The neutron fluence used in the ART calculation was 4.42 X 10^{18} n/cm^2 at the ¼T location and 1.61 X 10^{18} n/cm^2 at the ¾T location. The chemistry factor was 220.6 °F, which was determined using Table 1 of RG 1.99, Rev. 2. The initial RT_{NDT} for the limiting weld was -5 °F. The margin term used in calculating the ART for the limiting weld was 68.5 °F at the ¼T and ¾T locations, as permitted by RG 1.99, Rev. 2.

For the Oconee Unit 3 reactor vessel, the licensee determined that the most limiting material at the ¼T and ¾T locations is the circumferential weld of the reactor vessel upper shell forging to the lower shell forging. This weld was fabricated using weld wire heat 72442. The licensee calculated an ART of 202.1 °F at the ¼T location and 156.3 °F at the ¾T location at 26 EFPY. The neutron fluence used in the ART calculation was 4.38 X 10^{18} n/cm^2 at the ¼T location and 1.59 X 10^{18} n/cm^2 at the ¾T location at 26 EFPY. The chemistry factor was 180 °F, which was determined using Table 1 of RG 1.99, Rev. 2. The initial RT_{NDT} for the limiting weld was -5 °F. The margin term used in calculating the ART for the limiting weld was 68.5 °F at the ¼T and ¾T locations, as permitted by RG 1.99, Rev. 2.

2.2 Staff Evaluation of the Proposed Changes to the Oconee Units 1, 2, and 3 P-T Limit Curves

As previously stated, the licensee submitted ART calculations and P-T limit curves, for Oconee Units 1, 2, and 3, valid for 26 EFPY. The staff independently verified the accuracy of the licensee's ART calculations. In addition, the staff independently generated P-T curves for normal operations and hydrostatic test pressures effective to 26 EFPY for each of the three Oconee units. The details of this evaluation are provided below.

The ART is determined using the chemistry values percent copper and percent nickel for each beltline material of Oconee Units 1, 2, and 3. The Reactor Vessel Integrity database contains chemistry values for each beltline material for all light water reactors in the U.S. The licensee provided updated chemistry data for the beltline materials of Oconee Units 1, 2, and 3 by letter dated June 25, 1998. It should be noted that the licensee and staff used the most recent updated chemistry data for the beltline materials in the Oconee Units 1, 2, and 3 P-T limit evaluations. The staff compared the chemistry data and the initial RT_{NDT} values of the licensee's submittal of October 15, 1998, to the data in the BAW-2325, Revision 1, Report. The staff found that the chemistry data in the licensee's submittal, for the beltline materials of Oconee Units 1, 2, and 3, were the same as those indicated in the BAW-2325, Revision 1, Report. The staff also found that the initial RT_{NDT} values used by the licensee (in submittal dated October 15, 1998) were either the same or more conservative than those values specified in the BAW-2325, Revision 1, Report.

The staff performed an independent calculation of the ART values for the limiting material using the methodology in RG 1.99, Rev. 2. Based on these calculations, the staff verified that the licensee's limiting materials, for the Oconee Units 1, 2, and 3 reactor vessels, are those mentioned in Section 2.1 of this Safety Evaluation (SE). It should be noted that the staff verified the credibility of the surveillance data for the limiting material (weld wire heat 299L44) of Oconee Unit 2. The staff's calculated ART values for the limiting material agreed with the

licensee's calculated ART values at 26 EFPY for Oconee Units 1, 2, and 3. Substituting the ART values for the Oconee Units 1, 2, and 3 limiting welds into the equations in SRP 5.3.2, the staff verified that the proposed P-T limits satisfy the requirements in Paragraph IV.A.2 of Appendix G of 10 CFR Part 50. The staff independently generated P-T curves for normal operations and hydrostatic test pressures effective to 26 EFPY for each of the three Oconee units. In comparing the staff's generated curves to the licensee's generated curves, the staff determined that the P-T curves for Oconee Units 1, 2, and 3 meet the requirements of Appendix G of Section XI of the ASME Code. Therefore, the staff also determined that these curves meet the requirements of Appendix G of Section XI of the ASME Code.

In addition to beltline materials, Appendix G of 10 CFR Part 50 also imposes a minimum temperature at the RPV based on the reference temperature for the flange material. Section IV.A.2 of Appendix G states that when the pressure exceeds 20 percent of the preservice system hydrostatic test pressure, the temperature of the closure flange regions highly stressed by the bolt preload must exceed the adjusted reference temperature of the material in those regions by at least 120 °F for normal operation and by 90 °F for hydrostatic pressure tests and leak tests. Based on the RT_{NDT} of 60 °F for the limiting flange and upper shell materials, the staff has determined that the proposed P-T limits satisfy the requirement for the closure flange region during normal operation and hydrostatic pressure test and leak test for Oconee Units 1, 2, and 3.

The staff concludes that the proposed P-T limits for the reactor coolant system for heatup, cooldown, leak test, and criticality for Oconee Units 1, 2, and 3 satisfy the requirements in Appendix G to Section XI of the ASME Code and Appendix G of 10 CFR Part 50 for 26 EFPY. The proposed P-T limits also satisfy GL 88-11 because the method in RG 1.99, Rev. 2, was used to calculate the ART. Hence, the proposed P-T limits may be incorporated into the Oconee Units 1, 2, and 3 TSs.

2.3 Low Temperature Overpressure Protection System

The LTOP system mitigates overpressure transients at low temperatures so that the integrity of the reactor coolant pressure boundary is not compromised by violating the 10 CFR Part 50, Appendix G P/T limits. The LTOP system for Oconee, Units 1, 2, and 3 uses the pressurizer power-operated relief valve (PORV) to accomplish this function. The system is manually enabled by operators and uses a single lifting setpoint for the PORV. Since there is only one PORV in each unit, administrative controls are in place to assure that greater than 10 minutes are available for operator actions to manually mitigate an LTOP event. The design basis of the LTOP considers both mass-addition and heat-addition transients. The mass-addition analyses account for the injection from the makeup pumps with the makeup control valve failing open to a restricted fully open position. The heat-addition analyses accounts for an event scenario involving pressurizer heaters erroneously energized, loss of the decay heat removal system, and reactor coolant pump start-induced transients. With administrative controls in place, the results of the licensee's analyses show that more than 10 minutes are available for operator actions to mitigate these events assuming the PORV is inoperable. The proposed TSs with their associated Bases provided administrative restrictions in plant operation within the configuration assumed in the analysis for LTOP design.

The proposed LTOP enable temperature and the PORV actuation setpoint were established using methodology consistent with the guidelines contained in the NRC Branch Technical Position RSB 5-2 and ASME Code Case N-514.

The proposed limiting conditions for operation (LCO) in TS 3.4.12 requires that an LTOP system shall be operable with high pressure injection deactivated, the core flood tanks isolated, an operable PORV with a lift setpoint of less than or equal to 460 pounds per square inch gauge (psig); and administrative controls implemented with greater than or equal to 10 minutes available for operator action to mitigate an LTOP event. The detailed administrative controls necessary are specified in the Bases of TS 3.4.12 including the maximum RCS pressures in various temperature ranges, the maximum pressurizer levels in various plant operating conditions, and the maximum makeup flow rate when LTOP is needed.

The licensee has proposed modifications to TS 3.4.12 and associated Bases to reflect the proposed LTOP system and to restrict the plant operational configuration consistent with the design of the LTOP system. The licensee also proposed changes to TS 3.4.3 to incorporate the P-T limits effective up to 26 EFPY. The staff has reviewed the proposed changes regarding the design of the LTOP system and finds that they are acceptable. The staff evaluation of the LTOP setpoints is presented below.

Enable Temperature

The LTOP enable temperature is the temperature below which the LTOP system is required to be operable. The licensee proposed to establish an LTOP enable temperature methodology to: (1) account for instrument uncertainties associated with the instrumentation used to enable the LTOP system; and (2) implement the methodology provided in ASME Code Case N-514 using an enable RCS water temperature corresponding to a metal temperature of at least RT_{NDT} + 50 °F at the belt line location (¼T or ¾T). Therefore, the licensee proposed to calculate the enable temperature as RT_{NDT} + 50 °F plus the temperature difference between RCS and metal plus instrument uncertainties. Using the above equation, the calculated limiting enable temperature is 324.4 °F based on the ¼T location. The licensee proposed an enable temperature of 325 °F that includes an additional margin of 0.6 °F.

The staff finds that this proposed LTOP enable temperature is conservative with respect to the enable temperature allowed by ASME Code Case N-514 and, therefore, is acceptable.

LTOP Actuation Setpoint

The LTOP at Oconee is conservatively designed to mitigate overpressure transients at low temperatures to prevent violating 10 CFR Part 50, Appendix G P-T limits under normal heatup, and cooldown operating conditions. The LTOP actuation setpoint is the pressure at which the PORV will lift to limit the peak RCS pressure during a pressurization transient.

Using the methodology provided by ASME Code Case N-514, the maximum allowed RCS pressure, corresponding to the minimum RCS temperature of 60 °F, is 473 psig that bounds all other maximum allowable pressures over the LTOP temperature range. Considering an instrument uncertainty of 13 pounds per square inch, the licensee proposed a single PORV setpoint of 460 psig for entire temperature range.

The licensee has concluded that the transient pressure response during an LTOP event is relatively slow since a steam or nitrogen bubble is maintained in the pressurizer during low temperature operations. Also, the PORVs are fast opening valves with approximately 0.2 second stroke time. Therefore, the peak pressure during an LTOP transient will be limited to the PORV setpoint. The staff has evaluated the licensee's design of the LTOP system and finds the licensee's proposed PORV setpoint acceptable.

RCS Vent Size

In TS 3.4.12, it is stated that the LCO is applicable during Mode 3 when any RCS cold leg temperature is less than or equal to 325 °F, and during Modes 4, 5, and 6 when an RCS vent path capable of mitigating the most limiting LTOP event is not open. The licensee has specified a vent size with a minimum equivalent diameter of 1-3/32-inch. The basis of this sizing is that the 1-3/32 diameter is equal to the inner throat diameter of the PORVs. The staff finds that the basis for determining the vent size is conservative and the proposed vent size is acceptable.

The staff has reviewed the licensee's proposed TS 3.4.12 for the LTOP enable temperature and actuation setpoint. The staff also reviewed the licensee's assessment related to the proposed enable temperature of 325 °F and PORV actuation setpoint as discussed in Sections 2.1 and 2.2 of this SE. The licensee has considered instrument uncertainties in its setpoint calculation using ISA S67.04-1994. The staff finds that the licensee's analyses were performed in a manner consistent with the approved methodology and that the results of the analyses conservatively demonstrated that the 10 CFR Part 50, Appendix G P-T limits will be adequately protected with these setpoints and, therefore, the staff finds the proposed TS 3.4.12 with its associated Bases regarding LTOP acceptable.

2.4 Reactor Pressure Vessel Fluences

The licensee participates in the integrated surveillance program to satisfy the requirements of 10 CFR Part 50, Appendix H. In addition, in-cavity surveillance was used to lower the uncertainty of the available data. It was stated in the staff's evaluation of the integrated surveillance program that cavity dosimetry measurements are allowed for the integrated program participants. Cavity dosimetry results along with the available surveillance data formed the basis of the benchmark used for the calculational methodology, which was used in the evaluation of the 26 EFPY Oconee fluence. This methodology is the same as that described in a topical report which has been reviewed by the staff for applications related to the Babcock and Wilcox Owner's Group (B&WOG). The staff finds this methodology acceptable because it complies with the recommendations of Draft Regulatory Guide DG-1053, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," issued June 1996, which describes methods and assumptions that are acceptable to the NRC staff for determining the pressure vessel fluence. Thus, the staff finds the proposed fluence values acceptable.

2.5 Summary

The staff has reviewed the changes to the Oconee Nuclear Station Units 1, 2, and 3 TS proposed by the licensee in its submittal dated October 15, 1998, as supplemented by letters dated December 17, 1998, and January 11 and January 21, 1999, and found them to be acceptable based on the analysis previously described.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the South Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (63 FR 66592, dated December 2, 1998). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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