ENCLOSURE 2

VOLUME 9

ST. LUCIE PLANT
UNIT 1 AND UNIT 2

IMPROVED TECHNICAL SPECIFICATIONS CONVERSION

ITS SECTION 3.4 REACTOR COOLANT SYSTEM (RCS)

Revision 0

LIST OF ATTACHMENTS

1. 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
2. 3.4.2, RCS Minimum Temperature for Criticality
3. 3.4.3, RCS Pressure and Temperature (P/T) Limits
4. 3.4.4, RCS Loops - MODES 1 and 2
5. 3.4.5, RCS Loops - MODE 3
6. 3.4.6, RCS Loops - MODE 4
7. 3.4.7, RCS Loops - MODE 5, Loops Filled
8. 3.4.8, RCS Loops - MODE 5, Loops Not Filled
9. 3.4.9, Pressurizer
10. 3.4.10, Pressurizer Safety Valves
11. 3.4.11, Pressurizer Power Operated Relief Valves (PORVs)
12. 3.4.12, Low Temperature Overpressure Protection (LTOP) System
13. 3.4.13, RCS Operational LEAKAGE
14. 3.4.14, RCS Pressure Isolation Valve (PIV) Leakage
15. 3.4.15, RCS Leakage Detection Instrumentation
16. 3.4.16, RCS Specific Activity
17. 3.4.17, Steam Generator (SG) Tube Integrity
18. Relocated/Deleted Current Technical Specifications
19. ISTS Not Adopted

ATTACHMENT 1

3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

POWER DISTRIBUTION LIMITS 3.4 REACTOR COOLANT SYSTEM (RCS)

DNB PARAMETERS 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

LIMITING CONDITION FOR OPERATION

LCO 3.4.1 3.2.5 The following RCS DNB related parameters shall be maintained within the limits:

SR 3.4.1.2 a. Cold Leg Temperature as shown on Table 3.2-1 of the COLR, specified in the COLR

SR 3.4.1.1 b. Pressurizer Pressure* as shown on Table 3.2-1 of the COLR,

SR 3.4.1.3 c. Reactor Coolant System Total Flow Rate greater than or equal to ≥ 375,000 gpm, and

d. AXIAL SHAPE INDEX as shown on Figure 3.2-4 of the COLR. See ITS 3.2.4

Applicability **APPLICABILITY**: MODE 1.

ACTION:

ACTION A With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours

ACTION B or reduce THERMAL POWER to ≤ 5% of RATED THERMAL POWER Be in MODE 2 within the next 4 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1 SR 3.4.1.2 SR 3.4.1.3 4.2.5.1 Each of the DNB related parameters Pressurizer pressure RCS cold leg temperature RCS total flow rate shall be verified to be within their limits by instrument readout in accordance with the Surveillance Frequency Control Program.

SR 3.4.1.4 SR 3.4.1.4 Note 4.2.5.2 The Reactor Coolant System RCS total flow rate shall be determined to be within its limit by measurement precision heat balance** in accordance with the Surveillance Frequency Control Program.

Applicability Note * Pressurizer pressure Limit not applicable during either a THERMAL POWER ramp increase in excess of > 5% RTP per minute of RATED THERMAL POWER or a THERMAL POWER step increase of greater than > 10% of RATED THERMAL POWER.

SR 3.4.1.4 Note ** Not required to be performed until 24 hours after THERMAL POWER is ≥ 90% of RATED THERMAL POWER. L01

POWER DISTRIBUTION LIMITS
3.4 REACTOR COOLANT SYSTEM (RCS)

DNB PARAMETERS
3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

LIMITING CONDITION FOR OPERATION

LCO 3.4.1 3.2.5 The following RCS DNB-related parameters shall be maintained within the limits:

a. Cold Leg Temperature as shown on Table 3.2-2 of the COLR,

b. Pressurizer Pressure* as shown on Table 3.2-2 of the COLR, specified in the COLR

c. Reactor Coolant System Total Flow Rate - greater than or equal to ≥ 375,000 gpm, and

d. AXIAL SHAPE INDEX as shown on Figure 3.2-4 of the COLR. See ITS 3.2.4

Applicability **APPLICABILITY**: MODE 1.

ACTION:

ACTION A With any of the above parameters exceeding its limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to ≤ 5% of RATED THERMAL POWER Be in MODE 2 within the next 4 6

ACTION B hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1 SR 3.4.1.2 SR 3.4.1.3 4.2.5.1 Each of the DNB-related parameters (Pressurizer pressure, RCS cold leg temperature, RCS total flow rate) shall be verified to be within their limits by instrument readout in accordance with the Surveillance Frequency Control Program.

SR 3.4.1.4 4.2.5.2 The Reactor Coolant System RCS total flow rate shall be determined to be within its limit by measurement precision heat balance** in accordance with the Surveillance Frequency Control Program.

Applicability Note * Pressurizer pressure Limit not applicable during either a THERMAL POWER ramp increase in excess of > 5% RTP per minute of RATED THERMAL POWER or a THERMAL POWER step increase of greater than > 10% of RATED THERMAL POWER.

SR 3.4.1.4 Note ** Not required to be performed until 24 hours after THERMAL POWER is ≥ 90% of RATED THERMAL POWER. L01

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 *(Category 7 – Relaxation Of Surveillance Frequency)* CTS 4.2.5.2 Note states “Not required to be performed until THERMAL POWER is ≥ 90% of RATED THERMAL POWER. ITS SR 3.4.1.4 states “Not required to be performed until 24 hours after ≥ 90% RTP. ITS SR 3.4.1.4 Note allows 24 hours after ≥ 90% RTP to perform the Surveillance. This is necessary to allow measurement of the flow rate at normal operating conditions at power in MODE 1. The Surveillance will not yield accurate results if performed below 90% RTP. ITS SR 3.0.1 states that SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Once the unit reaches 90% RTP, a 24 hour allowance is provided for completing the Surveillance. If the Surveillance were not performed within this 24 hour interval (plus the extension allowed by SR 3.0.2), there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply. This changes the CTS by allowing up to 24 hours after ≥ 90% RTP to perform the Surveillance.

The purpose of CTS 4.2.5.2 is to perform the Surveillance at normal operating conditions when ≥ 90% RTP. ITS SR 3.4.1.4 allows up to 24 hours after ≥ 90% RTP to perform the Surveillance. This change is acceptable because the “24 hours” allows a reasonable time to perform the Surveillance once establishing the conditions at which the Surveillances can be performed. Additionally, the proposed time to perform the Surveillance is acceptable because there are other plant parameters available to indicate significant RCS low flow conditions. For example; reactor coolant pump running status indication, RCS low flow alarm, and Reactor Coolant Flow – low reactor trip. This change is designated as less restrictive because the Surveillances will be performed within an allowance of 24 hours after ≥ 90% RTP rather than immediately after ≥ 90% RTP.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 RCS Pressure, Temperature, and Flow [Departure from Nucleate Boiling (DNB)] Limits 2

LCO 3.2.5.a
LCO 3.2.5.b
LCO 3.2.5.c

LCO 3.4.1 RCS DNB parameters for pressurizer pressure, cold leg temperature, and RCS total flow rate shall be within the limits specified in the COLR. 4

and

shall be ≥ 375,000 gpm

3.2.5 Applicability

APPLICABILITY: MODE 1.

LCO 3.2.5.b Footnote *

-----NOTE-----
Pressurizer pressure limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute or

b. THERMAL POWER step > 10% RTP.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.2.5 Action	A. Pressurizer pressure or RCS flow rate [RCS DNB parameter(s)] not within limits.	A.1 Restore parameter(s) to within limit.	2 hours	3
3.2.5 Action	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2.	6 hours	
	C. RCS cold leg temperature not within limits.	C.1 Restore cold leg temperature to within limits.	2 hours	3
	D. Required Action and associated Completion Time of Condition C not met.	D.1 Reduce THERMAL POWER to ≤ [30]% RTP.	6 hours	3

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.2.5.1 LCO 3.2.5.b	SR 3.4.1.1	Verify pressurizer pressure is within the limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
4.2.5.1 LCO 3.2.5.a	SR 3.4.1.2	Verify RCS cold leg temperature is within the limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
4.2.5.2 LCO 3.2.5.c	SR 3.4.1.3	-------------------------------NOTE------------------------------- Only required to be met in MODE 1. -- Verify RCS total flow rate is greater than or equal to the limits specified in the COLR. ≥ 375,000 gpm	[12 hours OR In accordance with the Surveillance Frequency Control Program]	5 4 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
4.2.5.1 Footnote ** LCO 3.2.5.c DOC L01	SR 3.4.1.4 ------------------------------NOTE------------------------------ Not required to be performed until [24] hours after ≥ [90]% RTP. -- Verify by precision heat balance that RCS total flow rate is within the limits specified in the COLR. ≥ 375,000 gpm	[[18] months OR In accordance with the Surveillance Frequency Control Program] (4) (2)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 RCS Pressure, Temperature, and Flow [Departure from Nucleate Boiling (DNB)] Limits 2

LCO 3.2.5.a
LCO 3.2.5.b
LCO 3.2.5.c

LCO 3.4.1 RCS DNB parameters for pressurizer pressure, [and] cold leg temperature, and RCS total flow rate [shall be ≥ 375,000 gpm] shall be within the limits specified in the COLR. 4

3.2.5 Applicability

APPLICABILITY: MODE 1.

LCO 3.2.5.b Footnote *

---NOTE---

Pressurizer pressure limit does not apply during:

a. THERMAL POWER ramp > 5% RTP per minute or

b. THERMAL POWER step > 10% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
(3.2.5 Action) A. ~~Pressurizer pressure or RCS flow rate~~ [RCS DNB parameter(s)] not within limits.	A.1 Restore parameter(s) to within limit.	2 hours 3
(3.2.5 Action) B. Required Action and associated Completion Time ~~of Condition A~~ not met.	B.1 Be in MODE 2.	6 hours
~~C. RCS cold leg temperature not within limits.~~	~~C.1 Restore cold leg temperature to within limits.~~	~~2 hours~~ 3
~~D. Required Action and associated Completion Time of Condition C not met.~~	~~D.1 Reduce THERMAL POWER to ≤ [30]% RTP.~~	~~6 hours~~ 3

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.2.5.1 LCO 3.2.5.b	SR 3.4.1.1	Verify pressurizer pressure is within the limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
4.2.5.1 LCO 3.2.5.a	SR 3.4.1.2	Verify RCS cold leg temperature is within the limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
4.2.5.2 LCO 3.2.5.c	SR 3.4.1.3	-----------------------------NOTE----------------------------- Only required to be met in MODE 1. -- Verify RCS total flow rate is greater than or equal to the limits specified in the COLR. ≥ 375,000 gpm	[12 hours OR In accordance with the Surveillance Frequency Control Program]	5 4 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.1.4	------------------------------NOTE------------------------------ Not required to be performed until [24] hours after ≥ [90]% RTP. --- Verify by precision heat balance that RCS total flow rate is within the limits specified in the COLR. ≥ 375,000 gpm	[[18] months OR In accordance with the Surveillance Frequency Control Program] 4 2

4.2.5.1
Footnote **
LCO 3.2.5.c

DOC L01

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. ISTS 3.4.1 ACTIONS C and D are specific to RCS cold leg temperature and apply when operation may continue at a reduced RTP for an indefinite period of time. CTS 3.2.5 Actions for RCS cold leg temperature are the same as the Actions for pressurizer pressure and RCS flow rate which require a parameter not within limits be restored to within limits in 2 hours or be in MODE 2 within 6 hours. To reflect the current licensing basis, Condition A is revised to state, “RCS DNB parameter(s) not within limits,” Condition B deletes the phrase “of Condition A,” and ACTIONS C and D are deleted.

4. ISTS LCO 3.4.1 states that the RCS DNB parameters for pressurizer pressure, cold leg temperature, and RCS total flow rate shall be within the limits specified in the COLR. CTS LCO 3.2.5 states that the RCS total flow rate “shall be ≥ 375,000 gpm.” The NRC documented in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," that this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. However, NRC-approved Topical Report WCAP-14483, "Generic Methodology for Expanded Core Operating Limits Report," determined that the specific values for the DNB parameters may be relocated to the COLR as long as the limiting RCS total flow limit is retained in the LCO. Therefore, to reflect the CTS 3.2.5 current licensing basis, ISTS LCO 3.4.1 is changed to state that RCS total flow rate “shall be ≥ 375,000 gpm.”

5. The Note to ISTS SR 3.4.1.3 is deleted because it is unnecessary. SR 3.0.1 requires Surveillance to be met during the MODES or other specified conditions in the Applicability. Since ISTS LCO 3.4.1 is only applicable in MODE 1, there is no reason to modify SR 3.4.1.3 with a Note stating that the SR is only required to be met in MODE 1. This change is consistent with ISTS SR 3.4.1.3 in NUREG-1431, which does not contain this Note.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

 2

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.1 RCS Pressure, Temperature, and Flow [Departure from Nucleate Boiling (DNB)] Limits 2

BASES

BACKGROUND

These Bases address requirements for maintaining RCS pressure, temperature, and flow rate within limits assumed in the safety analyses. The safety analyses (Ref. 1) of normal operating conditions and anticipated operational occurrences assume initial conditions within the normal steady state envelope. The limits placed on departure from nucleate boiling (DNB) related parameters ensure that these parameters will not be less conservative than were assumed in the analyses and thereby provide assurance that the minimum departure from nucleate boiling ratio (DNBR) will meet the required criteria for each of the transients analyzed.

The LCO limits for minimum and maximum RCS pressures as measured at the pressurizer are consistent with operation within the nominal operating envelope and are bounded by those used as the initial pressures in the analyses.

The LCO limits for minimum and maximum RCS cold leg temperatures are consistent with operation at the indicated power level and are bounded by those used as the initial temperatures in the analyses.

The LCO limits for minimum RCS flow rate is bounded by the initial flow rate in the analyses. The RCS flow rate is not expected to vary during plant operation with all pumps running.

APPLICABLE SAFETY ANALYSES

The requirements of LCO 3.4.1 represent the initial conditions for DNB limited transients analyzed in the safety analyses (Ref. 1). The safety analyses have shown that transients initiated from the limits of this LCO will meet the DNBR criterion of ≥ [1.3]. This is the acceptance limit for the RCS DNB parameters. Changes to the facility that could impact these parameters must be assessed for their impact on the DNBR criterion. The transients analyzed for include loss of coolant flow events and dropped or stuck control element assembly (CEA) events. A key assumption for the analysis of these events is that the core power distribution is within the limits of [LCO 3.1.6, "Regulating CEA Insertion Limits," LCO 3.1.7, "Part Length CEA Insertion Limits," LCO 3.2.3, "AZIMUTHAL POWER TILT (Tq)," and LCO 3.2.5, "AXIAL SHAPE INDEX (ASI)"]. The safety analyses are performed over the following range of initial values: RCS pressure [1785-2400] psig, core inlet temperature [500-580]°F, and reactor vessel inlet coolant flow rate ≥ [95]%.

2 1 2 3 2

4 use 2225 - 2250 psia 535 - 551 ≥ 375,000 gpm

The RCS DNB limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

 1

BASES

LCO

This LCO specifies limits on the monitored process variables - RCS pressurizer pressure, RCS cold leg temperature, and RCS total flow rate - to ensure that the core operates within the limits assumed for the plant safety analyses. These variables are contained in the COLR to provide operating and analysis flexibility from cycle to cycle. Operating within these limits will result in meeting the DNBR criterion in the event of a DNB limited transient. 4

values for RCS pressurizer pressure and RCS cold leg temperature

The LCO numerical values for pressure, temperature, and flow rate specified in the COLR are given for the measurement location but have not been adjusted for instrument error. Plant specific limits of instrument error are established by the plant staff to meet the operational requirements of this LCO. 4

APPLICABILITY

In MODE 1, the limits on RCS pressurizer pressure, RCS cold leg temperature, and RCS flow rate must be maintained during steady state operation in order to ensure that DNBR criteria will be met in the event of an unplanned loss of forced coolant flow or other DNB limited transient. In all other MODES, the power level is low enough so that DNBR is not a concern.

A Note has been added to indicate the limit on pressurizer pressure may be exceeded during short term operational transients such as a THERMAL POWER ramp increase of > 5% RTP per minute or a THERMAL POWER step increase of > 10% RTP. These conditions represent short term perturbations where actions to control pressure variations might be counterproductive. Also, since they represent transients initiated from power levels < 100% RTP, an increased DNBR margin exists to offset the temporary pressure variations.

Another set of limits on DNB related parameters is provided in Safety Limit (SL) 2.1.1, "Reactor Core Safety Limits." Those limits are less restrictive than the limits of this LCO, but violation of SLs merits a stricter, more severe Required Action. Should a violation of this LCO occur, the operator should check whether or not an SL may have been exceeded.

ACTIONS

A.1

s

Pressurizer pressure is a controllable and measurable parameter. RCS flow rate is not a controllable parameter and is not expected to vary during steady state operation. With either parameter not within the LCO limits, action must be taken to restore the out of limit parameter. 4

and RCS cold leg temperature are

a

The 2 hour Completion Time for restoration of the parameters provides sufficient time to adjust plant parameters, to determine the cause of the off normal condition, and to restore the readings within limits. The Completion Time is based on plant operating experience that shows the parameter can be restored in this time period.

2

BASES

ACTIONS (continued)

B.1

If Required Action A.1 is not met within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 2 within 6 hours. In MODE 2, the reduced power condition eliminates the potential for violation of the accident analysis bounds.

Six hours is a reasonable time that permits the plant power to be reduced at an orderly rate in conjunction with even control of steam generator (SG) heat removal.

C.1

Cold leg temperature is a controllable and measurable parameter. If this parameter is not within the LCO limits, action must be taken to restore the parameter. 4

The 2 hour Completion Time is based on plant operating experience that shows that the parameter can be restored in this time period.

D.1

If Required Action C.1 is not met within the associated Completion Time, THERMAL POWER must be reduced to ≤ [30%] RTP. Plant operation may continue for an indefinite period of time in this condition. At the reduced power level, the potential for violation of the DNB limits is greatly reduced. 4

The 6 hour Completion Time is a reasonable time that permits power reduction at an orderly rate in conjunction with even control of SG heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1 2

[Since Required Action A.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for pressurizer pressure is sufficient to ensure that the pressure can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and verify operation is within safety analysis assumptions.

 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
-----]

SR 3.4.1.2

[Since Required Action A.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for cold leg temperature is sufficient to ensure that the RCS coolant temperature can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and to verify operation is within safety analysis assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
-----]

 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.1.3

[The 12 hour Surveillance Frequency for RCS total flow rate is performed using the installed flow instrumentation. The 12 hour Frequency has been shown by operating experience to be sufficient to assess for potential degradation and to verify operation is within safety analysis assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
---]

This SR is modified by a Note that only requires performance of this SR in MODE 1. The Note is necessary to allow measurement of RCS flow rate at normal operating conditions at power with all RCPs running. 4

SR 3.4.1.4

Measurement of RCS total flow rate by performance of a precision calorimetric heat balance. This allows the installed RCS flow instrumentation to be calibrated and verifies that the actual RCS flow rate is within the bounds of the analyses.

[The Frequency of [18] months reflects the importance of verifying flow after a refueling outage where the core has been altered, which may have caused an alteration of flow resistance. 2

 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
--]

The SR is modified by a Note that states the SR is only required to be performed [24] hours after ≥ [90]% RTP. The Note is necessary to allow measurement of the flow rate at normal operating conditions at power in MODE 1. The Surveillance cannot be performed in MODE 2 or below, and will not yield accurate results if performed below 90% RTP. 2

REFERENCES

1. FSAR, Section [15]. 2

U

Chapter 15

 1

 2

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.1 RCS Pressure, Temperature, and Flow [Departure from Nucleate Boiling (DNB)] Limits 2

BASES

BACKGROUND

These Bases address requirements for maintaining RCS pressure, temperature, and flow rate within limits assumed in the safety analyses. The safety analyses (Ref. 1) of normal operating conditions and anticipated operational occurrences assume initial conditions within the normal steady state envelope. The limits placed on departure from nucleate boiling (DNB) related parameters ensure that these parameters will not be less conservative than were assumed in the analyses and thereby provide assurance that the minimum departure from nucleate boiling ratio (DNBR) will meet the required criteria for each of the transients analyzed.

The LCO limits for minimum and maximum RCS pressures as measured at the pressurizer are consistent with operation within the nominal operating envelope and are bounded by those used as the initial pressures in the analyses.

The LCO limits for minimum and maximum RCS cold leg temperatures are consistent with operation at the indicated power level and are bounded by those used as the initial temperatures in the analyses.

The LCO limits for minimum RCS flow rate is bounded by the initial flow rate in the analyses. The RCS flow rate is not expected to vary during plant operation with all pumps running.

APPLICABLE SAFETY ANALYSES

The requirements of LCO 3.4.1 represent the initial conditions for DNB limited transients analyzed in the safety analyses (Ref. 1). The safety analyses have shown that transients initiated from the limits of this LCO will meet the DNBR criterion ~~of ≥ [1.3]. This is the~~ acceptance limit for the RCS DNB parameters. Changes to the facility that could impact these parameters must be assessed for their impact on the DNBR criterion. The transients analyzed ~~for~~ include loss of coolant flow events and dropped or stuck control element assembly (CEA) events. A key assumption for the analysis of these events is that the core power distribution is within the limits of [LCO 3.1.6, "Regulating CEA Insertion Limits," ~~LCO 3.1.7, "Part Length CEA Insertion Limits,"~~ LCO 3.2.3, "AZIMUTHAL POWER TILT (Tq)," and LCO 3.2.~~5~~ 4, "AXIAL SHAPE INDEX (ASI)"]. The safety analyses ~~are performed over~~ use the following range of initial values: RCS pressure ~~[1785-2400] psig~~ 2225 – 2250 psia, core inlet temperature ~~[500-580]~~ 535 - 551°F, and reactor vessel inlet coolant flow rate ~~≥ [95]%~~ ≥ 375,000 gpm. 2 1 2 3 2

The RCS DNB limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

 1

2

BASES

LCO

This LCO specifies limits on the monitored process variables - RCS pressurizer pressure, RCS cold leg temperature, and RCS total flow rate - to ensure that the core operates within the limits assumed for the plant safety analyses. These variables are contained in the COLR to provide operating and analysis flexibility from cycle to cycle. Operating within these limits will result in meeting the DNBR criterion in the event of a DNB limited transient. 4

values for RCS pressurizer pressure and RCS cold leg temperature

The LCO numerical values for pressure, temperature, and flow rate specified in the COLR are given for the measurement location but have not been adjusted for instrument error. Plant specific limits of instrument error are established by the plant staff to meet the operational requirements of this LCO. 4

APPLICABILITY

In MODE 1, the limits on RCS pressurizer pressure, RCS cold leg temperature, and RCS flow rate must be maintained during steady state operation in order to ensure that DNBR criteria will be met in the event of an unplanned loss of forced coolant flow or other DNB limited transient. In all other MODES, the power level is low enough so that DNBR is not a concern.

A Note has been added to indicate the limit on pressurizer pressure may be exceeded during short term operational transients such as a THERMAL POWER ramp increase of > 5% RTP per minute or a THERMAL POWER step increase of > 10% RTP. These conditions represent short term perturbations where actions to control pressure variations might be counterproductive. Also, since they represent transients initiated from power levels < 100% RTP, an increased DNBR margin exists to offset the temporary pressure variations.

Another set of limits on DNB related parameters is provided in Safety Limit (SL) 2.1.1, "Reactor Core Safety Limits." Those limits are less restrictive than the limits of this LCO, but violation of SLs merits a stricter, more severe Required Action. Should a violation of this LCO occur, the operator should check whether or not an SL may have been exceeded.

ACTIONS

A.1

s

Pressurizer pressure is a controllable and measurable parameter. RCS flow rate is not a controllable parameter and is not expected to vary during steady state operation. With either parameter not within the LCO limits, action must be taken to restore the out of limit parameter. 4

and RCS cold leg temperature are

a

The 2 hour Completion Time for restoration of the parameters provides sufficient time to adjust plant parameters, to determine the cause of the off normal condition, and to restore the readings within limits. The Completion Time is based on plant operating experience that shows the parameter can be restored in this time period.

 2

BASES

ACTIONS (continued)

B.1

If Required Action A.1 is not met within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 2 within 6 hours. In MODE 2, the reduced power condition eliminates the potential for violation of the accident analysis bounds.

Six hours is a reasonable time that permits the plant power to be reduced at an orderly rate in conjunction with even control of steam generator (SG) heat removal.

C.1

Cold leg temperature is a controllable and measurable parameter. If this parameter is not within the LCO limits, action must be taken to restore the parameter. 4

The 2 hour Completion Time is based on plant operating experience that shows that the parameter can be restored in this time period.

D.1

If Required Action C.1 is not met within the associated Completion Time, THERMAL POWER must be reduced to ≤ [30%] RTP. Plant operation may continue for an indefinite period of time in this condition. At the reduced power level, the potential for violation of the DNB limits is greatly reduced. 4

The 6 hour Completion Time is a reasonable time that permits power reduction at an orderly rate in conjunction with even control of SG heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1 2

[Since Required Action A.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for pressurizer pressure is sufficient to ensure that the pressure can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and verify operation is within safety analysis assumptions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
--]

SR 3.4.1.2

[Since Required Action A.1 allows a Completion Time of 2 hours to restore parameters that are not within limits, the 12 hour Surveillance Frequency for cold leg temperature is sufficient to ensure that the RCS coolant temperature can be restored to a normal operation, steady state condition following load changes and other expected transient operations. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess for potential degradation and to verify operation is within safety analysis assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
--]

 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.1.3

[The 12 hour Surveillance Frequency for RCS total flow rate is performed using the installed flow instrumentation. The 12 hour Frequency has been shown by operating experience to be sufficient to assess for potential degradation and to verify operation is within safety analysis assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 5
--]

This SR is modified by a Note that only requires performance of this SR in MODE 1. The Note is necessary to allow measurement of RCS flow rate at normal operating conditions at power with all RCPs running. 4

SR 3.4.1.4

Measurement of RCS total flow rate by performance of a precision calorimetric heat balance. This allows the installed RCS flow instrumentation to be calibrated and verifies that the actual RCS flow rate is within the bounds of the analyses.

[The Frequency of [18] months reflects the importance of verifying flow after a refueling outage where the core has been altered, which may have caused an alteration of flow resistance. 2

 1

 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 5

The SR is modified by a Note that states the SR is only required to be performed [24] hours after ≥ [90]% RTP. The Note is necessary to allow measurement of the flow rate at normal operating conditions at power in MODE 1. The Surveillance cannot be performed in MODE 2 or below, and will not yield accurate results if performed below 90% RTP. 2

REFERENCES 1. FSAR, ~~Section [15]~~. 2

U

Chapter 15

 1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.1, BASES, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The ISTS references LCO 3.1.7, "Part Length CEA Insertion Limits." Part length CEAs are no longer a design feature at PSL Unit 1 and Unit 2. To reflect the current licensing basis, the LCO 3.1.7 reference is deleted. The ISTS includes ISTS 3.2.1, Linear Heat Rate (LHR), ISTS 3.2.2, Total Planar Radial Peaking Factor, ISTS 3.2.3, Total Integrated Radial Peaking Factor, ISTS 3.2.4, Azimuthal Power Tilt, and ISTS 3.2.5, Axial Shape Index (ASI). CTS do not include a Specification for ISTS 3.2.2, Total Planar Radial Peaking Factor. Therefore, the ISTS is renumbered. ISTS 3.2.3, Total Integrated Radial Peaking Factor, ISTS 3.2.4, Azimuthal Power Tilt, and ISTS 3.2.5, Axial Shape Index, are renumbered as ITS 3.2.2, ITS 3.2.3, and ITS 3.2.4, respectively. Therefore, the ISTS Bases is changed to LCO 3.2.4, Axial Shape Index (ASI).

4. Changes have been made to be consistent with changes made to the Specifications.

5. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.1, RCS PRESSURE, TEMPERATURE, AND FLOW DEPARTURE FROM NUCLEATE BOILING (DNB) LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 2

3.4.2, RCS Minimum Temperature for Criticality

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

MINIMUM TEMPERATURE FOR CRITICALITY

LIMITING CONDITION FOR OPERATION

LCO 3.4.2 ~~3.1.1.5~~ ~~The~~ Each Reactor Coolant System ~~lowest operating~~ loop average temperature (T_{avg}) shall be ≥ 515°F ~~when the reactor is critical~~. A01

Applicability **APPLICABILITY**: MODE~~S~~ 1 with T_{avg} in one or more RCS loops < 525°F, ~~and~~ MODE 2# with T_{avg} in one or more RCS loops < 525°F and. A02

ACTION:

ACTION A With a Reactor Coolant System operating loop temperature (T_{avg}) < 515°F, ~~restore T_{avg} to within its limit within 15 minutes or~~ be in ~~HOT STANDBY~~ MODE 2 with Keff < 1.0 within ~~the next~~ ~~15~~ 30 minutes. A03 A04

SURVEILLANCE REQUIREMENTS

SR 3.4.2.1 ~~4.1.1.5~~ The Reactor Coolant System temperature (T_{avg}) shall be determined to be ≥ 515°F.

~~a. Within 15 minutes prior to achieving reactor criticality, and~~ L01

~~b.~~ In accordance with the Surveillance Frequency Control Program when the reactor is critical and the Reactor Coolant System temperature (T_{avg}) is < 525°F. (Applicability)

\# ~~With~~ K_{eff} ≥ 1.0.

REACTIVITY CONTROL SYSTEMS

MINIMUM TEMPERATURE FOR CRITICALITY

LIMITING CONDITION FOR OPERATION

LCO 3.4.2 ~~3.1.1.5~~ ~~The~~ Each Reactor Coolant System ~~lowest operating~~ average loop temperature (T_{avg}) shall be greater than or equal to 515°F. A01

Applicability **APPLICABILITY**: MODE~~S~~ 1 with T_{avg} in one or more RCS loops < 525°F, ~~and~~ MODE 2# with T_{avg} in one or more RCS loops < 525°F and. A02

ACTION:

ACTION A With a Reactor Coolant System operating loop temperature (T_{avg}) less than 515°F , ~~restore T_{avg} to within its limit within 15 minutes or~~ be in ~~HOT STANDBY~~ MODE 2 with Keff < 1.0 within ~~the next~~ ~~15~~ 30 minutes. A03 A04

SURVEILLANCE REQUIREMENTS

SR 3.4.2.1 ~~4.1.1.5~~ The Reactor Coolant System temperature (T_{avg}) shall be determined to be greater than or equal to 515°F:

~~a. Within 15 minutes prior to achieving reactor criticality, and~~ L01

~~b.~~ In accordance with the Surveillance Frequency Control Program when the reactor is critical and the Reactor Coolant System T_{avg} is less than 525°F. Applicability

~~With~~ K_{eff} greater than or equal to 1.0.

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 4.1.1.5.b requires a determination of RCS average temperature (Tavg) per the Frequency in accordance with the Surveillance Frequency Control Program when the reactor is critical and the RCS Tavg is < 525°F. ITS 3.4.2 Applicability states "MODE 1 with Tavg in one or more RCS loops < 525°F, MODE 2 with Tavg in one or more RCS loops < 525°F and Keff ≥ 1.0." The ITS couples the monitoring temperature limit with the Applicability. This changes the CTS by moving the temperature monitoring requirement from the Surveillance Frequency to the Applicability. This change is designated as administrative, as it results in no technical change to the CTS.

A03 CTS 3.1.1.5 Action states that with a Reactor Coolant System operating loop temperature (Tavg) < 515°F, "restore (Tavg) to within its limit within 15 minutes or be in HOT STANDBY within the next 15 minutes." ITS 3.4.2, ACTION A, states that with Tavg in one or more RCS loops not within limit, be in MODE 2 with keff < 1.0 within 30 minutes. This changes the CTS by eliminating the redundant and unnecessary requirement to restore Tavg to within its limit within 15 minutes. The change associated with entering MODE 2 with keff < 1.0 instead of HOT STANDBY is discussed in DOC A04.

This change is acceptable because it results in no technical change to the Technical Specifications. Although CTS 3.1.1.5 Action appears to only allow 15 minutes to restore the parameter to within the limit, it actually allows the entire 30 minutes to either restore the parameter to within limits or to be in HOT STANDBY (essentially outside the Applicability of CTS 3.1.1.5). In addition, CTS 3.1.1.5 Action only requires actual steps to begin reducing reactor power at the beginning of the last 15 minutes of the 30-minute interval. However, CTS 3.0.2 states that if the LCO is restored prior to expiration of the specified interval, completion of the Action requirements is not required. Therefore, for this case, if the parameter is restored between 15 minutes and 30 minutes after the LCO is not met, completion of the CTS 3.1.1.5 Action to be in HOT STANDBY is not required. Thus, 30 minutes is currently allowed for either the parameter to be restored to within its limit or the unit to be in HOT STANDBY (i.e., only one of the two CTS Actions must be met within 30 minutes). The CTS 3.0.2 requirement is retained in proposed ITS LCO 3.0.2. Therefore, this change does not expand the total time interval allowed to restore the parameter, as a 30-minute interval is already allowed by the CTS. This change is designated as administrative as it results in no technical change to the CTS.

A04 CTS 3.1.1.5 Action states that with a RCS operating loop temperature (Tavg) < 515°F, restore Tavg to within its limit within 15 minutes or "be in HOT STANDBY within the next 15 minutes." ITS 3.4.2, ACTION A, states that with Tavg in one or more RCS loops not within limit, be in MODE 2 with keff < 1.0 within 30 minutes. This changes the CTS from requiring the unit to be in HOT STANDBY to be in MODE 2 with keff < 1.0. Other changes to this CTS Action are discussed in DOC A03.

This change is acceptable because it results in no technical change to the Technical Specifications. CTS 3.1.1.5 is applicable in MODE 1 and MODE 2 with keff ≥ 1.0. CTS 3.0.1 states that compliance with the LCO is required during the MODES or other conditions specified therein, except that upon failure to meet the LCO, the associated Action requirements shall be met. Additionally, CTS 3.0.2 states, in part, that if the LCO is met or no longer applicable prior to expiration of the specified time interval, completion of the actions is not required. Therefore, the CTS 3.1.1.5 Action to be in MODE 3 ceases to be applicable once the unit enters MODE 2 with keff < 1.0, and the Action is exited. As a result, changing the Action to "be in MODE 2 with keff < 1.0," results in no operational difference from the CTS Action. This change is designated as administrative, as it results in no technical change to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 *(Category 7 – Relaxation Of Surveillance Frequency)* CTS 4.1.1.5.a states that the RCS temperature (Tavg) shall be determined to be ≥ 515°F within 15 minutes prior to achieving reactor criticality. ITS SR 3.4.2.1 requires RCS Tavg in each loop to be verified ≥ 515°F "In accordance with the Surveillance Frequency Control Program when the reactor is critical and the RCS temperature (Tavg) is < 525°F."

The purpose of CTS 4.1.1.5.a is to ensure RCS temperature (Tavg) is within limit when the reactor is critical. The requirement is that RCS Tavg be ≥ 515°F when the unit is operating in MODE 1 and MODE 2 with keff ≥ 1.0. CTS 4.0.4 (ITS SR 3.0.4) requires the SR to be met prior to entry into MODE 2 with keff ≥ 1.0 before the reactor is critical. Therefore, the RCS Tavg must be determined prior to achieving criticality.

This change is acceptable because the Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of assurance. With RCS temperature (Tavg) < 525°F, CTS 4.0.4 (ITS SR 3.0.4) requires the Surveillance to be performed within 30 minutes (i.e., periodic Frequency in accordance with the Surveillance Frequency Control Program) prior to achieving criticality. This Frequency is adequate to prevent an inadvertent violation of the LCO. In the approach to criticality, the reactor coolant pumps are adding heat to the RCS, so the conditions before and after criticality are similar. The approach to criticality is a carefully controlled evolution where RCS temperature is closely monitored. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.2 RCS Minimum Temperature for Criticality

LCO 3.1.1.5 LCO 3.4.2 Each RCS loop average temperature (T_{avg}) shall be ≥ [520]°F. 515 (2)

Applicability Footnote # 4.1.1.5.b APPLICABILITY: MODE 1 with T_{avg} in one or more RCS loops < [535]°F, 525 (2)
MODE 2 with T_{avg} in one or more RCS loops < [535]°F and K_{eff} ≥ 1.0. 525

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME
3.1.1.5 Actions	A. T_{avg} in one or more RCS loops not within limit.	A.1	Be in MODE 2 with K_{eff} < 1.0.	30 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.1.5	SR 3.4.2.1	Verify RCS T_{avg} in each loop ≥ [520]°F. 515	[12 hours OR In accordance with the Surveillance Frequency Control Program]	(2)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.2 RCS Minimum Temperature for Criticality

LCO 3.1.1.5 LCO 3.4.2 Each RCS loop average temperature (T_{avg}) shall be ≥ ~~[520]~~ 515 °F. 2

Applicability Footnote # 4.1.1.5.b APPLICABILITY: MODE 1 with T_{avg} in one or more RCS loops < ~~[535]~~ 525 °F, 2
MODE 2 with T_{avg} in one or more RCS loops < ~~[535]~~ 525 °F and K_{eff} ≥ 1.0.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.1.5 Actions	A. T_{avg} in one or more RCS loops not within limit.	A.1 Be in MODE 2 with K_{eff} < 1.0.	30 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.1.1.5	SR 3.4.2.1 Verify RCS T_{avg} in each loop ≥ ~~[520]~~ 515 °F.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.2, RCS MINIMUM TEMPERATURE FOR CRITICALITY

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.2 RCS Minimum Temperature for Criticality

BASES

BACKGROUND

Establishing the value for the minimum temperature for reactor criticality is based upon considerations for:

a. Operation within the existing instrumentation ranges and accuracies,

b. Operation within the bounds of the existing accident analyses, and

c. Operation with the reactor vessel above its minimum nil ductility reference temperature when the reactor is critical.

The reactor coolant moderator temperature coefficient used in core operating and accident analysis is typically defined for the normal operating temperature range (532°F to ~~573~~ [580°F] °F). The Reactor Protection System receives inputs from the narrow range hot [and cold] leg temperature detectors, which have a range of ~~520°F to 620°F~~ [515°F to 665°F and 465°F to 615°F, respectively]. The RCS loop average temperature (T_{avg}) is controlled using inputs of the same range. Nominal T_{avg} for making the reactor critical is 532°F. Safety and operating analyses for lower temperature have not been made. 1

APPLICABLE SAFETY ANALYSES

There are no accident analyses that dictate the minimum temperature for criticality, but all low power safety analyses assume initial temperatures near the ~~[520]~~ [515] °F limit (Ref. 1). 2

The RCS minimum temperature for criticality satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of the LCO is to prevent criticality outside the normal operating range (532°F to 573°F) and to prevent operation in an unanalyzed condition.

The LCO is only applicable below ~~[535]~~ [525] °F and provides a reasonable distance to the limit of ~~[520]~~ [515] °F. This allows adequate time to trend its approach and take corrective actions prior to exceeding the limit. 2

APPLICABILITY

The reactor has been designed and analyzed to be critical in MODES 1 and 2 only and in accordance with this specification. Criticality is not permitted in any other MODE. Therefore, this LCO is applicable in MODE 1, and MODE 2 when $K_{eff} \geq 1.0$. Coupled with the applicability definition for criticality is a temperature limit. Monitoring is required ~~at or~~ below a T_{avg} of ~~[535]~~ [525] °F. ~~The no load temperature of 544°F is maintained by the Steam Dump Control System.~~ 2 3

BASES

ACTIONS

A.1

515

If T_{avg} is below [520]°F, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 2 with K_{eff} < 1.0 within 30 minutes. Rapid reactor shutdown can be readily and practically achieved within a 30 minute period. The allowed time reflects the ability to perform this action and to maintain the plant within the analyzed range. 2

SURVEILLANCE REQUIREMENTS

SR 3.4.2.1

515

RCS loop average temperature is required to be verified at or above [520]°F. [The SR to verify RCS loop average temperatures every 12 hours takes into account indications and alarms that are continuously available to the operator in the control room and is consistent with other routine Surveillances which are typically performed once per shift. In addition, operators are trained to be sensitive to RCS temperature during approach to criticality and will ensure that the minimum temperature for criticality is met as criticality is approached. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 4
---]

REFERENCES

1. FSAR, Section [15]. 2

U Chapter 15 1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.2 RCS Minimum Temperature for Criticality

BASES

BACKGROUND

Establishing the value for the minimum temperature for reactor criticality is based upon considerations for:

a. Operation within the existing instrumentation ranges and accuracies,

b. Operation within the bounds of the existing accident analyses, and

c. Operation with the reactor vessel above its minimum nil ductility reference temperature when the reactor is critical.

The reactor coolant moderator temperature coefficient used in core operating and accident analysis is typically defined for the normal operating temperature range (532°F to ~~573~~°F) [580°F]. The Reactor Protection System receives inputs from the narrow range hot [and cold] leg temperature detectors, which have a range of ~~520°F to 620°F~~ [515°F to 665°F and 465°F to 615°F, respectively]. The RCS loop average temperature (T_{avg}) is controlled using inputs of the same range. Nominal T_{avg} for making the reactor critical is 532°F. Safety and operating analyses for lower temperature have not been made. 1

APPLICABLE SAFETY ANALYSES

There are no accident analyses that dictate the minimum temperature for criticality, but all low power safety analyses assume initial temperatures near the ~~[520]~~ [515]°F limit (Ref. 1). 2

The RCS minimum temperature for criticality satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of the LCO is to prevent criticality outside the normal operating range (532°F to 573°F) and to prevent operation in an unanalyzed condition.

The LCO is only applicable below ~~[535]~~ [525]°F and provides a reasonable distance to the limit of ~~[520]~~ [515]°F. This allows adequate time to trend its approach and take corrective actions prior to exceeding the limit. 2

APPLICABILITY

The reactor has been designed and analyzed to be critical in MODES 1 and 2 only and in accordance with this specification. Criticality is not permitted in any other MODE. Therefore, this LCO is applicable in MODE 1, and MODE 2 when $K_{eff} \geq 1.0$. Coupled with the applicability definition for criticality is a temperature limit. Monitoring is required ~~at or~~ below a T_{avg} of ~~[535]~~ [525]°F. ~~The no load temperature of 544°F is maintained by the Steam Dump Control System.~~ 2 3

BASES

ACTIONS

A.1

515

If T_{avg} is below [520]°F, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 2 with K_{eff} < 1.0 within 30 minutes. Rapid reactor shutdown can be readily and practically achieved within a 30 minute period. The allowed time reflects the ability to perform this action and to maintain the plant within the analyzed range. 2

SURVEILLANCE REQUIREMENTS

SR 3.4.2.1

515

RCS loop average temperature is required to be verified at or above [520]°F. [The SR to verify RCS loop average temperatures every 12 hours takes into account indications and alarms that are continuously available to the operator in the control room and is consistent with other routine Surveillances which are typically performed once per shift. In addition, operators are trained to be sensitive to RCS temperature during approach to criticality and will ensure that the minimum temperature for criticality is met as criticality is approached. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 4
---]

REFERENCES

1. FSAR, Section [15]. 2

U Chapter 15 1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.2, BASES, RCS MINIMUM TEMPERATURE FOR CRITICALITY

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The ISTS Applicability contains reference to no load temperature maintained by the Steam Bypass Control System or Atmospheric Dump Valves. This information is not related to the ITS 3.4.2 Applicability for the RCS minimum temperature for criticality and is deleted.

4. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.2, RCS MINIMUM TEMPERATURE FOR CRITICALITY

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 3

3.4.3, RCS Pressure and Temperature (P/T) Limits

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

EACTOR COOLANT SYSTEM

3/4.4.9 PRESSURE/TEMPERATURE LIMITS

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION

LA01 3.4.3-1 and 3.4.3-2 , and RCS heatup and cooldown rates

LCO 3.4.3 3.4.9.1 The Reactor Coolant System (except the pressurizer) temperature and pressure shall be limited in accordance with the limit lines shown on Figures 3.4-2a and 3.4-2b during heatup, cooldown, criticality, and inservice leak and hydrostatic testing.

maintained within A02

Applicability **APPLICABILITY:** At all times.*

A03 Add proposed Conditions A and C Notes M02

ACTION:

parameter(s) LA02

ACTIONS A and With any of the above limits exceeded, restore the temperature and/or pressure to within the limits within 30 minutes; perform an analysis to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System; determine that the Reactor Coolant System remains acceptable for continued operations or be in at least HOT STANDBY within the next

ACTION B 6 hours and reduce the RCS T_{avg} to less than 200°F within the following 30 hours in accordance with Figure 3.4-2b. Be in MODE 5

within 72 hours 36 MODE 3 M01

LCO 3.4.3 * During hydrostatic testing operations above system design pressure, a maximum temperature change in any one hour period shall be limited to 5°F.

shall be maintained of ≤ A04

Add proposed ACTION C M02

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS

~~4.4.9.1~~

Verify | shown in Figures 3.4.3-1 and 3.4.3-2 | , and RCS heatup and cooldown rates

SR 3.4.3.1 ~~a.~~ ~~The~~ Reactor Coolant System temperature and pressure ~~shall be determined to be~~ within the limits in accordance with the Surveillance Frequency Control Program

SR 3.4.3.1 Note during system heatup, cooldown, and inservice leak and hydrostatic testing operations.

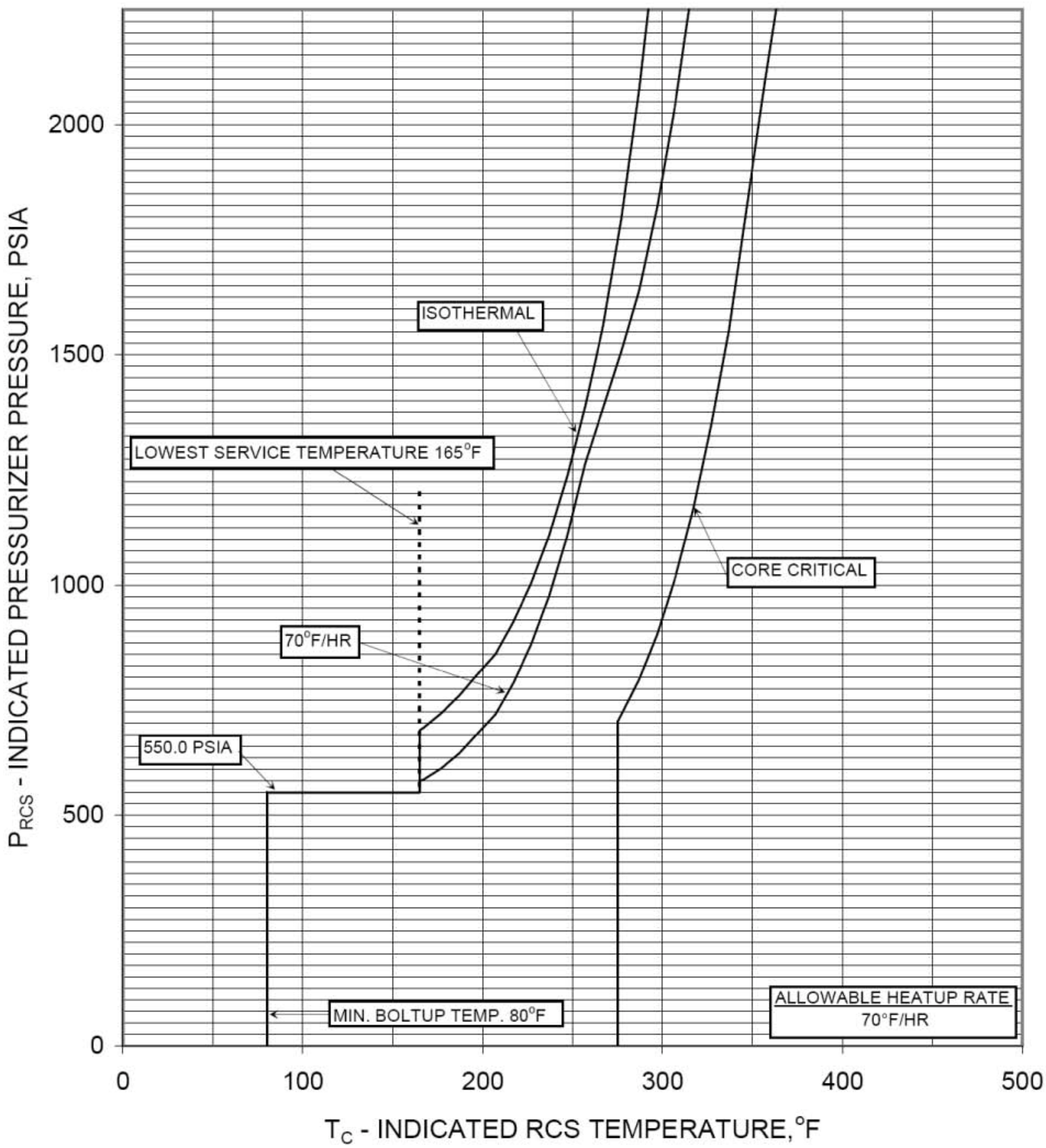
~~b. The Reactor Coolant System temperature and pressure conditions shall be determined to be to the right of the criticality limit line within 15 minutes prior to achieving reactor criticality.~~ L02

~~c. The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties as required by 10 CFR 50 Appendix H. The results of these examinations shall be used to update Figures 3.4-2a and 3.4-2b.~~ L01

FIGURE ~~3.4-2a~~ 3.4.3-1

~~ST. LUCIE UNIT 1~~ P/T LIMITS, 54 EFPY
HEATUP AND ~~CORE~~ CRITICAL ITY LIMITS

INSERT 1



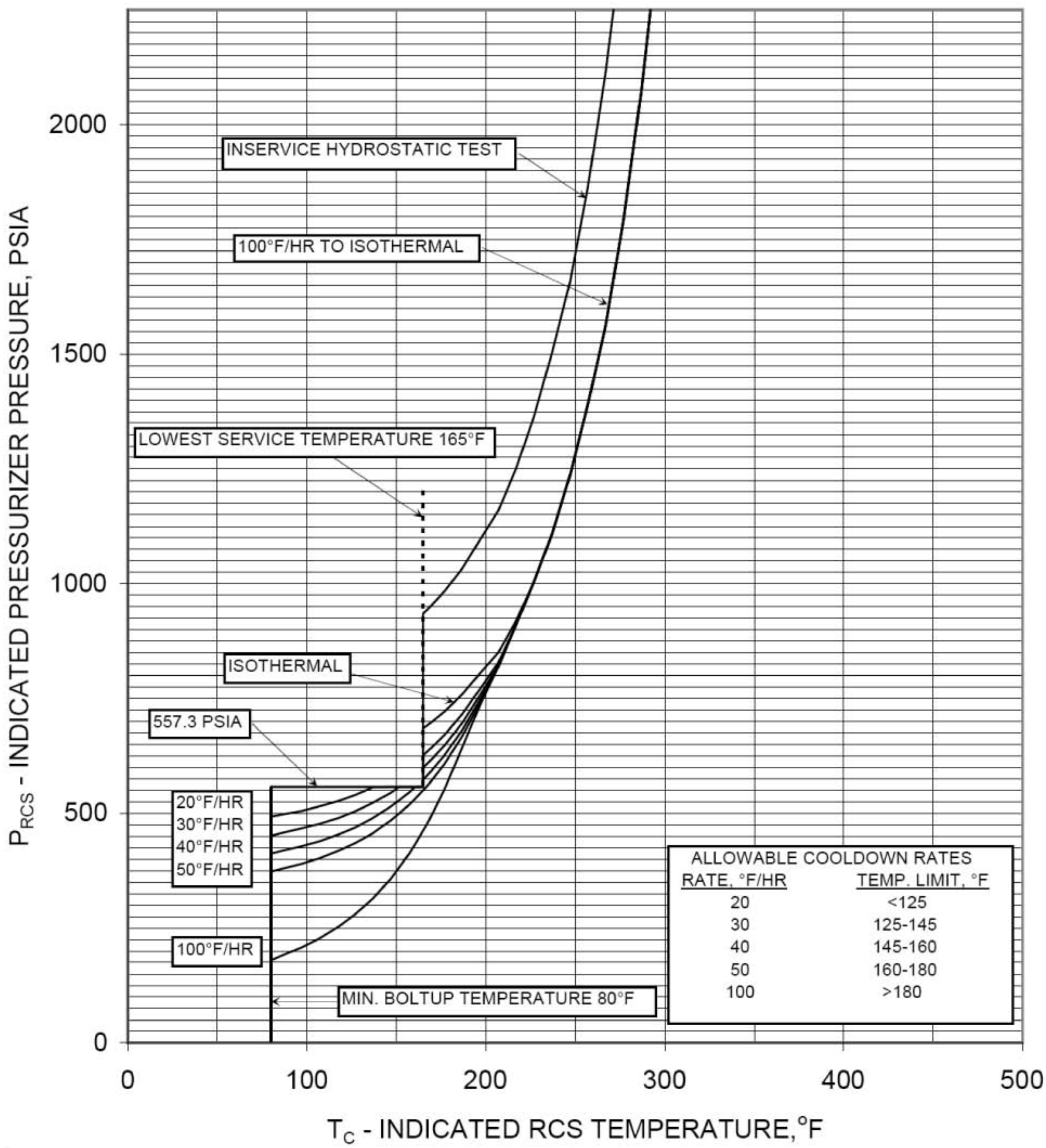
~~Limiting Material: Lower Shell Axial Welds (Ht. #305424)~~
~~Limiting ART Values at 54 EFPY: 1/4T, 210°F~~
~~3/4T, 156°F~~

L03

FIGURE 3.4-2b 3.4.3-2

ST. LUCIE UNIT 1 P/T LIMITS, 54 EFPY
COOLDOWN AND INSERVICE TEST LIMITS

INSERT 1



Limiting Material: Lower Shell Axial Welds (Ht. #305424)
Limiting ART Values at 54 EFPY: 1/4T, 210°F
3/4T, 156°F

L03

A01

~~DELETED~~

~~DELETED~~

A01

~~DELETED~~

A01

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

Pages 3/4 4-28 through 3/4 4-55 (Amendment No. 90), and Pages 3/4 4-56 through 3/4 4-57 (Amendment No. 80) have been deleted from the Technical Specifications. The next page is 3/4 4-58.

REACTOR COOLANT SYSTEM

3/4.4.9 PRESSURE/TEMPERATURE LIMITS

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION

LA01 3.4.3-1 and 3.4.3-2 , and RCS heatup and cooldown rates

LCO 3.4.3 ~~3.4.9.1~~ The Reactor Coolant System ~~(except the pressurizer)~~ temperature and pressure ~~shall be limited in accordance with~~ the limit~~ lines~~s shown on Figures ~~3.4-2 and 3.4-3~~ ~~during heatup, cooldown, criticality, and inservice leak and hydrostatic testing~~.

maintained within

A02

Applicability **APPLICABILITY:** At all times.

A03 Add proposed Conditions A and C Notes

ACTION:

M02 parameter(s)

ACTIONS A and C With any of the above limits exceeded, restore ~~the temperature and/or pressure~~ to within the limits within 30 minutes; ~~perform an engineering evaluation to determine the effects of the out-of-limit condition on the structural integrity of the Reactor Coolant System;~~ determine that the Reactor Coolant System remains acceptable for continued operations or be

LA02

M01 within 72 hours

ACTION B in ~~at least HOT STANDBY~~ within ~~the next~~ 6 hours and ~~reduce the RCS T_{avg} to less than 200°F~~ within ~~the next~~ ~~30~~ hours ~~in accordance with Figure 3.4-3~~.

Be in MODE 5

36

M02 Add proposed ACTION C

SURVEILLANCE REQUIREMENTS

Verify shown in Figures 3.4.3-1 and 3.4.3-2

SR 3.4.3.1 ~~4.4.9.1.1~~ ~~The~~ Reactor Coolant System temperature and pressure ~~shall be determined to be~~ within the limits in accordance with the Surveillance Frequency Control Program

SR 3.4.3.1 Note during system heatup, cooldown, and inservice leak and hydrostatic testing operations.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

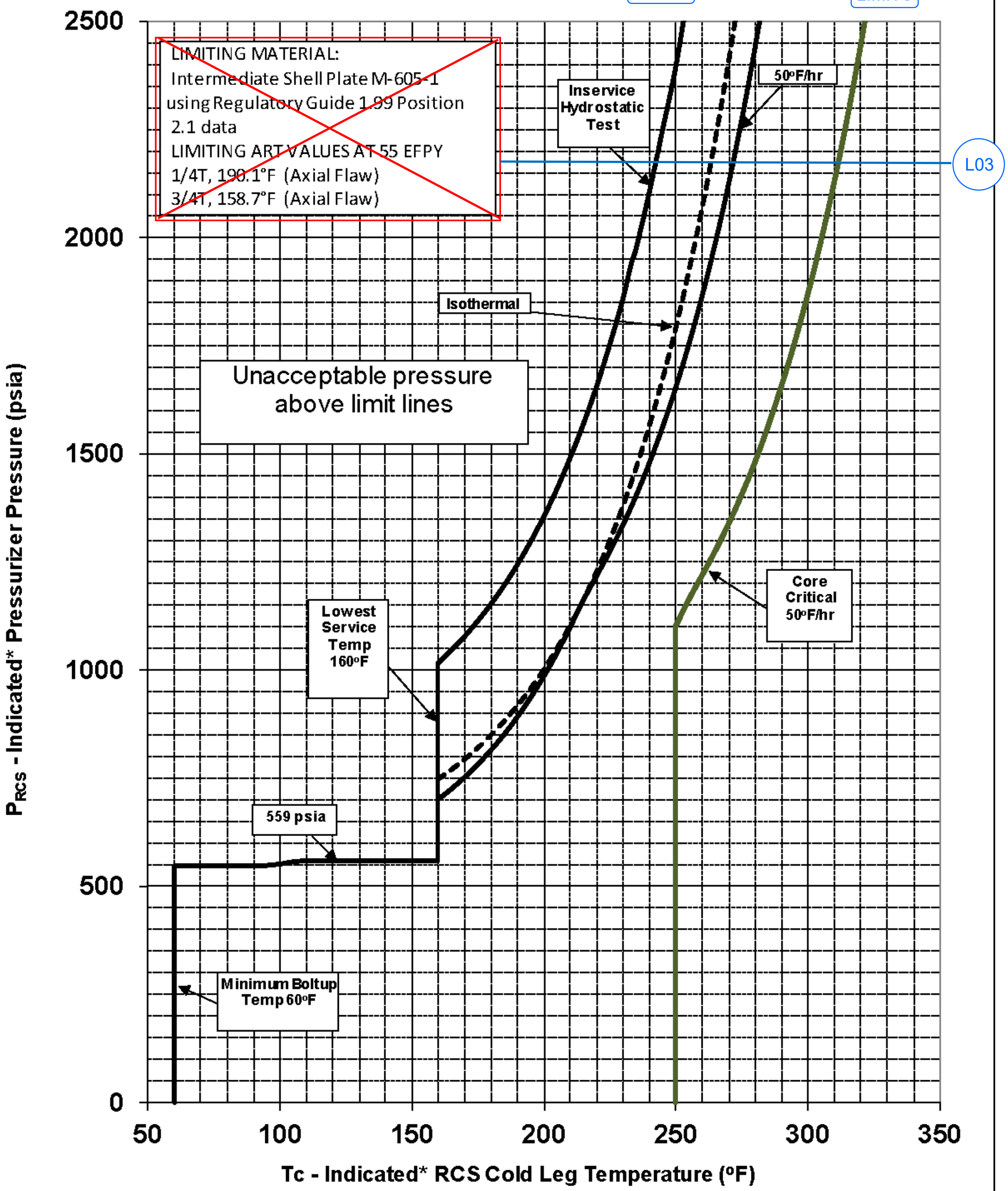
~~4.4.9.1.2 The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties, as required by 10 CFR 50 Appendix H. The results of these examinations shall be used to update Figures 3.4-2 and 3.4-3.~~ L01

A01

FIGURE ~~3.4-2~~ 3.4.3-1

INSERT 1

~~ST. LUCIE UNIT 2~~ REACTOR COOLANT SYSTEM PRESSURE-TEMPERATURE LIMITS FOR 55 EFPY, HEATUP, ~~CORE~~ CRITICALITY, AND INSERVICE TEST LIMITS

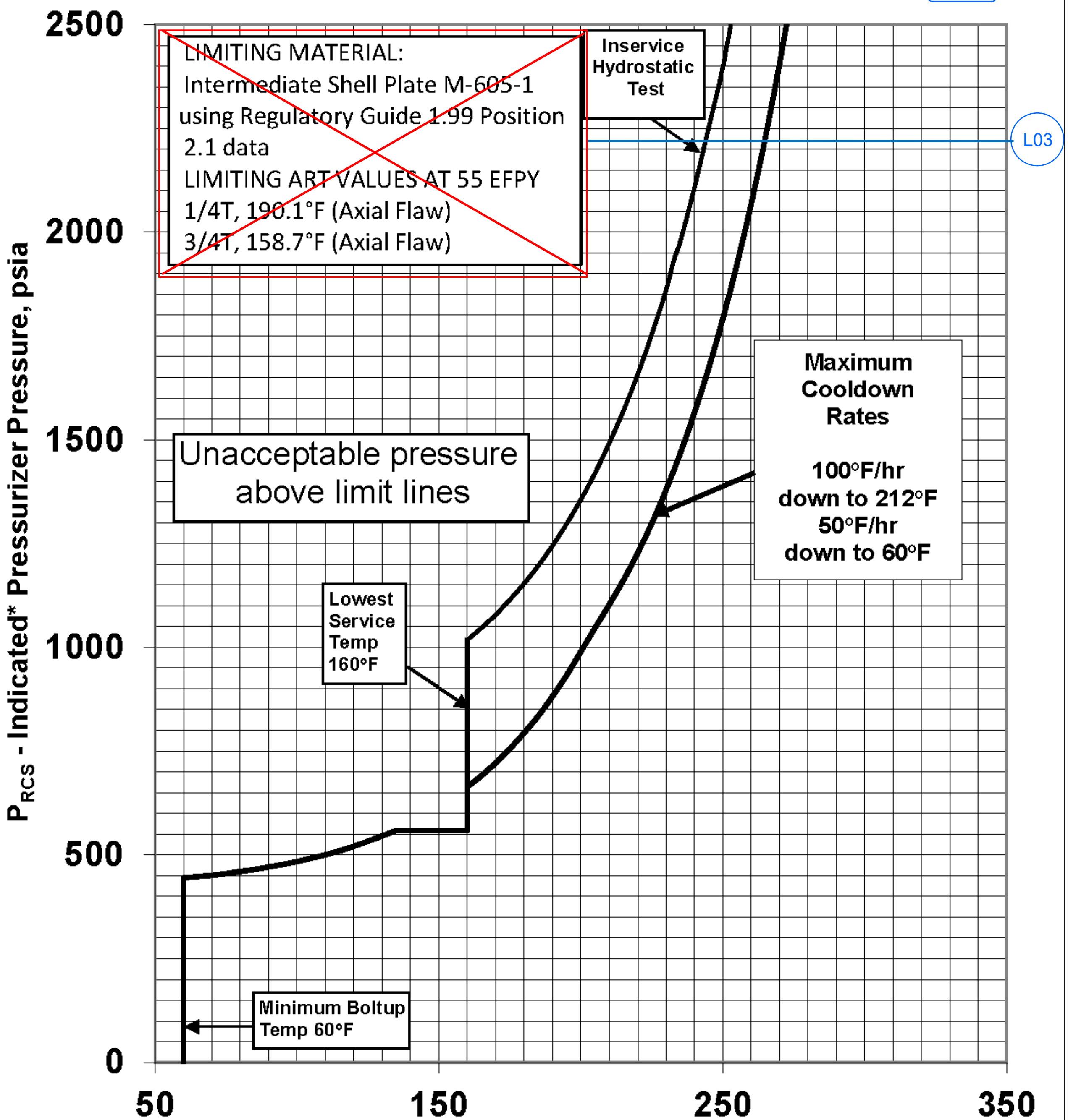


*Excludes Instrument Uncertainty

FIGURE ~~3.4-3~~ 3.4.3-2

~~ST. LUCIE UNIT 2~~ REACTOR COOLANT SYSTEM PRESSURE-TEMPERATURE LIMITS FOR 55 EFPY, COOLDOWN AND INSERVICE TEST LIMITS

INSERT 1



*Excludes Instrument Uncertainty

~~DELETED~~

A01

~~DELETED~~

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.4.9.1 requires that the RCS temperature and pressure shall be limited in accordance with the limit lines shown in the applicable CTS figures "during heatup, cooldown, criticality, and inservice leak and hydrostatic testing." CTS 3.4.9.1 is applicable "at all times." ITS 3.4.3 states that the RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in Figures 3.4.3-1 and 3.4.3-2. ITS 3.4.3 is applicable "at all times". The CTS LCO is revised to conform to the ISTS. This changes the CTS by eliminating the LCO requirement that the limits must be met during heatup, cooldown, and inservice leak and hydrostatic testing.

This change is acceptable because the limits protecting the reactor vessel and RCS are applicable at all times, including heatup, cooldown, and inservice leak and hydrostatic testing. The RCS pressure and temperature limits are not Mode dependent but are always required to assure the safety of the reactor vessel without exception. Stating that the limits are applicable during heatup, cooldown, and inservice leak and hydrostatic testing in the LCO is not required with the applicability of "at all times" which encompasses the more specific and limited CTS conditions. The applicability provides assurance that the RCS is maintained within the required limits and that the plant will continue to be operated in a safe manner. The list of conditions is duplicative of the conditions stated in the Surveillance. This allowance is more appropriately retained in the Note to SR 3.4.3.1 stating that the SR is only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A03 CTS 3.4.9.1 Action states, in part, that with any of the P/T limits exceeded, restore the temperature and/or pressure to within the limits within 30 minutes, perform an analysis to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System, and determine that the Reactor Coolant System remains acceptable for continued operations. ITS 3.4.3, Condition A and Condition C are modified by a Note which requires the determination that the RCS is acceptable for continued operation to be performed whenever the Condition is entered. This changes the CTS by explicitly stating that a determination that the RCS is acceptable for continued operation must be performed whenever the condition is entered. Other changes to the Actions are described in other DOCs. This change is acceptable because it is the current understanding and application of the CTS Action. The CTS 3.4.9.1 Action is currently interpreted as requiring a determination that the RCS is acceptable for continued operation whenever the LCO is not met. This change is designated as administrative as it clarifies the current understanding of the CTS requirement while providing an "unless otherwise stated," to the requirements of CTS 3.0.2 (ITS LCO 3.0.2).

A04 **Unit 1 only:** CTS 3.4.9.1 Applicability is modified by a footnote that states "During hydrostatic testing operations above system design pressure, a maximum temperature change in any one hour period shall be limited to 5°F." ITS 3.4.3 does not contain this Note. The Note is reworded as "A maximum temperature change of ≤ 5°F in any one hour period during hydrostatic testing above system design pressure" and added as a Note to the ITS Applicability. This change is designated as an administrative change and is acceptable because it does do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.4.9.1 Action states, in part, that with any of the P/T limits exceeded, restore the temperature and/or pressure to within the limits within 30 minutes, perform an analysis to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System, and determine that the Reactor Coolant System remains acceptable for continued operations. ISTS 3.4.3 Required Action A.2 requires determination that RCS is acceptable for continued operation within 72 hours. The CTS is revised to incorporate the 72 hour Completion Time. This changes the CTS by requiring determination that RCS is acceptable for continued operation within 72 hours.

The change is acceptable because besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify the reactor coolant pressure boundary (RCPB) integrity remains acceptable and must be completed before continuing operation. The 72 hour Completion Time is reasonable to accomplish the evaluation. The evaluation for a mild violation is possible within this time, but more severe violations may require special, event specific stress analyses or inspections. CTS and ISTS provide shutdown Actions if the RCS is not determined to be acceptable for continued operation. This change is designated as more restrictive because it establishes a Completion Time that was not in the CTS.

M02 CTS 3.4.9.1 Action states, in part, that with any of the P/T limits exceeded, restore the temperature and/or pressure to within the limits within 30 minutes, perform an analysis to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System, and determine that the Reactor Coolant System remains acceptable for continued operations. The applicability for these Actions is "at all times." ITS 3.4.3 provides separate Conditions (Conditions A and C) to differentiate between ACTIONS in MODES 1, 2, 3, and 4 and ACTIONS in conditions other than MODES 1, 2, 3, and 4. ITS 3.4.3 ACTION C provides requirements for "immediate" restoration of parameters to within limits and determination that RCS is acceptable for continued operation "prior to entering MODE 4." This changes the CTS by requiring an RCS PT limit violation in conditions other than MODE 1, 2, 3, or 4 to be corrected immediately and provides a time to complete the determination that the RCS is acceptable for continued operation.

The change is necessary because the actions of this LCO, anytime other than in MODE 1, 2, 3, or 4, consider the premise that a violation of the limits occurred during normal plant maneuvering. The CTS Action would appear to provide a half hour in which pressure and temperature requirements could exceed the limits, even if capable of being returned to within limits. Also, if the parameters are incapable of being restored within the limits within 30 minutes, the existing Action would appear to result in the requirement of a Licensee Event Report, since no additional Actions apply (the unit is already in MODE 5 or below). The Actions are more appropriately presented in ITS 3.4.3 ACTION C. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses. The Completion Time of "immediately" reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner. Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed before continuing operation. The Completion Time of prior to entering MODE 4 forces the evaluation prior to entering a MODE where temperature and pressure can be significantly increased. This change is designated as more restrictive because it establishes Actions with more restrictive Action Completion Times that are applicable anytime other than in MODE 1, 2, 3, or 4, and that are not in the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.4.9.1 states, that the reactor coolant system (except the pressurizer) temperature and pressure shall be limited in accordance with the limit lines shown on Figures 3.4-2a and 3.4 2b during heatup, cooldown, criticality, and inservice leak and hydrostatic testing." ITS 3.4.3 states that RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained with limits shown in Figures 3.4.3-1 and 3.4.3-2. This changes the CTS by moving the statement "(except the pressurizer)" which excludes the pressurizer from the LCO limit, to the Bases.

The removal of these details, which are related to design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The RCS P/T limits are applicable to RCPB ferritic materials associated with 10 CFR 50, Appendix G and ASME Code, Section III, Appendix G. The ITS still retains the RCS P/T limits. Neither the CTS nor the ITS P/T limits apply to the pressurizer. It is the ITS convention to state this detail in the ITS Bases. This detail of the LCO is not required to be in the Technical Specifications in order to provide adequate protection of the public health and safety. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.4.9 Action states, in part, to perform an analysis to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System and determine that the reactor coolant system remains acceptable for continued operation. ITS 3.4.3 also states to determine the RCS is acceptable for continued operation. This changes the CTS by removing these procedural details on how to determine the RCS is acceptable for continued operation, since details on how to make this determination are provided in the ITS 3.4.3 Bases.

The purpose of the CTS action requirements is to verify that the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components. ITS 3.4.3 Bases Background and ACTIONS A.1 and A.2 discussions provide details for evaluating that the RCS is acceptable for continued operation. The removal of these procedural details from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the Action to determine the RCS is acceptable for continued operation. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of procedural detail because information relating to the method of performing an action is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 5 - Deletion of Surveillance Requirement)* Unit 1 CTS 4.4.9.1.c and Unit 2 CTS 4.4.9.1.2 specify "The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties as required by 10 CFR 50 Appendix H. The results of these examinations shall be used to update Figures 3.4-2a and 3.4-2b." ISTS 3.4.3 does not contain a corresponding requirement. The CTS is revised to conform to the ISTS. This changes the CTS by deleting Unit 1 CTS 4.4.9.1.c and Unit 2 CTS 4.4.9.1.2 surveillance requirements.

This change is acceptable because the CTS surveillance is not required to assure the pressure and temperature limits in the LCO are properly updated. The unit is required to remove material irradiation surveillance specimens and generate new pressure and temperature curves in accordance with 10 CFR 50, Appendix H. Therefore, the CTS surveillance is redundant to the applicable federal regulations and is not required to assure compliance with the requirements of the federal regulations. The Code of Federal Regulations provide sufficient assurance that the pressure and temperature limits are updated when required and the remaining TS requirements provide adequate assurance that the plant is operated within those pressure and temperature limits. Therefore, the proposed change does not adversely impact the safe operation of the plant. The proposed change is designated less restrictive because a surveillance that is required in the CTS will not be required in the ITS.

L02 **Unit 1 only:** *(Category 5 - Deletion of Surveillance Requirement)* CTS 4.4.9.1.b specifies that "the Reactor Coolant System temperature and pressure conditions shall be determined to be to the right of the criticality limit line within 15 minutes prior to achieving reactor criticality." ITS 3.4.3 does not contain a corresponding requirement. The CTS is revised to conform to the ISTS. This changes the CTS by deleting CTS 4.4.9.1.b.

The purpose of the CTS requirement is to ensure the RCS P/T criticality limits are not exceeded during the approach to criticality during a plant startup. The proposed change is acceptable because the remaining TS requirements continue to provide adequate assurance that the required pressure and temperature limits continue to be met. The TS contain a separate requirement (ITS 3.4.2) for the minimum temperature for criticality (515°F). The temperature limit for critical operation provides assurance that critical operation does not occur at temperatures lower than the RCS P/T limits shown in the applicable CTS figure. As stated in the ITS 3.4.3 bases, the RCS minimum temperature for criticality specified in ITS 3.4.2 is more restrictive than the RCS pressure and temperature limits for criticality. Therefore, the performance of CTS surveillance 4.4.9.1.b is not required to assure the plant is operated within the required pressure and temperature limits. The RCS minimum temperature for criticality requirements provide sufficient assurance that the plant is operated within the RCS pressure and temperature limits. The proposed change is designated as less restrictive because a surveillance that is required by the CTS will not be required in the ITS.

L03 (*Category 1 – Relaxation of LCO Requirements*) Unit 1 CTS Figures 3.4-2a and 3.4-2b and Unit 2 CTS Figures 3.4-2 and 3.4-3 describe the limiting material and limiting ART values used to determine the P/T limits. The ITS Figures 3.4.3-1 and 3.4.3-2 do not include this information. This changes the CTS by deleting this information from the CTS.

The purpose of this information is to provide additional detail as to how the P/T curves were generated. However, deleting this information is acceptable because it is not necessary to be listed in the Figures to use the Figures effectively. ITS 3.4.3 requires the Figure limits to be met. The details as to how the Figures are generated is not needed to comply with the LCO. The ITS 3.4.3 Bases describes that the Figures were generated to comply with the applicable regulatory requirements of 10 CFR 50, Appendix G and ASME Section III,

Appendix G. Therefore, since PSL is required to comply with 10 CFR 50, Appendix G and ASME Section III, Appendix G, this additional information is not required. This change is designated as less restrictive because certain details related to how the LCO was generated are being deleted.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.9.1

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in ~~the PTLR~~ Figures 3.4.3-1 and 3.4.3-2. A maximum temperature change of ≤ 5°F in any one hour period shall be maintained during hydrostatic testing operations above system design pressure.

3

4

Applicability

APPLICABILITY: At all times.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.9.1 Action	A. ------------NOTE------------ Required Action A.2 shall be completed whenever this Condition is entered. -------------------------------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
3.4.9.1 Action	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5 ~~with RCS pressure < [500] psig~~.	6 hours 36 hours 5
DOC M02	C. ------------NOTE------------ Required Action C.2 shall be completed whenever this Condition is entered. -------------------------------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.4.9.1 SR 3.4.3.1	-------------------------------NOTE------------------------------ Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. -- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in ~~the PTLR~~ Figures 3.4.3-1 and 3.4.3-2.	~~[30 minutes~~ (2) ~~OR~~ (3) In accordance with the Surveillance Frequency Control Program ~~]~~

INSERT 1 (3)

Insert 1 (2)

CTS Figure
3.4-2a

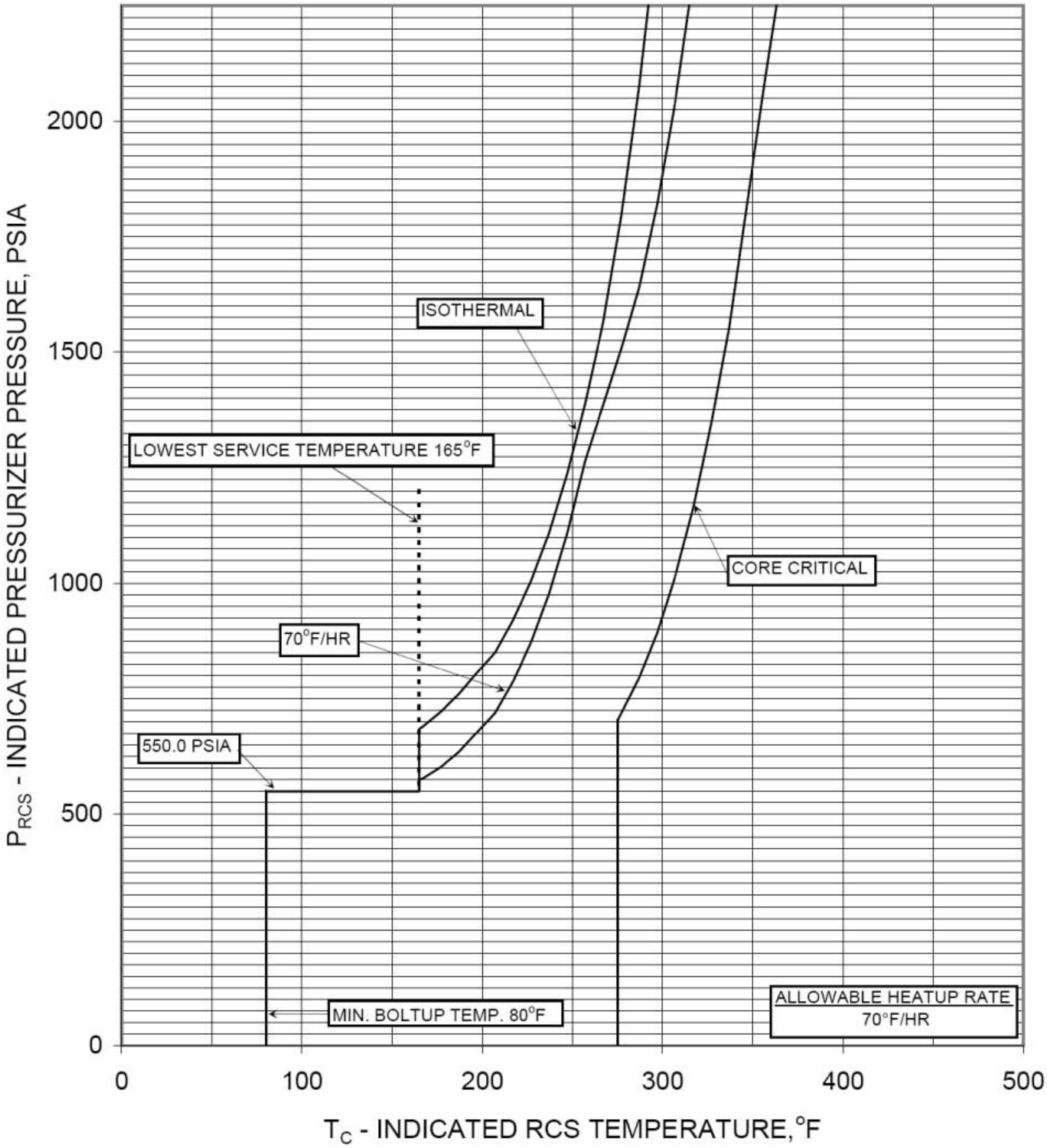


Figure 3.4.3-1
Reactor Coolant System Pressure versus Temperature Limits -
Heatup and Criticality Limits
(54 EFPY)

Insert 1 2

CTS Figure
3.4-2b

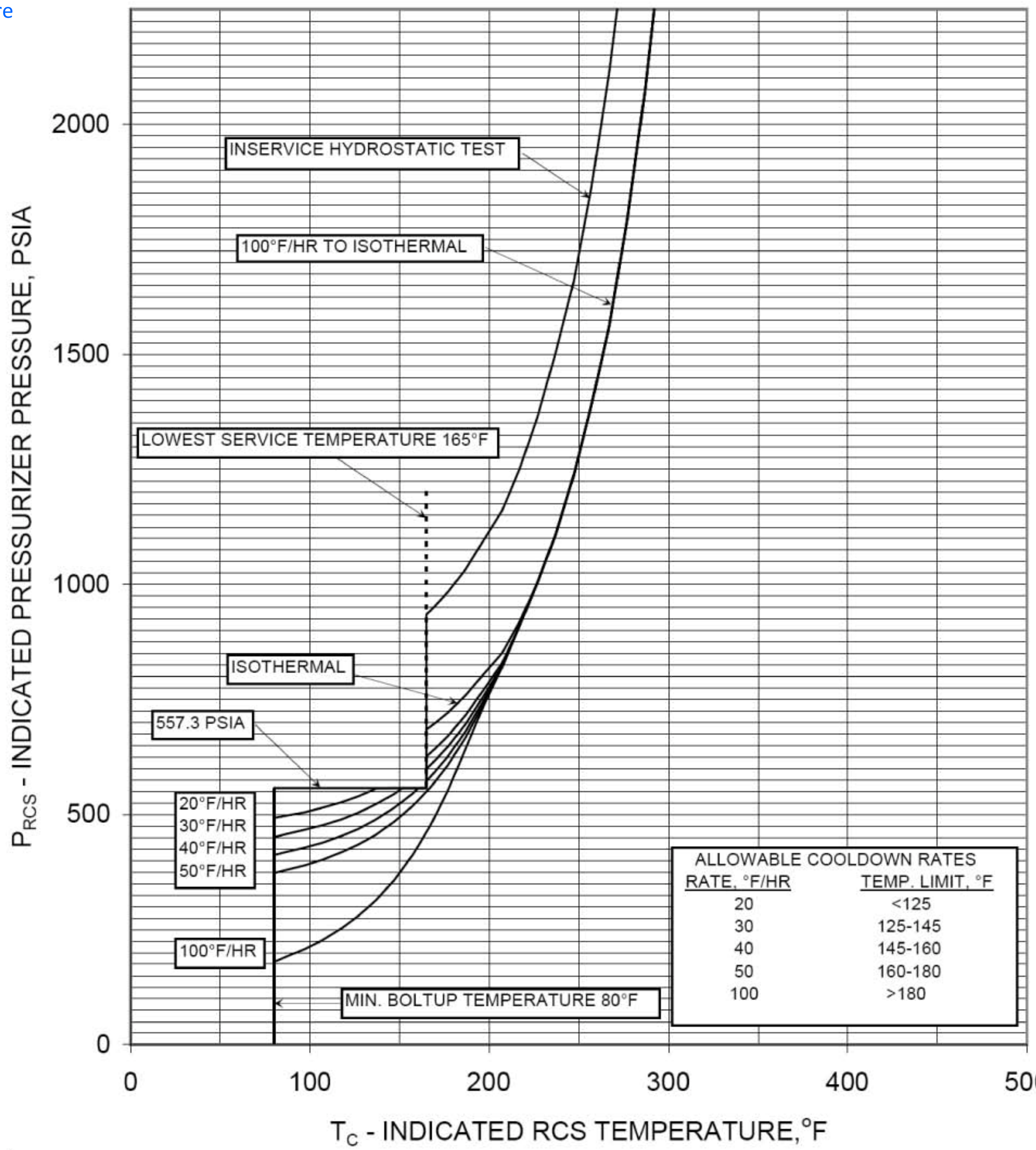


Figure 3.4.3-2
Reactor Coolant System Pressure versus Temperature Limits -
Cooldown and Inservice Test Limits
(54 EFPY)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.9.1 LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in ~~the PTLR~~ Figures 3.4.3-1 and 3.4.3-2. (3)

Applicability APPLICABILITY: At all times.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.9.1 Action	A. ------------NOTE------------ Required Action A.2 shall be completed whenever this Condition is entered. -------------------------------- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits. AND A.2 Determine RCS is acceptable for continued operation.	30 minutes 72 hours
3.4.9.1 Action	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5 ~~with RCS pressure < [500] psig~~. (5)	6 hours 36 hours
DOC M02	C. ------------NOTE------------ Required Action C.2 shall be completed whenever this Condition is entered. -------------------------------- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND C.2 Determine RCS is acceptable for continued operation.	Immediately Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.4.9.1.1 SR 3.4.3.1	-------------------------------NOTE------------------------------ Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. --- Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates within limits specified in the PTLR. Figures 3.4.3-1 and 3.4.3-2	[30 minutes 2 OR 3 In accordance with the Surveillance Frequency Control Program]

INSERT 1 3

Insert 1 (2)

CTS Figure 3.4-2

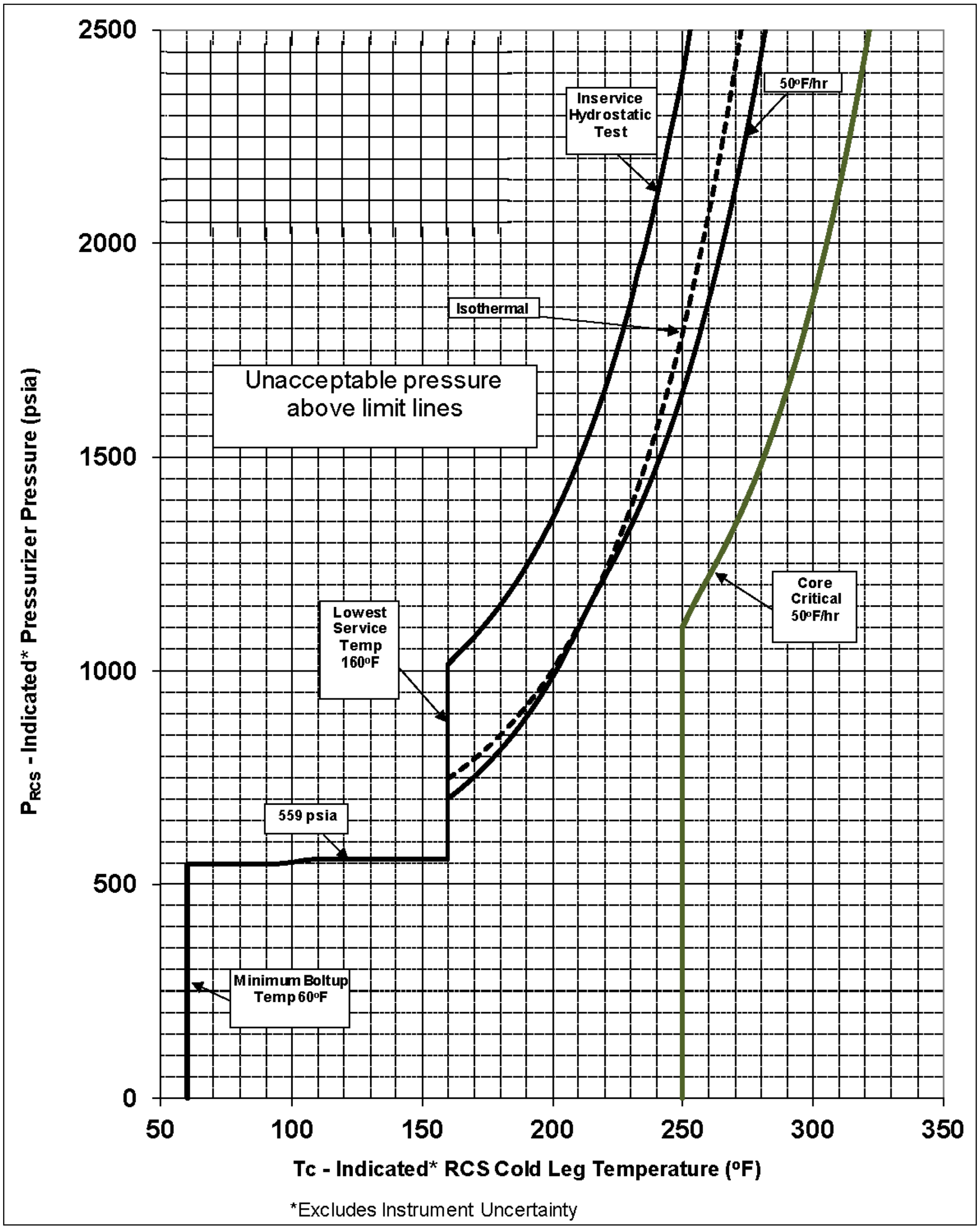


Figure 3.4.3-1
Reactor Coolant System Pressure versus Temperature Limits - Heatup, Criticality, and Inservice Test Limits
(55 EFPY)

Insert 1 2

CTS Figure 3.4-3

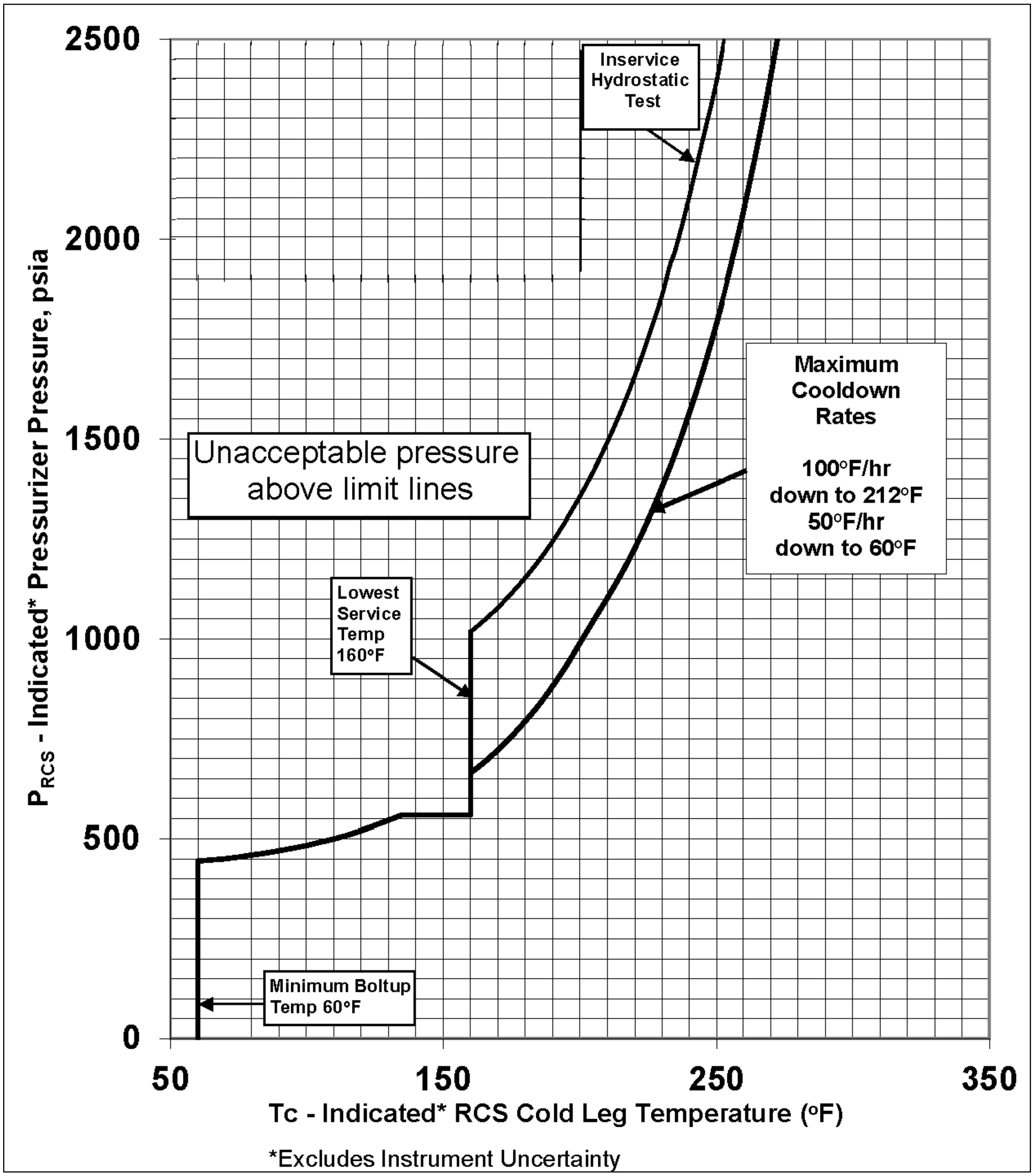


Figure 3.4.3-2
Reactor Coolant System Pressure versus Temperature Limits -
Cooldown and Inservice Test Limits
(55 EFPY)

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.3, RCS PRESSURE AND TEMPERATURE (P/T) LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. PSL is not adopting a Pressure Temperature Limits Report (PTLR) and is retaining the RCS Pressure and Temperature (P/T) limits in the ITS. Therefore, references to the PTLR have been changed to Figures 3.4.3-1 and 3.4.3-2. In addition, the CTS P/T figures have been added to ITS 3.4.3 as Figures 3.4.3-1 and 3.4.3-2.

4. **Unit 1 only:** ISTS LCO 3.4.3 is modified to include a statement that limits the temperature change allowed during hydrostatic testing operations above system design pressure. The ITS maintains a P/T limit restriction consistent with the equivalent CTS requirement and licensing basis.

5. ISTS 3.4.3, Required Action B.2 is modified to delete the requirement to reduce RCS pressure < [500] psig. CTS 3.4.9.1 actions, in the condition when actions and associated completion times are not met, only require a reduction of RCS Tavg to less than 200°F (i.e., MODE 5). The ITS is consistent with the equivalent CTS requirement and licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 RCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the RCS are designed to withstand effects of cyclic loads due to system pressure and temperature changes. These loads are introduced by startup (heatup) and shutdown (cooldown) operations, power transients, and reactor trips. This LCO limits the pressure and temperature changes during RCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

Figures 3.4.3-1 and 3.4.3-2 ~~The PTLR~~ contain~~s~~ the P/T limit curves for heatup, cooldown, and inservice leak and hydrostatic (ISLH) testing, core critical, and data for the maximum rate of change of reactor coolant temperature (Ref. 1). 1

Each P/T limit curve defines an acceptable region for normal operation. The usual use of the curves is operational guidance during heatup or cooldown maneuvering, when pressure and temperature indications are monitored and compared to the applicable curve to determine that operation is within the allowable region.

The LCO establishes operating limits that provide a margin to brittle failure of the reactor vessel and piping of the reactor coolant pressure boundary (RCPB). The vessel is the component most subject to brittle failure, and the LCO limits apply mainly to the vessel. The limits do not apply to the pressurizer, which has different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 2), requires the establishment of P/T limits for material fracture toughness requirements of the RCPB materials. Reference 2 requires an adequate margin to brittle failure during normal operation, anticipated operational occurrences, and system hydrostatic tests. It mandates the use of the ASME Code, Section III, Appendix G (Ref. 3).

The actual shift in the RT_{NDT} of the vessel material will be established periodically by removing and evaluating the irradiated reactor vessel material specimens, in accordance with ASTM E 185 (Ref. 4) and Appendix H of 10 CFR 50 (Ref. 5). The operating P/T limit curves will be adjusted, as necessary, based on the evaluation findings and the recommendations of Reference 3.

BASES

BACKGROUND (continued)

The P/T limit curves are composite curves established by superimposing limits derived from stress analyses of those portions of the reactor vessel and head that are the most restrictive. At any specific pressure, temperature, and temperature rate of change, one location within the reactor vessel will dictate the most restrictive limit. Across the span of the P/T limit curves, different locations are more restrictive, and, thus, the curves are composites of the most restrictive regions.

The heatup curve represents a different set of restrictions than the cooldown curve because the directions of the thermal gradients through the vessel wall are reversed. The thermal gradient reversal alters the location of the tensile stress between the outer and inner walls.

The criticality limit includes the Reference 2 requirement that the limit be no less than 40°F above the heatup curve or the cooldown curve and not less than the minimum permissible temperature for the ISLH testing. However, the criticality limit is not operationally limiting; a more restrictive limit exists in LCO 3.4.2, "RCS Minimum Temperature for Criticality."

The consequence of violating the LCO limits is that the RCS has been operated under conditions that can result in brittle failure of the RCPB, possibly leading to a nonisolable leak or loss of coolant accident. In the event these limits are exceeded, an evaluation must be performed to determine the effect on the structural integrity of the RCPB components. The ASME Code, Section XI, Appendix E (Ref. 6), provides a recommended methodology for evaluating an operating event that causes an excursion outside the limits.

APPLICABLE SAFETY ANALYSES

The P/T limits are not derived from Design Basis Accident (DBA) Analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the RCPB, an unanalyzed condition. Reference 1 establishes the methodology for determining the P/T limits. Since the P/T limits are not derived from any DBA, there are no acceptance limits related to the P/T limits. Rather, the P/T limits are acceptance limits themselves since they preclude operation in an unanalyzed condition.

The RCS P/T limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The two elements of this LCO are:

a. The limit curves for heatup, cooldown, and ISLH testing and

b. Limits on the rate of change of temperature.

The LCO limits apply to all components of the RCS, except the pressurizer.

These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The limits for the rate of change of temperature control the thermal gradient through the vessel wall and are used as inputs for calculating the heatup, cooldown, and ISLH testing P/T limit curves. Thus, the LCO for the rate of change of temperature restricts stresses caused by thermal gradients and also ensures the validity of the P/T limit curves.

Violating the LCO limits places the reactor vessel outside of the bounds of the stress analyses and can increase stresses in other RCPB components. The consequences depend on several factors, as follows:

a. The severity of the departure from the allowable operating P/T regime or the severity of the rate of change of temperature,

b. The length of time the limits were violated (longer violations allow the temperature gradient in the thick vessel walls to become more pronounced), and

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The RCS P/T limits Specification provides a definition of acceptable operation for prevention of nonductile failure in accordance with 10 CFR 50, Appendix G (Ref. 2). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or ISLH testing, their Applicability is at all times in keeping with the concern for nonductile failure. The limits do not apply to the pressurizer.

During MODES 1 and 2, other Technical Specifications provide limits for operation that can be more restrictive than or can supplement these P/T limits. LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits," LCO 3.4.2, "RCS Minimum

BASES

APPLICABILITY (continued)

Temperature for Criticality," and Safety Limit 2.1, "Safety Limits," also provide operational restrictions for pressure and temperature and maximum pressure. Furthermore, MODES 1 and 2 are above the temperature range of concern for nonductile failure, and stress analyses have been performed for normal maneuvering profiles, such as power ascension or descent.

The actions of this LCO consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures.

ACTIONS

A.1 and A.2

Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The 30 minute Completion Time reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in this time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify the RCPB integrity remains acceptable and must be completed ~~before continuing operation~~ [within 72 hours]. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components. 1

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The 72 hour Completion Time is reasonable to accomplish the evaluation. The evaluation for a mild violation is possible within this time, but more severe violations may require special, event specific stress analyses or inspections. A favorable evaluation must be completed before continuing to operate.

Condition A is modified by a Note requiring Required Action A.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action A.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

BASES

ACTIONS (continued)

B.1 and B.2

If a Required Action and associated Completion Time of Condition A are not met, the plant must be placed in a lower MODE because:

a. The RCS remained in an unacceptable P/T region for an extended period of increased stress or

b. A sufficiently severe event caused entry into an unacceptable region.

Either possibility indicates a need for more careful examination of the event, best accomplished with the RCS at reduced pressure and temperature. With reduced pressure and temperature conditions, the possibility of propagation of undetected flaws is decreased.

Pressure and temperature are reduced by placing the plant in MODE 3 within 6 hours and in MODE 5 ~~with RCS pressure < [500] psig~~ within 36 hours. 1

The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

The actions of this LCO, anytime other than in MODE 1, 2, 3, or 4, consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The Completion Time of "immediately" reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

BASES

ACTIONS (continued)

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The Completion Time of prior to entering MODE 4 forces the evaluation prior to entering a MODE where temperature and pressure can be significantly increased. The evaluation for a mild violation is possible within several days, but more severe violations may require special, event specific stress analyses or inspections.

Condition C is modified by a Note requiring Required Action C.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action C.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

Verification that operation is within the ~~PTLR~~ RCS P/T limits is required when RCS pressure and temperature conditions are undergoing planned changes. ~~[This Frequency of 30 minutes is considered reasonable in view of the control room indication available to monitor RCS status. Also, since temperature rate of change limits are specified in hourly increments, 30 minutes permits assessment and correction for minor deviations within a reasonable time.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 3
~~---]~~

Surveillance for heatup, cooldown, or ISLH testing may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that requires this SR be performed only during RCS system heatup, cooldown, and ISLH testing. No SR is given for criticality operations because LCO 3.4.2 contains a more restrictive requirement.

REFERENCES

1. [NRC approved topical report that defines the methodology for determining the P/T limits]. WCAP-17197-NP, St. Lucie Unit 1 RCS Pressure and Temperature Limits and Low-Temperature Overpressure Protection Report for 54 Effective Full Power Years, Revision 1, January 2012.

2. 10 CFR 50, Appendix G.

3. ASME, Boiler and Pressure Vessel Code, Section III, Appendix G.

4. ASTM E 185-82, July 1982.

5. 10 CFR 50, Appendix H.

6. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E.

2

1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 RCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the RCS are designed to withstand effects of cyclic loads due to system pressure and temperature changes. These loads are introduced by startup (heatup) and shutdown (cooldown) operations, power transients, and reactor trips. This LCO limits the pressure and temperature changes during RCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

Figures 3.4.3-1 and 3.4.3-2 ~~The PTLR~~ contain~~s~~ the P/T limit curves for heatup, cooldown, and inservice leak and hydrostatic (ISLH) testing, core critical, and data for the maximum rate of change of reactor coolant temperature (Ref. 1). 1

Each P/T limit curve defines an acceptable region for normal operation. The usual use of the curves is operational guidance during heatup or cooldown maneuvering, when pressure and temperature indications are monitored and compared to the applicable curve to determine that operation is within the allowable region.

The LCO establishes operating limits that provide a margin to brittle failure of the reactor vessel and piping of the reactor coolant pressure boundary (RCPB). The vessel is the component most subject to brittle failure, and the LCO limits apply mainly to the vessel. The limits do not apply to the pressurizer, which has different design characteristics and operating functions.

10 CFR 50, Appendix G (Ref. 2), requires the establishment of P/T limits for material fracture toughness requirements of the RCPB materials. Reference 2 requires an adequate margin to brittle failure during normal operation, anticipated operational occurrences, and system hydrostatic tests. It mandates the use of the ASME Code, Section III, Appendix G (Ref. 3).

The actual shift in the RT_{NDT} of the vessel material will be established periodically by removing and evaluating the irradiated reactor vessel material specimens, in accordance with ASTM E 185 (Ref. 4) and Appendix H of 10 CFR 50 (Ref. 5). The operating P/T limit curves will be adjusted, as necessary, based on the evaluation findings and the recommendations of Reference 3.

BASES

BACKGROUND (continued)

The P/T limit curves are composite curves established by superimposing limits derived from stress analyses of those portions of the reactor vessel and head that are the most restrictive. At any specific pressure, temperature, and temperature rate of change, one location within the reactor vessel will dictate the most restrictive limit. Across the span of the P/T limit curves, different locations are more restrictive, and, thus, the curves are composites of the most restrictive regions.

The heatup curve represents a different set of restrictions than the cooldown curve because the directions of the thermal gradients through the vessel wall are reversed. The thermal gradient reversal alters the location of the tensile stress between the outer and inner walls.

The criticality limit includes the Reference 2 requirement that the limit be no less than 40°F above the heatup curve or the cooldown curve and not less than the minimum permissible temperature for the ISLH testing. However, the criticality limit is not operationally limiting; a more restrictive limit exists in LCO 3.4.2, "RCS Minimum Temperature for Criticality."

The consequence of violating the LCO limits is that the RCS has been operated under conditions that can result in brittle failure of the RCPB, possibly leading to a nonisolable leak or loss of coolant accident. In the event these limits are exceeded, an evaluation must be performed to determine the effect on the structural integrity of the RCPB components. The ASME Code, Section XI, Appendix E (Ref. 6), provides a recommended methodology for evaluating an operating event that causes an excursion outside the limits.

APPLICABLE SAFETY ANALYSES

The P/T limits are not derived from Design Basis Accident (DBA) Analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the RCPB, an unanalyzed condition. Reference 1 establishes the methodology for determining the P/T limits. Since the P/T limits are not derived from any DBA, there are no acceptance limits related to the P/T limits. Rather, the P/T limits are acceptance limits themselves since they preclude operation in an unanalyzed condition.

The RCS P/T limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The two elements of this LCO are:

a. The limit curves for heatup, cooldown, and ISLH testing and

b. Limits on the rate of change of temperature.

The LCO limits apply to all components of the RCS, except the pressurizer.

These limits define allowable operating regions and permit a large number of operating cycles while providing a wide margin to nonductile failure.

The limits for the rate of change of temperature control the thermal gradient through the vessel wall and are used as inputs for calculating the heatup, cooldown, and ISLH testing P/T limit curves. Thus, the LCO for the rate of change of temperature restricts stresses caused by thermal gradients and also ensures the validity of the P/T limit curves.

Violating the LCO limits places the reactor vessel outside of the bounds of the stress analyses and can increase stresses in other RCPB components. The consequences depend on several factors, as follows:

a. The severity of the departure from the allowable operating P/T regime or the severity of the rate of change of temperature,

b. The length of time the limits were violated (longer violations allow the temperature gradient in the thick vessel walls to become more pronounced), and

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The RCS P/T limits Specification provides a definition of acceptable operation for prevention of nonductile failure in accordance with 10 CFR 50, Appendix G (Ref. 2). Although the P/T limits were developed to provide guidance for operation during heatup or cooldown (MODES 3, 4, and 5) or ISLH testing, their Applicability is at all times in keeping with the concern for nonductile failure. The limits do not apply to the pressurizer.

During MODES 1 and 2, other Technical Specifications provide limits for operation that can be more restrictive than or can supplement these P/T limits. LCO 3.4.1, "RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits," LCO 3.4.2, "RCS Minimum

BASES

APPLICABILITY (continued)

Temperature for Criticality," and Safety Limit 2.1, "Safety Limits," also provide operational restrictions for pressure and temperature and maximum pressure. Furthermore, MODES 1 and 2 are above the temperature range of concern for nonductile failure, and stress analyses have been performed for normal maneuvering profiles, such as power ascension or descent.

The actions of this LCO consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures.

ACTIONS

A.1 and A.2

Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The 30 minute Completion Time reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in this time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify the RCPB integrity remains acceptable and must be completed ~~before continuing operation~~ within 72 hours. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components. 1

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The 72 hour Completion Time is reasonable to accomplish the evaluation. The evaluation for a mild violation is possible within this time, but more severe violations may require special, event specific stress analyses or inspections. A favorable evaluation must be completed before continuing to operate.

Condition A is modified by a Note requiring Required Action A.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action A.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

BASES

ACTIONS (continued)

B.1 and B.2

If a Required Action and associated Completion Time of Condition A are not met, the plant must be placed in a lower MODE because:

a. The RCS remained in an unacceptable P/T region for an extended period of increased stress or

b. A sufficiently severe event caused entry into an unacceptable region.

Either possibility indicates a need for more careful examination of the event, best accomplished with the RCS at reduced pressure and temperature. With reduced pressure and temperature conditions, the possibility of propagation of undetected flaws is decreased.

Pressure and temperature are reduced by placing the plant in MODE 3 within 6 hours and in MODE 5 ~~with RCS pressure < [500] psig~~ within 36 hours. 1

The Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

The actions of this LCO, anytime other than in MODE 1, 2, 3, or 4, consider the premise that a violation of the limits occurred during normal plant maneuvering. Severe violations caused by abnormal transients, at times accompanied by equipment failures, may also require additional actions from emergency operating procedures. Operation outside the P/T limits must be corrected so that the RCPB is returned to a condition that has been verified by stress analyses.

The Completion Time of "immediately" reflects the urgency of restoring the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner.

Besides restoring operation to within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed before continuing operation. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, new analyses, or inspection of the components.

BASES

ACTIONS (continued)

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

The Completion Time of prior to entering MODE 4 forces the evaluation prior to entering a MODE where temperature and pressure can be significantly increased. The evaluation for a mild violation is possible within several days, but more severe violations may require special, event specific stress analyses or inspections.

Condition C is modified by a Note requiring Required Action C.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action C.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

RCS P/T

Verification that operation is within the ~~PTLR~~ limits is required when RCS pressure and temperature conditions are undergoing planned changes. ~~[This Frequency of 30 minutes is considered reasonable in view of the control room indication available to monitor RCS status. Also, since temperature rate of change limits are specified in hourly increments, 30 minutes permits assessment and correction for minor deviations within a reasonable time.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 3
~~---]~~

Surveillance for heatup, cooldown, or ISLH testing may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that requires this SR be performed only during RCS system heatup, cooldown, and ISLH testing. No SR is given for criticality operations because LCO 3.4.2 contains a more restrictive requirement.

REFERENCES

1. ~~[NRC approved topical report that defines the methodology for determining the P/T limits]~~. WCAP-18275-NP, St. Lucie Unit 2 Heatup and Cooldown Limit Curves for Normal Operation Through End of License Extension, Revision 0, November 2019.

2

2. 10 CFR 50, Appendix G.

3. ASME, Boiler and Pressure Vessel Code, Section III, Appendix G.

4. ASTM E 185-82, July 1982.

5. 10 CFR 50, Appendix H.

6. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.3, BASES, RCS PRESSURE AND TEMPERATURE (P/T) LIMITS

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.3, RCS PRESSURE AND TEMPERATURE (P/T) LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 4

3.4.4, RCS Loops – MODES 1 and 2

Current Technical Specifications (CTS) Markup
and Discussion of Changes (DOCs)

3/4.4 REACTOR COOLANT SYSTEM

REACTOR COOLANT LOOPS AND COOLANT CIRCULATION

STARTUP AND POWER OPERATION

LIMITING CONDITION FOR OPERATION

A02

Two RCS

OPERABLE and

LCO 3.4.4 3.4.1.1 Both reactor coolant loops and both reactor coolant pumps in each loop shall be in operation. LA01

Applicability **APPLICABILITY:** MODES 1 and 2.

ACTION:

Requirements of LCO not met

ACTION A With less than the above required reactor coolant pumps in operation, be in at least HOT STANDBY within 1 hour.

MODE 3

6 L01

SURVEILLANCE REQUIREMENTS

Each RCS

SR 3.4.4.1 4.4.1.1 The above required reactor coolant loops shall be verified to be in operation and circulating reactor coolant in accordance with the Surveillance Frequency Control Program. LA01

3/4.4 REACTOR COOLANT SYSTEM

3/4.4.1 REACTOR COOLANT LOOPS AND COOLANT CIRCULATION

STARTUP AND POWER OPERATION

LIMITING CONDITION FOR OPERATION

A02

LCO 3.4.4 3.4.1.1 Two RCS Both Reactor Coolant loops and both Reactor Coolant pumps in each loop shall be OPERABLE and in operation. LA01

Applicability **APPLICABILITY**: 1 and 2.* A03

ACTION:

ACTION A Requirements of LCO not met With less than the above required Reactor Coolant pumps in operation, be in at least MODE 3 HOT STANDBY within 6 1 hour. L01

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1 4.4.1.1 Each RCS The above required Reactor Coolant loops shall be verified to be in operation and circulating Reactor Coolant in accordance with the Surveillance Frequency Control Program. LA01

---

* See Special Test Exception 3.10.3 A03

DISCUSSION OF CHANGES
ITS 3.4.4, RCS LOOPS – MODES 1 and 2

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.4.1.1 states that both reactor coolant loops and both reactor coolant pumps in each loop shall be in operation. ITS 3.4.4. states that two RCS loops shall be OPERABLE and in operation. This changes the CTS by requiring the RCS loops to be OPERABLE. This change is acceptable because it is consistent with the current use and understanding of the LCO. It is not sufficient for an RCS loop to be in operation if it is not capable of performing its safety function (i.e., OPERABLE). This change is designated as administrative as it clarifies the current understanding of a requirement.

A03 **Unit 2 only:** The Applicability of CTS 3.4.1.1 is modified by footnote * that states "See Special Test Exception 3.10.3." The ITS 3.4.4 Applicability does not contain the footnote or a reference to the Special Test Exceptions. This changes the CTS to not include the footnote "See Special Test Exception 3.10.3."

The purpose of the footnote reference is to alert the user that a Special Test Exception exists that may modify the Applicability of the Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS. See Unit 2 CTS 3/4.10.3 Discussion of Changes for changes to this Special Test Exception.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.4.1.1 states that both reactor coolant loops and both reactor coolant pumps in each loop shall be in operation. ITS 3.4.4. states that two RCS loops shall be OPERABLE and in operation. CTS 4.4.1.1 states, in part, that the above required reactor coolant loops shall be verified to be in operation and circulating reactor coolant. ITS SR 3.4.4.1 states verify each RCS loop is in operation.

This changes the CTS by moving the LCO detail of two reactor coolant pumps in each loop, and by moving the Surveillance Requirement to verify that the reactor coolant loops are circulating reactor coolant, to the Bases.

The removal of this detail for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be in the Technical Specifications in order to provide adequate protection of the public health and safety. The ITS retains the requirement that two RCS loops be in operation. This will ensure adequate forced flow for core heat removal. Flow is represented by having both RCS loops with both RCPs in each loop in operation for removal of heat by the two SGs. To meet safety analysis acceptance criteria for DNB, four pumps are required at rated power. Each OPERABLE loop consists of two RCPs providing forced flow for heat transport to an SG that is OPERABLE. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 – Relaxation of Completion Time)* CTS 3.4.1.1 Action states that with less than the above required reactor coolant pumps in operation, be in at least HOT STANDBY within 1 hour. ITS 3.4.4 ACTION A states when the RCS loop requirements are not met, the unit must be in MODE 3 (i.e., HOT STANDBY) within 6 hours. This changes the CTS by relaxing the Completion Time from 1 hour to 6 hours.

The purpose of CTS 3.4.1.1 ACTION is to require a unit shutdown if the necessary reactor coolant loop flow is not available. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the low probability of a DBA occurring during the allowed Completion Time. Operating experience has shown that 6 hours is a reasonable time to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. It is likely that failure to meet the LCO requirements will lead to a reactor trip on low flow. However, if the LCO is not met for a reason that does not lead to a reactor trip, then 6 hours to transition from full power operation to MODE 3 is consistent with the Completion Time provided for a loss of safety function for other systems and with LCO 3.0.3. This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 RCS Loops - MODES 1 and 2

3.4.1.1 LCO 3.4.4 Two RCS loops shall be OPERABLE and in operation.

Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action	A. Requirements of LCO not met.	A.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.4.1.1	SR 3.4.4.1 Verify each RCS loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 RCS Loops - MODES 1 and 2

3.4.1.1 LCO 3.4.4 Two RCS loops shall be OPERABLE and in operation.

Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
Action	A. Requirements of LCO not met.	A.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.4.1.1	SR 3.4.4.1 Verify each RCS loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.4, RCS LOOPS – MODES 1 and 2

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.4 RCS Loops - MODES 1 and 2

BASES

BACKGROUND

The primary function of the RCS is removal of the heat generated in the fuel due to the fission process and transfer of this heat, via the steam generators (SGs), to the secondary plant.

The secondary functions of the RCS include:

a. Moderating the neutron energy level to the thermal state, to increase the probability of fission,

b. Improving the neutron economy by acting as a reflector,

c. Carrying the soluble neutron poison, boric acid,

d. Providing a second barrier against fission product release to the environment, and

e. Removing the heat generated in the fuel due to fission product decay following a unit shutdown.

The RCS configuration for heat transport uses two RCS loops. Each RCS loop contains a SG and two reactor coolant pumps (RCPs). An RCP is located in each of the two SG cold legs. The pump flow rate has been sized to provide core heat removal with appropriate margin to departure from nucleate boiling (DNB) during power operation and for anticipated transients originating from power operation. This Specification requires two RCS loops with both RCPs in operation in each loop. The intent of the Specification is to require core heat removal with forced flow during power operation. Specifying two RCS loops provides the minimum necessary paths (two SGs) for heat removal.

APPLICABLE SAFETY ANALYSES

Safety analyses contain various assumptions for the Design Bases Accident (DBA) initial conditions including RCS pressure, RCS temperature, reactor power level, core parameters, and safety system setpoints. The important aspect for this LCO is the reactor coolant forced flow rate, which is represented by the number of RCS loops in service.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Both transient and steady state analyses have been performed to establish the effect of flow on DNB. The transient or accident analysis for the plant has been performed assuming four RCPs are in operation. The majority of the plant safety analyses are based on initial conditions at high core power or zero power. The accident analyses that are of most importance to RCP operation are the four pump coastdown, single pump locked rotor, ~~single pump (broken shaft or coastdown),~~ and rod withdrawal events (Ref. 1). 1

Steady state DNB analysis had been performed for the [four] pump combination. For [four] pump operation, the steady state DNB analysis, which generates the pressure and temperature and Safety Limit (i.e., the departure from nucleate boiling ratio (DNBR) limit), assumes a maximum power level of 112 ~~107~~% RTP. This is the design overpower condition for four pump operation. The 112 ~~107~~% value is the accident analysis setpoint of the nuclear overpower (high flux) trip and is based on an analysis assumption that bounds possible instrumentation errors. The DNBR limit defines a locus of pressure and temperature points that result in a minimum DNBR greater than or equal to the critical heat flux correlation limit. 2 1

RCS Loops - MODES 1 and 2 satisfy Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require adequate forced flow for core heat removal. Flow is represented by having both RCS loops with both RCPs in each loop in operation for removal of heat by the two SGs. To meet safety analysis acceptance criteria for DNB, four pumps are required at rated power.

Each OPERABLE loop consists of two RCPs providing forced flow for heat transport to an SG that is OPERABLE. SG, and hence RCS loop, OPERABILITY with regard to SG water level is ensured by the Reactor Protection System (RPS) in MODES 1 and 2. A reactor trip places the plant in MODE 3 if any SG level is ≤ 35 ~~[25]~~% narrow range as sensed by the RPS. The minimum water level to declare the SG OPERABLE is 35 ~~[25]~~% narrow range. 2

APPLICABILITY

In MODES 1 and 2, the reactor is critical and thus has the potential to produce maximum THERMAL POWER. Thus, to ensure that the assumptions of the accident analyses remain valid, all RCS loops are required to be OPERABLE and in operation in these MODES to prevent DNB and core damage.

BASES

APPLICABILITY (continued)

The decay heat production rate is much lower than the full power heat rate. As such, the forced circulation flow and heat sink requirements are reduced for lower, noncritical MODES as indicated by the LCOs for MODES 3, 4, 5, and 6.

Operation in other MODES is covered by:

LCO 3.4.5, "RCS Loops - MODE 3,"
LCO 3.4.6, "RCS Loops - MODE 4,"
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

ACTIONS

A.1

If the requirements of the LCO are not met, the Required Action is to reduce power and bring the plant to MODE 3. This lowers power level and thus reduces the core heat removal needs and minimizes the possibility of violating DNB limits. It should be noted that the reactor will trip and place the plant in MODE 3 as soon as the RPS senses less than four RCPs operating.

The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging safety systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification of the required number of loops in operation. Verification includes flow rate, temperature, or pump status monitoring, which help to ensure that forced flow is providing heat removal while maintaining the margin to DNB. ~~[The Frequency of 12 hours has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.~~ 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

REFERENCES 1. FSAR, Section [ ]. 15.3 2

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.4 RCS Loops - MODES 1 and 2

BASES

BACKGROUND

The primary function of the RCS is removal of the heat generated in the fuel due to the fission process and transfer of this heat, via the steam generators (SGs), to the secondary plant.

The secondary functions of the RCS include:

a. Moderating the neutron energy level to the thermal state, to increase the probability of fission,

b. Improving the neutron economy by acting as a reflector,

c. Carrying the soluble neutron poison, boric acid,

d. Providing a second barrier against fission product release to the environment, and

e. Removing the heat generated in the fuel due to fission product decay following a unit shutdown.

The RCS configuration for heat transport uses two RCS loops. Each RCS loop contains a SG and two reactor coolant pumps (RCPs). An RCP is located in each of the two SG cold legs. The pump flow rate has been sized to provide core heat removal with appropriate margin to departure from nucleate boiling (DNB) during power operation and for anticipated transients originating from power operation. This Specification requires two RCS loops with both RCPs in operation in each loop. The intent of the Specification is to require core heat removal with forced flow during power operation. Specifying two RCS loops provides the minimum necessary paths (two SGs) for heat removal.

APPLICABLE SAFETY ANALYSES

Safety analyses contain various assumptions for the Design Bases Accident (DBA) initial conditions including RCS pressure, RCS temperature, reactor power level, core parameters, and safety system setpoints. The important aspect for this LCO is the reactor coolant forced flow rate, which is represented by the number of RCS loops in service.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Both transient and steady state analyses have been performed to establish the effect of flow on DNB. The transient or accident analysis for the plant has been performed assuming four RCPs are in operation. The majority of the plant safety analyses are based on initial conditions at high core power or zero power. The accident analyses that are of most importance to RCP operation are the four pump coastdown, single pump locked rotor, single pump (broken shaft or coastdown), and rod withdrawal events (Ref. 1). 1

Steady state DNB analysis had been performed for the [four] pump combination. For [four] pump operation, the steady state DNB analysis, which generates the pressure and temperature and Safety Limit (i.e., the departure from nucleate boiling ratio (DNBR) limit), assumes a maximum power level of 107% RTP. This is the design overpower condition for four pump operation. The 107% value is the accident analysis setpoint of the nuclear overpower (high flux) trip and is based on an analysis assumption that bounds possible instrumentation errors. The DNBR limit defines a locus of pressure and temperature points that result in a minimum DNBR greater than or equal to the critical heat flux correlation limit. 2

RCS Loops - MODES 1 and 2 satisfy Criteria 2 and 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require adequate forced flow for core heat removal. Flow is represented by having both RCS loops with both RCPs in each loop in operation for removal of heat by the two SGs. To meet safety analysis acceptance criteria for DNB, four pumps are required at rated power.

Each OPERABLE loop consists of two RCPs providing forced flow for heat transport to an SG that is OPERABLE. SG, and hence RCS loop, OPERABILITY with regard to SG water level is ensured by the Reactor Protection System (RPS) in MODES 1 and 2. A reactor trip places the plant in MODE 3 if any SG level is ≤ 35 [25]% narrow range as sensed by the RPS. The minimum water level to declare the SG OPERABLE is 35 [25]% narrow range. 2

APPLICABILITY

In MODES 1 and 2, the reactor is critical and thus has the potential to produce maximum THERMAL POWER. Thus, to ensure that the assumptions of the accident analyses remain valid, all RCS loops are required to be OPERABLE and in operation in these MODES to prevent DNB and core damage.

BASES

APPLICABILITY (continued)

The decay heat production rate is much lower than the full power heat rate. As such, the forced circulation flow and heat sink requirements are reduced for lower, noncritical MODES as indicated by the LCOs for MODES 3, 4, 5, and 6.

Operation in other MODES is covered by:

LCO 3.4.5, "RCS Loops - MODE 3,"
LCO 3.4.6, "RCS Loops - MODE 4,"
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

ACTIONS

A.1

If the requirements of the LCO are not met, the Required Action is to reduce power and bring the plant to MODE 3. This lowers power level and thus reduces the core heat removal needs and minimizes the possibility of violating DNB limits. It should be noted that the reactor will trip and place the plant in MODE 3 as soon as the RPS senses less than four RCPs operating.

The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging safety systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification of the required number of loops in operation. Verification includes flow rate, temperature, or pump status monitoring, which help to ensure that forced flow is providing heat removal while maintaining the margin to DNB. ~~[The Frequency of 12 hours has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.~~ 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~-----]~~

REFERENCES 1. FSAR, Section ~~[ ]~~ 15.3. 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.4, BASES, RCS LOOPS – MODES 1 and 2

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to reflect the Specification Title.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.4, RCS LOOPS – MODES 1 and 2

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 5

3.4.5, RCS Loops – MODE 3

Current Technical Specifications (CTS) Markup
and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

HOT STANDBY

LIMITING CONDITION FOR OPERATION

LCO 3.4.5 ~~3.4.1.2~~ [Two RCS] ~~The reactor coolant~~ loops ~~listed below~~ shall be OPERABLE and ~~at least~~ one ~~of these reactor coolant~~ [RCS] loop~~s~~ shall be in operation.*

~~a. Reactor Coolant Loop A and its associated steam generator and at least one associated reactor coolant pump.~~

~~b. Reactor Coolant Loop B and its associated steam generator and at least one associated reactor coolant pump.~~ LA01

Applicability **APPLICABILITY**: MODE 3.

ACTION:

ACTION A a. ~~With less than the~~ [one RCS] ~~above required reactor coolant~~ loop~~s~~ [IN] OPERABLE, restore ~~the required~~ loop~~s~~ to OPERABLE status within 72 hours or

ACTION B be in ~~HOT SHUTDOWN~~ [MODE 4] within the next 12 hours.

ACTION C.1 b. [Two RCS loops inoperable OR Required RCS] ~~With no reactor coolant~~ loop [not] in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of ~~Technical Specification~~ [LCO] 3.1.1~~.1~~ ~~and within one~~ M01

ACTION C.2 ~~(1) hour~~ [Immediately] initiate ~~corrective~~ action to ~~return the required reactor coolant~~ [Restore one RCS] loop to [OPERABLE status and] operation. M01 M02

SURVEILLANCE REQUIREMENTS

SR 3.4.5.3 ~~4.4.1.2.1~~ [Add proposed SR 3.4.5.3 Note] ~~At least the above~~ [each] required ~~reactor coolant~~ pump~~s, if not in operation, shall be determined to be OPERABLE~~ in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments and indicated power availability. L01

SR 3.4.5.1 ~~4.4.1.2.2~~ ~~At least~~ one ~~reactor coolant~~ [RCS] loop shall be verified to be in operation ~~and circulating reactor coolant~~ in accordance with the Surveillance Frequency Control Program. LA02

SR 3.4.5.2 ~~4.4.1.2.3~~ ~~The required~~ [each] steam generators shall be determined OPERABLE by verifying the secondary side water level to be ≥ 10% ~~of narrow range indication~~ in accordance with the Surveillance Frequency Control Program.

LCO 3.4.5 Note * All reactor coolant pumps may be ~~de-energized~~ [removed from operation] for ~~up to~~ [≤] 1 hour [per 8 hour period] provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of ~~Technical Specification~~ [LCO] 3.1.1~~.1~~ and (2) core outlet temperature is maintained at least 10°F below saturation temperature. M03

REACTOR COOLANT SYSTEM

HOT STANDBY

LIMITING CONDITION FOR OPERATION

Two RCS

LCO 3.4.5 3.4.1.2 The Reactor Coolant loops listed below shall be OPERABLE and at least one of these Reactor Coolant loops shall be in operation.*

RCS

a. Reactor Coolant Loop 2A and its associated steam generator and at least one associated Reactor Coolant pump.

b. Reactor Coolant Loop 2B and its associated steam generator and at least one associated Reactor Coolant pump. LA01

Applicability **APPLICABILITY**: MODE 3

ACTION:

one RCS IN

ACTION A a. With less than the above required Reactor Coolant loops OPERABLE, restore the required loops to OPERABLE status within 72 hours or be

ACTION B in HOT SHUTDOWN within the next 12 hours.

MODE 4 not Two RCS loops inoperable OR Required RCS M01

ACTION C.1 b. With no Reactor Coolant loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.1 LCO

ACTION C.2 and immediately initiate corrective action to return the required Reactor Coolant loop to operation. Restore one RCS OPERABLE status and M01

SURVEILLANCE REQUIREMENTS

Add proposed SR 3.4.5.3 Note L01

SR 3.4.5.3 4.4.1.2.1 At least the above required Reactor Coolant pumps, if not in operation, shall be determined to be OPERABLE in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments and indicated power availability. each

RCS

SR 3.4.5.1 4.4.1.2.2 At least one Reactor Coolant loop shall be verified to be in operation and circulating reactor coolant in accordance with the Surveillance Frequency Control Program. LA02

SR 3.4.5.2 4.4.1.2.3 The required steam generator(s) shall be determined OPERABLE verifying the secondary side water level to be ≥ 10% indicated narrow range level in accordance with the Surveillance Frequency Control Program. each

removed from operation ≤ per 8 hour period M03

LCO 3.4.5 Note * All Reactor Coolant pumps may be deenergized for up to 1 hour provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.1 and (2) core outlet temperature is maintained at least 10°F below saturation temperature. LCO

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.4.1.2 Action b. states, in part, that with no reactor coolant loop in operation, take the actions specified therein. ITS 3.4.5 ACTION C states the Condition as two RCS loops inoperable or required RCS loop not in operation. This changes the CTS by adding the Condition "two RCS loops inoperable" and a Required Action to immediately initiate action to restore the RCS loops to OPERABLE status.

This change is acceptable because it provides appropriate actions if two RCS loops are inoperable. Under these conditions, immediate action is necessary to ensure certain unit transients do not occur, and action is immediately taken to restore one loop to OPERABLE status. This change is designated as more restrictive, because it requires an additional condition under which the actions must be taken, and an additional action that the RCS loop be restored to OPERABLE status.

M02 **Unit 1 only:** CTS Action b. states, in part, within one (1) hour initiate corrective action to return the required reactor coolant loop to operation. ITS Required Action C.2 states immediately initiate action to restore one RCS loop to OPERABLE status and operation. This changes the CTS by revising the Actions to "immediately" require actions to be taken when a required RCS loop is not in operation.

This change is acceptable because it provides appropriate immediate actions for a required RCS loop not in operation. This action is required to assure continued safe operation. Action to restore one RCS loop to OPERABLE status and operation is necessary to be able to remove the decay heat generated by the reactor. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

M03 CTS 3.4.1.2 states, in part, that the reactor coolant loops listed shall be OPERABLE and at least one of these reactor coolant loops shall be in operation. CTS 3.4.1.2 is modified by a footnote (*) that states, in part, that all reactor coolant pumps may be de energized for up to 1 hour under the conditions specified therein. ITS 3.4.5 contains the same allowance, but limits the use of the 1 hour exception to once per 8 hour period. This changes the CTS by modifying the 1 hour allowance that all reactor coolant pumps may be de-energized and limits the usage of the allowance to once per 8 hour period.

The purpose of the 1 hour allowance is to allow a reactor coolant loop to be removed from operation to support testing. This change is acceptable because it helps ensure that boron stratification and inadequate decay heat removal do not occur should multiple 1 hour periods be required. This change is designated as more restrictive because it limits the allowance to 1 hour per 8 hour period, and that restriction does not currently exist

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.4.1.2 states, that the reactor coolant loops listed below shall be OPERABLE and at least one of these reactor coolant loops shall be in operation. CTS 3.4.1.2 contains a description of what constitutes an OPERABLE RCS loop. ITS 3.4.5 does not include a description of what constitutes an OPERABLE RCS loop. This changes the CTS by moving the details of what constitutes an OPERABLE RCS loop, to the Bases.

The removal of these details related to system design from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains a requirement for two RCS loops to be OPERABLE and one RCS loop to be in operation. The removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change, because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.4.1.2.2 states, in part, that at least one reactor coolant loop shall be verified to be in operation and circulating reactor coolant. ITS SR 3.4.5.1 states verify one RCS loop is in operation. This changes the CTS by moving the detail to verify that the reactor coolant loops are circulating reactor coolant, to the Bases.

The removal of this detail for performing the Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be in the Technical Specifications in order to provide adequate protection of the public health and safety. The ITS retains the requirement that a RCS loop be in operation. This will require adequate forced flow for core heat removal. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5.

This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 7 – Relaxation Of Surveillance Frequency)* CTS 4.4.1.2.1 states that the required reactor coolant pumps, if not in operation, shall be determined to be OPERABLE by verifying correct breaker alignments and indicated power availability. ITS SR 3.4.5.3 requires verification of correct breaker alignment and indicated power availability to each required pump. ITS SR 3.4.5.3 is modified by a Note that states "Not required to be performed until 24 hours after a required pump is not in operation." This changes the CTS by not requiring the Surveillance Requirement to be performed until 24 hours after a required pump is not in operation.

The purpose of the Surveillance is to ensure that the standby reactor coolant pump is ready to operate. This change is acceptable because the Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. The Note provides time to perform the Surveillance to verify correct breaker alignment and indicated power availability. Without the Note, the Surveillance may not be performed within its Frequency immediately after taking a pump out of operation requiring the Surveillance to be declared not met per SR 3.0.1 (CTS 4.0.1). This change is designated as less restrictive because the Surveillance will be performed less frequently under the ITS than under the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops - MODE 3

3.4.1.2 LCO 3.4.5 [Two] RCS loops shall be OPERABLE and one RCS loop shall be in operation.

-----NOTE-----

3.4.1.2 Footnote *
DOC M03

All reactor coolant pumps may be removed from operation for ≤ 1 hour per 8 hour period, provided:

a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1 , "SHUTDOWN MARGIN (SDM)," and 1

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

Applicability APPLICABILITY: MODE 3.

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.2 Action a.	A. One RCS loop inoperable.	A.1 Restore RCS loop to OPERABLE status.	72 hours ~~[OR~~ ~~In accordance with the Risk Informed Completion Time Program]~~ 2
3.4.1.2 Action a.	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hours

ACTIONS (continued)

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M01 3.4.1.2 Action b.	C. Two RCS loops inoperable. OR Required RCS loop not in operation. (3.4.1.2 Action b.; DOC M02)	C.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. AND	Immediately
		C.2 Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
4.4.1.2.2	SR 3.4.5.1	Verify one RCS loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2
4.4.1.2.3	SR 3.4.5.2	Verify secondary side water level in each steam generator ≥ ~~[25]~~ 10 % narrow range.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.5.3	-------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required pump.	[7 days OR In accordance with the Surveillance Frequency Control Program]

4.4.1.2.1

DOC L01

2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.5 RCS Loops - MODE 3

3.4.1.2

LCO 3.4.5 [Two] RCS loops shall be OPERABLE and one RCS loop shall be in operation.

3.4.1.2 Footnote *

DOC M03

-----NOTE-----
All reactor coolant pumps may be removed from operation for ≤ 1 hour per 8 hour period, provided:

a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1, and
   , "SHUTDOWN MARGIN (SDM)," (1)

b. Core outlet temperature is maintained at least 10°F below saturation temperature.

Applicability

APPLICABILITY: MODE 3.

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.1.2 Action a.	A. One RCS loop inoperable.	A.1 Restore RCS loop to OPERABLE status.	72 hours ~~[OR~~ ~~In accordance with the Risk Informed Completion Time Program]~~	2
3.4.1.2 Action a.	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hours	

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M01 3.4.1.2 Action b. 3.4.1.2 Action b.	C. Two RCS loops inoperable. OR Required RCS loop not in operation.	C.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. AND C.2 Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.1.2.2	SR 3.4.5.1	Verify one RCS loop is in operation.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.1.2.3	SR 3.4.5.2	Verify secondary side water level in each steam generator ≥ [25]%. 10 narrow range	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
4.4.1.2.1 DOC L01 SR 3.4.5.3	------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. -- Verify correct breaker alignment and indicated power available to each required pump.	[7 days OR In accordance with the Surveillance Frequency Control Program]

2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.5, RCS LOOPS – MODE 3

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.5 RCS Loops - MODE 3

BASES

BACKGROUND

The primary function of the reactor coolant in MODE 3 is removal of decay heat and transfer of this heat, via the steam generators (SGs), to the secondary plant fluid. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 3, reactor coolant pumps (RCPs) are used to provide forced circulation heat removal during heatup and cooldown. The MODE 3 decay heat removal requirements are low enough that a single RCS loop with one RCP is sufficient to remove core decay heat. However, [two] RCS loops are required to be OPERABLE to provide redundant paths for decay heat removal. Only one RCP needs to be OPERABLE to declare the associated RCS loop OPERABLE. 2

Reactor coolant natural circulation is not normally used but is sufficient for core cooling. However, natural circulation does not provide turbulent flow conditions. Therefore, boron reduction in natural circulation is prohibited because mixing to obtain a homogeneous concentration in all portions of the RCS cannot be ensured.

APPLICABLE SAFETY ANALYSES

Analyses have shown that the rod withdrawal event from MODE 3 with one RCS loop in operation is bounded by the rod withdrawal initiated from MODE 2.

Failure to provide heat removal may result in challenges to a fission product barrier. The RCS loops are part of the primary success path that functions or actuates to prevent or mitigate a Design Basis Accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier.

RCS Loops - MODE 3 satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require both RCS loops to be available for heat removal, thus providing redundancy. The LCO requires both loops to be OPERABLE with the intent of requiring both SGs to be capable ~~(> 25% water level)~~ of transferring heat from the reactor coolant at a controlled rate. Forced reactor coolant flow is the required way to transport heat, although natural circulation flow provides adequate removal. A minimum of one running RCP meets the LCO requirement for one loop in operation. 1

BASES

LCO (continued)

The Note permits a limited period of operation without RCPs. All RCPs may be removed from operation for ≤ 1 hour per 8 hour period. This means that natural circulation has been established. When in natural circulation, a reduction in boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained is prohibited because an even concentration distribution throughout the RCS cannot be ensured. Core outlet temperature is to be maintained at least 10°F below the saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

In MODES 3, 4, and 5, it is sometimes necessary to stop all RCPs or shutdown cooling (SDC) pump forced circulation (e.g., to change operation from one SDC train to the other, to perform surveillance or startup testing, to perform the transition to and from SDC System cooling, or to avoid operation below the RCP minimum net positive suction head limit). The time period is acceptable because natural circulation is adequate for heat removal, or the reactor coolant temperature can be maintained subcooled and boron stratification affecting reactivity control is not expected.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE. A RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

APPLICABILITY

In MODE 3, the heat load is lower than at power; therefore, one RCS loop in operation is adequate for transport and heat removal. A second RCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops - MODES 1 and 2,"
LCO 3.4.6, "RCS Loops - MODE 4,"
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

BASES

ACTIONS

A.1

If one RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the RCS loop to OPERABLE status within a Completion Time of 72 hours [or in accordance with the Risk Informed Completion Time Program]. This time allowance is a justified period to be without the redundant, nonoperating loop because a single loop in operation has a heat transfer capability greater than that needed to remove the decay heat produced in the reactor core. 2

B.1

If restoration for Required Action A.1 is not possible within 72 hours, the unit must be placed in MODE 4 within 12 hours. In MODE 4, the plant may be placed on the SDC System. The Completion Time of 12 hours is compatible with required operation to achieve cooldown and depressurization from the existing plant conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

If two RCS loops are inoperable or a required RCS loop is not in operation, except as provided in the Note 1 in the LCO section, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended. Action to restore one RCS loop to OPERABLE status and operation shall be initiated immediately and continued until one RCS loop is restored to OPERABLE status and operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. 1

SURVEILLANCE REQUIREMENTS

SR 3.4.5.1

This SR requires verification that one RCS loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. [The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status. 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

SR 3.4.5.2

This SR requires narrow range verification that the secondary side water level in each SG is ≥ [25]%. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. 2 10
[The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within the safety analyses assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.5.3

Verification that each required RCP is OPERABLE ensures that the single failure criterion is met and that an additional RCS loop can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power availability to each required RCP. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. ~~[The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~--]~~

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

REFERENCES None.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.5 RCS Loops - MODE 3

BASES

BACKGROUND	The primary function of the reactor coolant in MODE 3 is removal of decay heat and transfer of this heat, via the steam generators (SGs), to the secondary plant fluid. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid. In MODE 3, reactor coolant pumps (RCPs) are used to provide forced circulation heat removal during heatup and cooldown. The MODE 3 decay heat removal requirements are low enough that a single RCS loop with one RCP is sufficient to remove core decay heat. However, [two] RCS loops are required to be OPERABLE to provide redundant paths for decay heat removal. Only one RCP needs to be OPERABLE to declare the associated RCS loop OPERABLE. 2 Reactor coolant natural circulation is not normally used but is sufficient for core cooling. However, natural circulation does not provide turbulent flow conditions. Therefore, boron reduction in natural circulation is prohibited because mixing to obtain a homogeneous concentration in all portions of the RCS cannot be ensured.
APPLICABLE SAFETY ANALYSES	Analyses have shown that the rod withdrawal event from MODE 3 with one RCS loop in operation is bounded by the rod withdrawal initiated from MODE 2. Failure to provide heat removal may result in challenges to a fission product barrier. The RCS loops are part of the primary success path that functions or actuates to prevent or mitigate a Design Basis Accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier. RCS Loops - MODE 3 satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).
LCO	The purpose of this LCO is to require both RCS loops to be available for heat removal, thus providing redundancy. The LCO requires both loops to be OPERABLE with the intent of requiring both SGs to be capable (> 25% water level) of transferring heat from the reactor coolant at a controlled rate. Forced reactor coolant flow is the required way to transport heat, although natural circulation flow provides adequate removal. A minimum of one running RCP meets the LCO requirement for one loop in operation. 1

BASES

LCO (continued)

The Note permits a limited period of operation without RCPs. All RCPs may be removed from operation for ≤ 1 hour per 8 hour period. This means that natural circulation has been established. When in natural circulation, a reduction in boron concentration with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained is prohibited because an even concentration distribution throughout the RCS cannot be ensured. Core outlet temperature is to be maintained at least 10°F below the saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

In MODES 3, 4, and 5, it is sometimes necessary to stop all RCPs or shutdown cooling (SDC) pump forced circulation (e.g., to change operation from one SDC train to the other, to perform surveillance or startup testing, to perform the transition to and from SDC System cooling, or to avoid operation below the RCP minimum net positive suction head limit). The time period is acceptable because natural circulation is adequate for heat removal, or the reactor coolant temperature can be maintained subcooled and boron stratification affecting reactivity control is not expected.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE. A RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required.

APPLICABILITY

In MODE 3, the heat load is lower than at power; therefore, one RCS loop in operation is adequate for transport and heat removal. A second RCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops - MODES 1 and 2,"
LCO 3.4.6, "RCS Loops - MODE 4,"
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

BASES

ACTIONS

A.1

If one RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the RCS loop to OPERABLE status within a Completion Time of 72 hours ~~[or in accordance with the Risk Informed Completion Time Program]~~. This time allowance is a justified period to be without the redundant, nonoperating loop because a single loop in operation has a heat transfer capability greater than that needed to remove the decay heat produced in the reactor core. 2

B.1

If restoration for Required Action A.1 is not possible within 72 hours, the unit must be placed in MODE 4 within 12 hours. In MODE 4, the plant may be placed on the SDC System. The Completion Time of 12 hours is compatible with required operation to achieve cooldown and depressurization from the existing plant conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

If two RCS loops are inoperable or a required RCS loop is not in operation, except as provided in the Note ~~1~~ in the LCO section, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended. Action to restore one RCS loop to OPERABLE status and operation shall be initiated immediately and continued until one RCS loop is restored to OPERABLE status and operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operation. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. 1

SURVEILLANCE REQUIREMENTS

SR 3.4.5.1

This SR requires verification that one RCS loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing heat removal. ~~[The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.~~ 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~-----]~~

SR 3.4.5.2

This SR requires verification that the secondary side water level in each SG is ≥ ~~[25]~~ 10 % narrow range. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. 2
~~[The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within the safety analyses assumptions.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~-----]~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.5.3

Verification that each required RCP is OPERABLE ensures that the single failure criterion is met and that an additional RCS loop can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power availability to each required RCP. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. [The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

REFERENCES None.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.5, BASES, RCS LOOPS – MODE 3

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to reflect the correct Specification Title.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.5, RCS LOOPS – MODE 3

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 6

3.4.6, RCS Loops – MODE 4

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

HOT SHUTDOWN

LIMITING CONDITION FOR OPERATION

consisting of any combination of RCS loops and shutdown cooling (SDC) loops

LCO 3.4.6 ~~3.4.1.3~~ ~~At least~~ two ~~of the~~ loops ~~listed below~~ shall be OPERABLE and ~~at least~~ one ~~reactor coolant or shutdown cooling loop~~ loop shall be in operation.*

~~a. Reactor Coolant Loop A and its associated steam generator and at least one associated reactor coolant pump,~~

~~b. Reactor Coolant Loop B and its associated steam generator and at least one associated reactor coolant pump,~~

~~c. Shutdown Cooling Loop A,~~

~~d. Shutdown Cooling Loop B.~~

LA01

Applicability **APPLICABILITY:** MODE 4.

ACTION:

ACTION A.1 ~~a.~~ ~~With less than the above~~ IN One required ~~reactor coolant or shutdown cooling~~ loop~~s~~ OPERABLE, ~~within one (1) hour~~ immediately initiate corrective action to restore a second ~~return the required~~ loop~~s~~ to OPERABLE status M01

ACTION A.2 and immediately initiate action to make at least one steam generator available for decay heat removal via natural circulation.

ACTION A.2 Note LCO 3.0.4.a is not applicable when entering MODE 4 ~~HOT SHUTDOWN~~. M02

ACTION B.1 ~~b.~~ Two required loops inoperable OR Required ~~With no reactor coolant or shutdown cooling~~ loop not in operation, immediately suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of ~~Technical Specification~~ LCO 3.1.1~~.1~~ M01

ACTION B.2 and ~~within one (1) hour~~ immediately initiate ~~corrective~~ action to ~~return the required reactor coolant~~ restore one loop to OPERABLE status and operation. M01

LCO 3.4.6 Note 1 * All reactor coolant pumps (RCPs) and ~~shutdown cooling~~ SDC pumps may be ~~de-energized~~ removed from operation for ~~up to~~ ≤ 1 hour per 8 hour period provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of ~~Technical Specification~~ LCO 3.1.1~~.1~~ and (2) core outlet temperature is maintained at least 10°F below saturation temperature. M03

REACTOR COOLANT SYSTEM

HOT SHUTDOWN

SURVEILLANCE REQUIREMENTS

Add proposed SR 3.4.6.3 Note L01

SR 3.4.6.3 4.4.1.3.1 The required reactor coolant pump(s), if not in operation, shall be determined to be OPERABLE in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments and indicated power availability. le to each required pump

in SG(s) is

SR 3.4.6.2 4.4.1.3.2 The required steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be ≥ 10% of narrow range indication in accordance with the Surveillance Frequency Control Program. LA02

required RCS loop SDC

SR 3.4.6.1 4.4.1.3.3 At least one reactor coolant or shutdown cooling loop shall be verified to be in operation and circulating reactor coolant in accordance with the Surveillance Frequency Control Program. LA02

SDC loop

SR 3.4.6.4 4.4.1.3.4 Verify required shutdown cooling train locations susceptible to gas accumulation are sufficiently filled with water in accordance with the Surveillance Frequency Control Program.*

SR 3.4.6.4 Note * Not required to be performed until 12 hours after entering MODE 4.

REACTOR COOLANT SYSTEM

REACTOR COOLANT PUMP - STARTING

LIMITING CONDITION FOR OPERATION

ITS 3.4.6 Note 2 3.4.14 If the steam generator temperature exceeds the primary temperature by more than 30°F, the first idle reactor coolant pump shall not be started.

APPLICABILITY: MODES 4# and 5. See ITS 3.4.7

ACTION:

If a reactor coolant pump is started when the steam generator temperature exceeds primary temperature by more than 30°F, evaluate the subsequent transient to determine compliance with Specification 3.4.9.1. A02

SURVEILLANCE REQUIREMENTS

ITS 3.4.6 Note 2 4.4.14 Prior to starting a reactor coolant pump, verify that the steam generator temperature does not exceed primary temperature by more than 30°F.

ITS 3.4.6 Applicability # Any Reactor Coolant System Cold Leg Temperature is less than ≤ 300°F.

REACTOR COOLANT SYSTEM

HOT SHUTDOWN

LIMITING CONDITION FOR OPERATION

consisting of any combination of RCS loops and shutdown cooling (SDC) loops

LCO 3.4.6 3.4.1.3 At least two of the loop(s)/train(s) listed below shall be OPERABLE and at least one Reactor Coolant and/or shutdown cooling loops shall be in operation.* loop LA01

a. Reactor Coolant Loop 2A and its associated steam generator and at least one associated Reactor Coolant pump,**

b. Reactor Coolant Loop 2B and its associated steam generator and at least one associated Reactor Coolant pump,**

c. Shutdown Cooling Train 2A,

d. Shutdown Cooling Train 2B.

LA01

Applicability **APPLICABILITY:** MODE 4.

ACTION:

ACTION A.1 a. IN One With less than the above required Reactor Coolant and/or shutdown cooling loops OPERABLE, immediately initiate corrective action to restore a second return the required loops to OPERABLE status as soon as possible and

ACTION A.2 immediately initiate action to make at least one steam generator available for decay heat removal via natural circulation. LCO 3.0.4.a is not applicable when

ACTION A.2 Note entering HOT SHUTDOWN. MODE 4

Two required loops inoperable OR Required M02

ACTION B.1 b. With no Reactor Coolant or shutdown cooling loop not in operation, suspend immediately M01 operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical LCO Specifications 3.1.1.1 and immediately initiate corrective action to return the restore one

ACTION B.2 required coolant loop to OPERABLE status and operation. M01

(RCPs) SDC removed from operation

LCO 3.4.6 Note 1 * All Reactor Coolant pumps and shutdown cooling pumps may be de-energized ≤ for up to 1 hour per 8 hour period provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.1 and (2) core outlet temperature is maintained at least 10°F below saturation temperature. M03

No RCP RCS any

LCO 3.4.6 Note 2 ** A No Reactor Coolant pump RCP shall not be started with two idle loops and one or more of the Reactor Coolant System any RCS cold leg temperatures less than or equal to that specified in Table 3.4-3 ≤ 252°F unless the secondary side water temperature of in each steam generator (SG) is less than 40°F above each of the Reactor Coolant System RCS cold leg temperatures.

REACTOR COOLANT SYSTEM

HOT SHUTDOWN

SURVEILLANCE REQUIREMENTS

Add proposed SR 3.4.6.3 Note L01

SR 3.4.6.3 4.4.1.3.1 The required Reactor Coolant pump(s), if not in operation, shall be determined to be OPERABLE in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments and indicated power availability. le to each required pump

SR 3.4.6.2 4.4.1.3.2 The in required SG(s) is steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be ≥ 10% indicated narrow range level in accordance with the Surveillance Frequency Control Program. LA02

SR 3.4.6.1 4.4.1.3.3 At required least one Reactor RCS loop Coolant or shutdown SDC cooling loop shall be verified to be in operation and circulating Reactor Coolant in accordance with the Surveillance Frequency Control Program. LA02

SR 3.4.6.4 4.4.1.3.4 Verify required shutdown SDC loop cooling trains locations susceptible to gas accumulation are sufficiently filled with water in accordance with the Surveillance Frequency Control Program.*

SR 3.4.6.4 Note * Not required to be performed until 12 hours after entering MODE 4.

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 **Unit 1 only:** CTS 3.4.14 Action states, in part, if a RCP is started when not within the limits, evaluate the subsequent transient to determine compliance with CTS 3.4.9.1, RCS Pressure and Temperature (P/T) Limits. ITS 3.4.6 does not contain a reference to specification 3.4.9.1. (i.e., ITS 3.4.3). This changes the CTS by not including this reference in the ITS.

The purpose of the reference is to alert the user that a determination must be made to ensure compliance with CTS 3.4.9.1, RCS P/T Limits. It is an ITS convention to not include these types of cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 Unit 1 CTS 3.4.1.3 Action a. states, in part, with less than the above required reactor coolant or shutdown cooling loops OPERABLE, within one (1) hour initiate corrective action to return the required loops to OPERABLE status. ITS 3.4.6 ACTION A states that with one required loop inoperable, “immediately” initiate action to restore a second loop to OPERABLE status. This changes the Unit 1 CTS by adding the requirement to “immediately” initiate action to restore a second loop to OPERABLE status.”

CTS 3.4.1.3 Action b. states, in part, with no Reactor Coolant or shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specifications 3.1.1.1. ITS 3.4.6 ACTION B states that with two required loops inoperable or required loop not in operation, “immediately” suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. This changes the CTS by adding the requirement to “immediately” initiate action to restore a second loop to OPERABLE status.”

Unit 1 CTS 3.4.1.3 Action b. states, in part, and within one (1) hour initiate corrective action to return the required reactor coolant loop to operation. Unit 2 CTS Action b. states, in part, and immediately initiate corrective action to return the required coolant loop to operation. ITS 3.4.6 ACTION B states that with two required loops inoperable or required loop not in operation, immediately initiate action to restore one loop to OPERABLE status and operation. This changes the

Unit 1 CTS by adding the requirement to "immediately" initiate action to return the required reactor coolant loop to operation, changes the Unit 1 and Unit 2 CTS and by adding the requirement to restore the loop to OPERABLE status.

This change is acceptable because it provides appropriate actions if one required loop is inoperable, and if two required loops or trains are inoperable or the required loop is not in operation. Under these conditions immediate action is necessary to ensure unit transients do not occur, and action is immediately taken to restore one loop to OPERABLE status and operation to be able to remove the decay heat generated by the reactor. These actions are required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operation. Action to restore one RCS loop to OPERABLE status and operation is necessary to be able to remove the decay heat generated by the reactor. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. This change is designated as more restrictive, because it requires immediate action to return the required reactor coolant loop to operation and adds the requirement to restore the loop to OPERABLE status.

M02 CTS 3.4.1.3 Action b. states, in part, that with no reactor coolant loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.1. ITS 3.4.6 Action B states the Condition two required loops inoperable or required loop not in operation. This changes the CTS by adding the Condition "two required loops inoperable" to the CTS Condition no required loop in operation.

This change is acceptable because it provides appropriate actions if two required loops are inoperable or a required loop is not in operation. Under these conditions, immediate action is necessary to ensure certain unit transients do not occur, and action is immediately taken to restore one loop to OPERABLE status and operation to be able to remove the decay heat generated by the reactor. This change is designated as more restrictive, because it requires an additional condition under which the actions must be taken.

M03 Unit 1 CTS 3.4.1.3 requires, in part, that at least two of the loops listed shall be OPERABLE and at least one shall be in operation. CTS 3.4.1.3 is modified by a footnote (*) that states, in part, that all reactor coolant pumps and shutdown cooling pumps may be de-energized for up to 1 hour under the conditions specified therein. ITS 3.4.6 contains the same allowance, but limits the use of the 1 hour exception to once per 8 hour period. This changes the CTS by modifying the 1 hour allowance that all reactor coolant pumps and shutdown cooling (SDC) pumps may be removed from operation under the conditions specified therein and limits the usage of the allowance to once per 8 hour period.

The purpose of the 1 hour allowance is to allow reactor coolant pumps and SDC pumps to be removed from operation to support testing. This means that natural circulation has been established using the SGs. This change is acceptable because it helps ensure that boron stratification and inadequate decay heat removal do not occur should multiple 1 hour periods be required. This change is designated as more restrictive because it limits the allowance to 1 hour per 8 hour period, and that restriction does not currently exist

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* Unit 1 CTS 3.4.1.3 states, in part, that at least two of the loops listed shall be OPERABLE and at least one reactor coolant or shutdown cooling loop shall be in operation. Unit 2 CTS 3.4.1.3 states, in part, that at least two of the loop(s)/train(s) listed shall be OPERABLE and at least one reactor coolant and/or shutdown cooling loops shall be in operation. CTS 3.4.1.3 contains a description of what constitutes OPERABLE RCS loops and SDC loops. ITS 3.4.5 does not include a description of what constitutes OPERABLE RCS loops and SDC loops. This changes the CTS by moving the details of what constitutes OPERABLE RCS loops and SDC loops to the Bases. Additionally, Unit 2 CTS 3.4.1.3 is also changed by deletion of the descriptor "train(s)". Use of the descriptor "SDC loop(s)" is consistent with Unit 1 CTS 3.4.1.3, CTS 3.4.1.4.1, "Cold Shutdown – Loops Filled," CTS 3.4.1.4.2, "Cold Shutdown – Loops Not Filled," CTS 3.9.8.1, "Shutdown Cooling and Coolant Circulation," and CTS 3.9.8.2, "Low Water Level."

The removal of these details related to system design from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains a requirement for two loops consisting of any combination of RCS and SDC loops to be OPERABLE. The removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change, because information relating to system design is being removed from the Technical Specifications.

LA02 *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.4.1.3.2 states, in part, that the required steam generator(s) shall be determined OPERABLE by verifying the secondary side water level to be > 10% of narrow range indication. ITS 3.4.6.2 requires verifying secondary side water level in required SG(s) is > 10%. This changes the CTS by moving the Surveillance Requirement for the instrumentation to be used to verify secondary side level in required SGs, to the Bases. CTS 4.4.1.3.3 states, in part, that at least one reactor coolant or shutdown cooling loop shall be verified to be in operation and circulating reactor coolant. ITS SR 3.4.6.1 states verify required RCS loop or SDC loop is in operation. This changes the CTS by moving the Surveillance Requirement to verify that the reactor coolant loops or SDC loops are circulating reactor coolant, to the Bases.

The removal of this detail for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be in the Technical Specifications in order to provide adequate protection of the public health and safety. The ITS retains the requirement that two loops consisting of any combination of RCS loops and SDC loops shall be OPERABLE and one loop shall be in operation. Any one loop in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop is required to be OPERABLE to provide redundancy for heat removal. Also, this change is acceptable because this type of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

<u>LESS RESTRICTIVE CHANGES</u>

L01 (Category 7 – Relaxation of Surveillance Frequency) CTS 4.4.1.3.1 states, in part, that the required reactor coolant pump(s), if not in operation, shall be determined to be OPERABLE in accordance with the Surveillance Frequency Control Program by verifying correct breaker alignments and indicated power availability. ITS SR 3.4.6.3 requires verification of correct breaker alignment and indicated power availability to the pump not in operation in accordance with the Surveillance Frequency Control Program. It is modified by a Note that states "Not required to be performed until 24 hours after a required pump is not in operation." This changes the CTS by not requiring the Surveillance Requirement to be performed until 24 hours after a pump is taken out of operation.

The purpose of CTS 4.4.1.3.1 is to ensure that the standby pump is ready to operate. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. The Note provides time to perform the Surveillance to verify correct breaker alignment and indicated power availability. Without the Note, the Surveillance would not be met immediately after taking a pump out of operation. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops - MODE 4

3.4.1.3 LCO 3.4.6 Two loops ~~or trains~~ consisting of any combination of RCS loops and shutdown cooling (SDC) ~~trains~~ [loops] shall be OPERABLE and one loop ~~or train~~ shall be in operation. 1

---NOTES---

3.4.1.3 Footnote *

DOC M03

1. All reactor coolant pumps (RCPs) and SDC pumps may be removed from operation for ≤ 1 hour per 8 hour period, provided:

   a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1[, "SHUTDOWN MARGIN (SDM),"] and 1

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

3.4.14

2. No RCP shall be started with [two idle RCS loops and] any RCS cold leg temperature [≤ 300°F unless] ~~less than or equal to the LTOP enable temperature specified in the PTLR unless:~~ 1

   ~~a. Pressurizer water level is < [60]% or~~

   ~~b.~~ Secondary side water temperature in each steam generator (SG) is < ~~[100]~~ [30]°F above each of the RCS cold leg temperatures.

Applicability APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.3 Action a. A. One required loop inoperable.	A.1 Initiate action to restore a second loop ~~or train~~ to OPERABLE status. <u>AND</u>	Immediately 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.3 Action a.	A.2 ---------------NOTE-------------- LCO 3.0.4.a is not applicable when entering MODE 4. ------------------------------------- Initiate action to make at least one steam generator available for decay heat removal via natural circulation.	Immediately
DOC M02 3.4.1.3 Action b. B. Two required loops ~~or trains~~ inoperable. <u>OR</u> Required loop ~~or train~~ not in operation.	B.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately (1)
	<u>AND</u>	(1)
3.4.1.3 Action b.	B.2 Initiate action to restore one loop ~~or train~~ to OPERABLE status and operation.	Immediately (1)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.4.1.3.3 SR 3.4.6.1	Verify required RCS loop or SDC ~~train~~ loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ (1) (2) (2)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.1.3.2	SR 3.4.6.2	Verify secondary side water level in required SG(s) is ≥ [25] 10 % narrow range.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.1.3.1 DOC L01	SR 3. 4.6.3	-------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required pump.	[7 days OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.1.3.4	SR 3.4. 6.4	-------------------------------NOTE------------------------------ Not required to be performed until 12 hours after entering MODE 4. --- Verify required SDC train loop locations susceptible to gas accumulation are sufficiently filled with water.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2 1 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops - MODE 4

3.4.1.3 LCO 3.4.6 Two loops ~~or trains~~ consisting of any combination of RCS loops and shutdown cooling (SDC) ~~trains~~ [loops] shall be OPERABLE and one loop ~~or train~~ shall be in operation. 1

-----NOTES-----

3.4.1.3 Footnote *

DOC M03

1. All reactor coolant pumps (RCPs) and SDC pumps may be removed from operation for ≤ 1 hour per 8 hour period, provided:

   a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1[, "SHUTDOWN MARGIN (SDM),"] and 1

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

3.4.1.3 Footnote **

2. No RCP shall be started with [two idle RCS loops and] any RCS cold leg temperature [≤ 252°F unless] ~~less than or equal to the LTOP enable temperature specified in the PTLR unless:~~ 1

   ~~a. Pressurizer water level is < [60]% or~~

   ~~b.~~ [s]Secondary side water temperature in each steam generator (SG) is < ~~[100]~~ [40]°F above each of the RCS cold leg temperatures.

Applicability APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.3 Action a. A. One required loop inoperable.	A.1 Initiate action to restore a second loop ~~or train~~ to OPERABLE status. AND	Immediately 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.3 Action a.	A.2 ---------------NOTE-------------- LCO 3.0.4.a is not applicable when entering MODE 4. ------------------------------------- Initiate action to make at least one steam generator available for decay heat removal via natural circulation.	Immediately
DOC M02 3.4.1.3 Action b. B. Two required loops ~~or trains~~ inoperable. <u>OR</u> Required loop ~~or train~~ not in operation.	B.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. <u>AND</u> 3.4.1.3 Action b. B.2 Initiate action to restore one loop ~~or train~~ to OPERABLE status and operation.	Immediately (1) Immediately (1) (1)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.4.1.3.3 SR 3.4.6.1	Verify required RCS loop or SDC ~~train~~ loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ (1) (2) (2)

SURVEILLANCE REQUIREMENTS (continued)

CTS		SURVEILLANCE	FREQUENCY	
4.4.1.3.2	SR 3.4.6.2	Verify secondary side water level in required SG(s) is ≥ [25]%. 10 narrow range	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.1.3.1 DOC L01	SR 3. 4.6.3	------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required pump.	[7 days OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.1.3.4	SR 3.4. 6.4	------------------------------NOTE------------------------------ Not required to be performed until 12 hours after entering MODE 4. --- Verify required SDC train loop locations susceptible to gas accumulation are sufficiently filled with water.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2 1 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.6, RCS LOOPS – MODE 4

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.6 RCS Loops - MODE 4

BASES

BACKGROUND

In MODE 4, the primary function of the reactor coolant is the removal of decay heat and transfer of this heat to the steam generators (SGs) or shutdown cooling (SDC) heat exchangers. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 4, either reactor coolant ~~pumps (RCPs)~~ system (RCS) loops or SDC ~~trains~~ loops can be used for coolant circulation. The intent of this LCO is to provide forced flow from at least one ~~RCP~~ reactor coolant pump (RCP) or one SDC ~~train~~ pump for decay heat removal and transport. The flow provided by one RCP loop or SDC ~~train~~ loop is adequate for heat removal. The other intent of this LCO is to require that two paths be available to provide redundancy for heat removal. 1

APPLICABLE SAFETY ANALYSES

In MODE 4, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The RCS loops and SDC ~~trains~~ loops provide this circulation. 1

RCS Loops - MODE 4 satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require that at least two loops ~~or trains~~, RCS or SDC, be OPERABLE in MODE 4 and one of these loops ~~or trains~~ be in operation. The LCO allows the two loops that are required to be OPERABLE to consist of any combination of RCS and SDC System loops. Any one loop ~~or train~~ in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop ~~or train~~ is required to be OPERABLE to provide redundancy for heat removal. 1

Note 1 permits all RCPs and SDC pumps to be removed from operation ≤ 1 hour per 8 hour period. This means that natural circulation has been established using the SGs. The Note prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained when forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction. The response of the RCS without the RCPs or SDC pumps depends on the core decay heat load and the length of time that the

BASES

LCO (continued)

pumps are stopped. As decay heat diminishes, the effects on RCS temperature and pressure diminish. Without cooling by forced flow, higher heat loads will cause the reactor coolant temperature and pressure to increase at a rate proportional to the decay heat load. Because pressure can increase, the applicable system pressure limits (pressure and temperature (P/T) limits or low temperature overpressure protection (LTOP) limits) must be observed and forced SDC flow or heat removal via the SGs must be re-established prior to reaching the pressure limit. The circumstances for stopping both RCPs or SDC pumps are to be limited to situations where:

a. Pressure and temperature increases can be maintained well within the allowable pressure (P/T limits and LTOP) and 10°F subcooling limits or

b. An alternate heat removal path through the SGs is in operation.

Note 2 requires that ~~either of the following two conditions be satisfied~~ before an RCP may be started with two idle RCS loops and any RCS cold leg temperature ~~less than or equal to the LTOP enable temperature specified in the PTLR:~~ ≤ 300°F, 1

~~a. Pressurizer water level is < [60]% or~~

b. Secondary side water temperature in each SG is < [100] 30°F above each of the RCS cold leg temperatures. 1

Satisfying ~~either of~~ the above condition~~s~~ will preclude a large pressure surge in the RCS when the RCP is started.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE and has the minimum water level specified in SR 3.4.6.2.

Similarly, for the SDC System, an OPERABLE SDC ~~train~~ loop is composed of the OPERABLE SDC pump~~(s)~~ capable of providing forced flow to the SDC heat exchanger~~(s)~~. RCPs and SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. Management of gas voids is important to SDC System OPERABILITY. 1

BASES

APPLICABILITY

In MODE 4, this LCO applies because it is possible to remove core decay heat and to provide proper boron mixing with either the RCS loops and SGs or the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops - MODES 1 and 2,"
LCO 3.4.5, "RCS Loops - MODE 3,"
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4, "Shutdown Cooling and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5, "Shutdown Cooling and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

ACTIONS

A.1

If only one required ~~RCS~~ loop is OPERABLE and in operation ~~and no SDC trains are OPERABLE~~, redundancy for heat removal is lost. Action must be initiated immediately to restore a required non-operating loop ~~or train~~ to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for decay heat removal. 1

A.2

~~-----------------------------REVIEWER'S NOTE-----------------------------~~
~~Adoption of a MODE 4 end state requires the licensee to make the following commitments:~~

~~1. [LICENSEE] will follow the guidance established in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision [4F].~~ 4

~~2. [LICENSEE] will follow the guidance established in Revision 2 of WCAP-16364-NP, "Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)," Westinghouse, May 2010.~~
~~--~~

If only one required ~~SDC train~~ loop is OPERABLE and in operation ~~and no required RCS loops are OPERABLE~~, redundancy for heat removal is lost and the plant must be placed in a configuration that minimizes overall plant risk. This redundancy is obtained by making at least one SG available for decay heat removal via natural circulation because: 1

BASES

ACTIONS (continued)

1. MODE 4 operation poses overall lower risk of core damage and large early radiation release than does MODE 5 (Ref. 1). This is particularly true with SDC impaired.

2. In MODE 4, RCS and steam generator conditions may be maintained such that failure of the operating SDC ~~train~~ loop may be by natural circulation heat removal through one or more steam generators. 1

Remaining within the Applicability of the LCO is acceptable because the plant risk in MODE 4 is similar to or lower than MODE 5 (Ref. 1). However, voluntary entry into MODE 5 may be made as it is also an acceptable low-risk state.

Required Action A.2 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 4. This Note prohibits the use of LCO 3.0.4.a to enter MODE 4 during startup with the LCO not met. However, there is no restriction on the use of LCO 3.0.4.b, if applicable, because LCO 3.0.4.b requires performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering MODE 4, and establishment of risk management actions, if appropriate. LCO 3.0.4 is not applicable to, and the Note does not preclude, changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

<u>B.1 and B.2</u>

If two required loops ~~or trains~~ are inoperable or a required loop ~~or train~~ is not in operation except during conditions permitted by Note 1 in the LCO section, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended and action to restore one ~~RCS~~ loop ~~or SDC train~~ to OPERABLE status and operation must be initiated. The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Times reflect the importance of decay heat removal. The action to restore must continue until one loop ~~or train~~ is restored to operation. 1 1

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

RCS loop or SDC

This SR requires verification that the required loop or train is in operation. This ensures forced flow is providing heat removal. Verification includes flow rate, temperature, or pump status monitoring. [The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms will normally indicate loop status. 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

SR 3.4.6.2

narrow range

This SR requires verification of secondary side water level in the required SG(s) ≥ [25]%. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. 1

10

[The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.6.3

loop

Verification that each required pump is OPERABLE ensures that an additional RCS loop or SDC ~~train~~ can be placed in operation, if needed to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. ~~[The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~ 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~--]~~

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

SR 3.4.6.4

SDC System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the required SDC loop ~~train~~(s) and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel. 1

Selection of SDC System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The SDC System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the Surveillance is met and past system OPERABILITY is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the SDC System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

SDC System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

This SR is modified by a Note that states the SR is not required to be performed until 12 hours after entering MODE 4. In a rapid shutdown, there may be insufficient time to verify all susceptible locations prior to entering MODE 4.

~~[The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the SDC System piping and the procedural controls governing system operation.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------------------------------REVIEWER'S NOTE----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

2

REFERENCES

1. CE NPSD-1186-A, Technical Justification for the Risk Informed Modification to Selected Required Action End States for CEOG PWRs, October, 2001.

1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.6 RCS Loops - MODE 4

BASES

BACKGROUND

In MODE 4, the primary function of the reactor coolant is the removal of decay heat and transfer of this heat to the steam generators (SGs) or shutdown cooling (SDC) heat exchangers. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 4, either reactor coolant ~~pumps (RCPs)~~ system (RCS) loops or SDC ~~trains~~ loops can be used for coolant circulation. The intent of this LCO is to provide forced flow from at least one ~~RCP~~ reactor coolant pump (RCP) or one SDC ~~train~~ pump for decay heat removal and transport. The flow provided by one RCP loop or SDC ~~train~~ loop is adequate for heat removal. The other intent of this LCO is to require that two paths be available to provide redundancy for heat removal. 1

APPLICABLE SAFETY ANALYSES

In MODE 4, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The RCS loops and SDC ~~trains~~ loops provide this circulation. 1

RCS Loops - MODE 4 satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require that at least two loops ~~or trains~~, RCS or SDC, be OPERABLE in MODE 4 and one of these loops ~~or trains~~ be in operation. The LCO allows the two loops that are required to be OPERABLE to consist of any combination of RCS and SDC System loops. Any one loop ~~or train~~ in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop ~~or train~~ is required to be OPERABLE to provide redundancy for heat removal. 1

Note 1 permits all RCPs and SDC pumps to be removed from operation ≤ 1 hour per 8 hour period. This means that natural circulation has been established using the SGs. The Note prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained when forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature so that no vapor bubble may form and possibly cause a natural circulation flow obstruction. The response of the RCS without the RCPs or SDC pumps depends on the core decay heat load and the length of time that the

BASES

LCO (continued)

pumps are stopped. As decay heat diminishes, the effects on RCS temperature and pressure diminish. Without cooling by forced flow, higher heat loads will cause the reactor coolant temperature and pressure to increase at a rate proportional to the decay heat load. Because pressure can increase, the applicable system pressure limits (pressure and temperature (P/T) limits or low temperature overpressure protection (LTOP) limits) must be observed and forced SDC flow or heat removal via the SGs must be re-established prior to reaching the pressure limit. The circumstances for stopping both RCPs or SDC pumps are to be limited to situations where:

a. Pressure and temperature increases can be maintained well within the allowable pressure (P/T limits and LTOP) and 10°F subcooling limits or

b. An alternate heat removal path through the SGs is in operation.

Note 2 requires that either of the following two conditions be satisfied before an RCP may be started with two idle RCS loops and any RCS cold leg temperature ≤ 252°F, less than or equal to the LTOP enable temperature specified in the PTLR: 1

a. Pressurizer water level is < [60]% or

b. Secondary side water temperature in each SG is < [100] 40°F above each of the RCS cold leg temperatures. 1

Satisfying either of the above conditions will preclude a large pressure surge in the RCS when the RCP is started.

An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE and has the minimum water level specified in SR 3.4.6.2.

Similarly, for the SDC System, an OPERABLE SDC train loop is composed of the OPERABLE SDC pump(s) capable of providing forced flow to the SDC heat exchanger(s). RCPs and SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. Management of gas voids is important to SDC System OPERABILITY. 1

BASES

APPLICABILITY

In MODE 4, this LCO applies because it is possible to remove core decay heat and to provide proper boron mixing with either the RCS loops and SGs or the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4,	"RCS Loops - MODES 1 and 2,"
LCO 3.4.5,	"RCS Loops - MODE 3,"
LCO 3.4.7,	"RCS Loops - MODE 5, Loops Filled,"
LCO 3.4.8,	"RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4,	"Shutdown Cooling and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5,	"Shutdown Cooling and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

ACTIONS

A.1

If only one required ~~RCS~~ loop is OPERABLE and in operation ~~and no SDC trains are OPERABLE~~, redundancy for heat removal is lost. Action must be initiated immediately to restore a required non-operating loop ~~or train~~ to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for decay heat removal. 1

A.2

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Adoption of a MODE 4 end state requires the licensee to make the following commitments:~~

~~1. [LICENSEE] will follow the guidance established in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision [4F].~~ 4

~~2. [LICENSEE] will follow the guidance established in Revision 2 of WCAP-16364-NP, "Implementation Guidance for Risk Informed Modification to Selected Required Action End States at Combustion Engineering NSSS Plants (TSTF-422)," Westinghouse, May 2010.~~
~~--~~

If only one required ~~SDC train~~ loop is OPERABLE and in operation ~~and no required RCS loops are OPERABLE~~, redundancy for heat removal is lost and the plant must be placed in a configuration that minimizes overall plant risk. This redundancy is obtained by making at least one SG available for decay heat removal via natural circulation because: 1

BASES

ACTIONS (continued)

1. MODE 4 operation poses overall lower risk of core damage and large early radiation release than does MODE 5 (Ref. 1). This is particularly true with SDC impaired.

2. In MODE 4, RCS and steam generator conditions may be maintained such that failure of the operating SDC ~~train~~ loop may be mitigated by natural circulation heat removal through one or more steam generators. 1

Remaining within the Applicability of the LCO is acceptable because the plant risk in MODE 4 is similar to or lower than MODE 5 (Ref. 1). However, voluntary entry into MODE 5 may be made as it is also an acceptable low-risk state.

Required Action A.2 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 4. This Note prohibits the use of LCO 3.0.4.a to enter MODE 4 during startup with the LCO not met. However, there is no restriction on the use of LCO 3.0.4.b, if applicable, because LCO 3.0.4.b requires performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering MODE 4, and establishment of risk management actions, if appropriate. LCO 3.0.4 is not applicable to, and the Note does not preclude, changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

<u>B.1 and B.2</u>

If two required loops ~~or trains~~ are inoperable or a required loop ~~or train~~ is not in operation except during conditions permitted by Note 1 in the LCO section, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended and action to restore one ~~RCS~~ loop ~~or SDC train~~ to OPERABLE status and operation must be initiated. The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Times reflect the importance of decay heat removal. The action to restore must continue until one loop ~~or train~~ is restored to operation. 1

1

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

RCS loop or SDC

This SR requires verification that the required loop or train is in operation. This ensures forced flow is providing heat removal. Verification includes flow rate, temperature, or pump status monitoring. [The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess RCS loop status. In addition, control room indication and alarms will normally indicate loop status. 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

SR 3.4.6.2

narrow range

This SR requires verification of secondary side water level in the required SG(s) ≥ [25]%. An adequate SG water level is required in order to have a heat sink for removal of the core decay heat from the reactor coolant. 1

10

[The 12 hour interval has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.6.3

loop

Verification that each required pump is OPERABLE ensures that an additional RCS loop or SDC train can be placed in operation, if needed to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. [The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience. 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
-----] 2

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

SR 3.4.6.4

SDC System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the required SDC loop train(s) and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel. 1

Selection of SDC System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The SDC System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the Surveillance is met and past system OPERABILITY is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the SDC System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

SDC System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

This SR is modified by a Note that states the SR is not required to be performed until 12 hours after entering MODE 4. In a rapid shutdown, there may be insufficient time to verify all susceptible locations prior to entering MODE 4.

~~[The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the SDC System piping and the procedural controls governing system operation.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------------------------------REVIEWER'S NOTE----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

2

REFERENCES

1. CE NPSD-1186-A, Technical Justification for the Risk Informed Modification to Selected Required Action End States for CEOG PWRs, October, 2001.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.6, BASES, RCS LOOPS – MODE 4

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to reflect the correct Specification Title.

4. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.6, RCS LOOPS – MODE 4

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 7

3.4.7, RCS Loops – MODE 5, Loops Filled

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS FILLED

LIMITING CONDITION FOR OPERATION

LCO 3.4.7 3.4.1.4.1 At least one shutdown cooling loop shall be OPERABLE and in operation* and either:

a. One additional shutdown cooling loop shall be OPERABLE#, or

b. The secondary side water level of at least two steam generators shall be greater than 10% of narrow range indication.

Applicability **APPLICABILITY**: MODE 5 with reactor coolant loops filled##.

ACTION:

Condition A, Condition B, ACTION A,B a. With less than the above required loops OPERABLE or with less than the required steam generator level, within one (1) hour initiate corrective action to return the required loops to OPERABLE status or to restore the required level.

ACTION C b. With no shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.2 and within one (1) hour initiate corrective action to return the required shutdown loop to operation.

SURVEILLANCE REQUIREMENTS

SR 3.4.7.2 4.4.1.4.1.1 The secondary side water level of at least two steam generators when required shall be determined to be within limits in accordance with the Surveillance Frequency Control Program.

SR 3.4.7.1 4.4.1.4.1.2 At least one shutdown cooling loop shall be determined to be in operation and circulating reactor coolant in accordance with the Surveillance Frequency Control Program.

SR 3.4.7.4 4.4.1.4.1.3 Verify required shutdown cooling train locations susceptible to gas accumulation are sufficiently filled with water in accordance with the Surveillance Frequency Control Program.

LCO 3.4.7 Note 1 * The shutdown cooling pump may be de-energized for up to 1 hour provided 1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.2 and 2) core outlet temperature is maintained at least 10°F below saturation temperature.

LCO 3.4.7 Note 2 # One shutdown cooling loop may be inoperable for up to 2 hours for surveillance testing provided the other shutdown cooling loop is OPERABLE and in operation.

LCO 3.4.7 Note 3 ## A reactor coolant pump shall not be started with two idle loops unless the secondary water temperature of each steam generator is less than 30°F above each of the Reactor Coolant System cold leg temperatures.

REACTOR COOLANT SYSTEM

REACTOR COOLANT PUMP - STARTING

LIMITING CONDITION FOR OPERATION

ITS 3.4.7 Note 3 3.4.14 If the steam generator temperature exceeds the primary temperature by more than 30°F, the first idle reactor coolant pump shall not be started.

APPLICABILITY: MODES 4# and 5.

ACTION:

If a reactor coolant pump is started when the steam generator temperature exceeds primary temperature by more than 30°F, evaluate the subsequent transient to determine compliance with Specification 3.4.9.1.

See ITS 3.4.6

SURVEILLANCE REQUIREMENTS

ITS 3.4.7 Note 3 4.4.14 Prior to starting a reactor coolant pump, verify that the steam generator temperature does not exceed primary temperature by more than 30°F.

Reactor Coolant System Cold Leg Temperature is less than 300°F.

See ITS 3.4.6

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS FILLED

CONDITION FOR OPERATION

LCO 3.4.7 3.4.1.4.1 At least one shutdown cooling loop shall be OPERABLE and in operation*, and either:

a. One additional shutdown cooling loop shall be OPERABLE#, or

b. The secondary side water level of at least two steam generators shall be greater than 10% indicated narrow range level. (each) LA01

Applicability **APPLICABILITY**: MODE 5 with Reactor Coolant loops filled##. (RCS) (s with secondary side water level not within limit) (AND One SDC loop OPERABLE) A02

ACTION:

Condition A, Condition B, ACTION A,B a. With one of the shutdown cooling loops inoperable and with less than the required steam generator level, immediately initiate corrective action to return the inoperable shutdown cooling loop to OPERABLE status or to restore the required steam generator level as soon as possible. (required) (One or more) (restore a second SDC) (Immediately initiate action) (s secondary side water level to within limit) M04

ACTION C b. With no shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.2 and immediately initiate corrective action to return the required shutdown cooling loop to operation. (No required SDC loops OPERABLE OR Required SDC) (not) (immediately) M01 (restore one) (LCO) (OPERABLE status and) M01

SURVEILLANCE REQUIREMENTS

SR 3.4.7.2 4.4.1.4.1.1 The secondary side water level of at least two steam generators when required shall be determined to be within limits in accordance with the Surveillance Frequency Control Program. (Verify required SG) (is ≥ 10%)

SR 3.4.7.1 4.4.1.4.1.2 At least one shutdown cooling loop shall be determined to be in operation and circulating reactor coolant in accordance with the Surveillance Frequency Control Program. (is) (Verify required SDC) LA01

(Insert proposed SR 3.4.7.3) M02

SR 3.4.7.4 4.4.1.4.1.3 Verify required shutdown cooling trains locations susceptible to gas accumulation are sufficiently filled with water in accordance with the Surveillance Frequency Control Program. (SDC loop)

(SDC) (of the loop in operation) (removed from operation) (≤) (per 8 hour period) M03

LCO 3.4.7 Note 1 * The shutdown cooling pump may be de-energized for up to 1 hour provided 1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of Technical Specification 3.1.1.2 and 2) core outlet temperature is maintained at least 10°F below saturation temperature. (LCO) (>)

(SDC)

LCO 3.4.7 Note 2 # One shutdown cooling loop may be inoperable for up to 2 hours for surveillance testing provided the other shutdown cooling loop is OPERABLE and in operation. (SDC)

(No RCP)

LCO 3.4.7 Note 3 ## A Reactor Coolant pump shall not be started with two idle loops unless the secondary water temperature of each steam generator is less than 40°F above each of the Reactor Coolant System cold leg temperatures. (side) (RCS) (in)

(Insert proposed LCO 3.4.7 Note 4) L01

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 ITS SR 3.4.7.3 Condition A requires one required shutdown cooling (SDC) loop inoperable and “one SDC loop OPERABLE.” ITS SR 3.4.7.3 Condition B requires one or more SGs with secondary water level not within limit and “one SDC loop OPERABLE.” The condition for “one SDC loop OPERABLE” is not in the CTS. This changes the CTS by adding an additional condition; however, this condition requires one “SDC loop be OPERABLE” which is expected if one SDC loop is inoperable, or if one or more SGs with secondary water level not within limit. The addition of this condition to ITS Condition A and Condition B allows entry into ITS 3.4.7 ACTION C, that is, no required SDC loops OPERABLE or required SDC loop not in operation, without requiring entry into ACTION A or ACTION B. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 Unit 1 CTS 3.4.1.4.1 Action a. states, in part, with less than the above required loops OPERABLE or with less than the required steam generator level, within one (1) hour initiate corrective action to return the required loops to OPERABLE status or to restore the required level. ITS 3.4.7 Required Actions A.1 and B.1 each state “immediately” initiate action to restore a second SDC loop to OPERABLE status. ITS 3.4.7 Required Actions A.2 and B.2 each state “immediately” initiate action to restore required SGs secondary side water level to within limit. This changes the Unit 1 CTS by adding the requirement to “immediately” initiate the action to restore a second loop to OPERABLE status and to restore required SGs secondary side water level to within limit.

CTS 3.4.1.4.1 Action b. states, in part, with no shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specifications 3.1.1.1. ITS 3.4.7 ACTION C and Required Action C. 1 state that with no required SDC loop OPERABLE or required SDC loop is not in operation, “immediately” suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. This changes the Unit 1 and Unit 2 CTS by adding the requirement to “immediately” suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1 to the CTS.

CTS 3.4.1.4.1 Action b. states, in part, with no shutdown cooling loop in operation, within one (1) hour (Unit 1) and immediately (Unit 2) initiate corrective action to return the required shutdown loop to operation. ITS 3.4.7 ACTION C and Required Action C. 2 state that with no required SDC loop OPERABLE or required SDC loop is not in operation, immediately initiate action to restore one SDC loop to OPERABLE status and operation. This changes the CTS by adding the requirement to restore the loop to OPERABLE status.

This change is acceptable because it provides appropriate actions if one SDC loop is inoperable, no required SDC loops are OPERABLE, or a required SDC loop in not is not in operation. Under these conditions immediate action is necessary to ensure unit transients do not occur, and action is immediately taken to restore one loop to OPERABLE status and operation to be able to remove the decay heat generated by the reactor. These actions are required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operation. Action to restore one SDC loop to OPERABLE status and operation is necessary to be able to remove the decay heat generated by the reactor. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. This change is designated as more restrictive, because it requires immediate action to return the required reactor coolant loop to operation and adds the requirement to restore the loop to OPERABLE status.

M02 ITS SR 3.4.7.3 requires verification that correct breaker alignment and indicated power are available to each required SDC pump. A Note further explains that the Surveillance is not required to be performed until 24 hours after a required pump is not in operation. This Surveillance is not required by the CTS. This changes the CTS by requiring verification of correct breaker alignment and indicated power availability on required SDC pumps that are not in operation.

The purpose of ITS SR 3.4.7.3 is to ensure a standby SDC pump is available to provide RCS cooling should the operating pump fail. This change is acceptable because the verification of proper breaker alignment and power availability ensures that an additional SDC pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. This change is designated as more restrictive because it adds a Surveillance Requirement to the CTS.

M03 CTS 3.4.1.4.1 states, in part, that at least one shutdown cooling loop shall be OPERABLE and in operation. CTS 3.4.1.4.1 is modified by a footnote (*) that states, in part, that the shutdown cooling pumps may be de-energized for up to 1 hour under the conditions specified therein. ITS 3.4.7 contains the same allowance, but limits the use of the 1 hour exception to once per 8 hour period. This changes the CTS by modifying the 1 hour allowance that SDC pumps may be removed from operation under the conditions specified therein and limits the usage of the allowance to once per 8 hour period.

The purpose of the 1 hour allowance is to allow SDC pumps to be removed from operation to change operation from one SDC loop to the other, perform surveillance or startup testing, and perform the transition to and from the SDC.

This change is acceptable because it helps ensure that boron stratification and inadequate decay heat removal do not occur should multiple 1 hour periods be required. This change is designated as more restrictive because it limits the allowance to 1 hour per 8 hour period, and that restriction does not currently exist.

M04 **Unit 2 only:** CTS 3.4.1.4.1 Action a. states, in part, with one of the shutdown cooling loops inoperable "and" with less than the required steam generator level, immediately initiate the actions specified therein. ITS 3.4.7 ACTION A states that with one required SDC loop inoperable and one SDC loop OPERABLE, then immediately initiate the actions specified therein, of which, are the same as the CTS actions. Similarly, ITS 3.4.7 ACTION B states that with one or more required SGs with secondary side water level not within limit and one SDC loop OPERABLE, then immediately initiate the actions specified therein, of which, are the same as the CTS actions. This changes the CTS by requiring the actions specified therein be taken with one of the shutdown cooling loops inoperable "or" with less than the required steam generator level, rather than both Conditions being required before actions are taken (i.e., and).

This change is acceptable because the ITS retains the appropriate actions if one of the shutdown cooling loops inoperable or if steam generator level is less than the required steam generator level. Under these conditions, immediate action is necessary to ensure certain unit transients do not occur, and action is immediately taken to restore one loop to OPERABLE status and operation to be able to remove the decay heat generated by the reactor. This change is designated as more restrictive, because it adds separate Conditions than are required in the CTS.

<u>RELOCATED SPECIFICATIONS</u>

None

<u>REMOVED DETAIL CHANGES</u>

LA01 *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.4.1.4.1.b states that the secondary side water level of at least two steam generators shall be greater than 10% of narrow range indication. ITS LCO 3.4.7.b states that the secondary side water level of each steam generator (SG) shall be ≥ 10%. CTS 4.4.1.4.1.2 states, in part, that at least one shutdown cooling loop shall be determined to be in operation and circulating reactor coolant. ITS SR 3.4.7.1 states verify required SDC loop is in operation. This changes the CTS by moving the requirement for the instrumentation to be used to verify secondary side level in SGs and to verify that the SDC loops are circulating reactor coolant, to the Bases.

The removal of this detail for determining LCO requirements and performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be in the Technical Specifications in order to provide adequate protection of the public health and safety. The ITS retains the requirement that one shutdown cooling (SDC) loop shall be OPERABLE and in operation, and additional SDC loop shall be OPERABLE or the secondary side water level of each SG shall be ≥ 10%. Any one SDC loop in operation provides enough flow to ensure circulation of reactor coolant. Maintaining secondary side water level in each SG > 10% provides a sufficient volume in the SG to serve as a backup source for decay heat removal. Also, this change is acceptable because this type of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 1 – Relaxation of LCO Requirements)* CTS 3.4.1.4.1 states, in part, that at least one shutdown cooling loop shall be OPERABLE and in operation, and either of the specified requirements therein. ITS 3.4.7 specifies the same requirements; however, ITS LCO 3.4.7 Note 4 allows all SDC loops to be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation. This changes the CTS by adding an allowance for all SDC loops to be removed from operation during planned heatup operations to MODE 4.

The purpose of CTS 3.4.1.4.1 is to ensure there is sufficient forced circulation to prevent boric acid stratification and to provide forced flow for decay heat removal and transport. This change is acceptable because the LCO requirements continue to ensure that the structures, systems, and components are maintained consistent with the safety analyses and licensing basis. This change allows an RCS loop to be in operation instead of a SDC loop. The RCS loop simply replaces the function of the SDC loop. This change is designated as less restrictive because less stringent LCO requirements are being applied in the ITS than were applied in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops - MODE 5, Loops Filled

3.4.1.4.1 LCO 3.4.7 One shutdown cooling (SDC) ~~train~~ loop shall be OPERABLE and in operation and either: 1

a. One additional SDC ~~train~~ loop shall be OPERABLE or 1

b. The secondary side water level of each steam generator (SG) shall be ≥ ~~[25~~ 10 % ~~]~~ narrow range. 2

---NOTES---

3.4.1.4.1 Note * 1. The SDC pump of the ~~train~~ loop in operation may be removed from operation for ≤ 1 hour per 8 hour period provided: 1

a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," and 1

b. Core outlet temperature is maintained at ≥ 10°F below saturation temperature.

3.4.1.4.1 Note # 2. One SDC ~~train~~ loop may be inoperable for up to 2 hours for surveillance testing provided that the other SDC ~~train~~ loop is OPERABLE and in operation. 1

3.4.1.4.1 Note ## 3. No reactor coolant pump (RCP) shall be started with two idle RCS loops unless ~~any RCS cold leg temperature less than or equal to the LTOP enable temperature specified in the PTLR unless:~~ 1

~~a. The pressurizer water level is < [60]% or~~

~~b.~~ ~~The~~ secondary side water temperature in each SG is < ~~[100]~~ 30 °F above each of the RCS cold leg temperatures. 2

DOC L01 4. All SDC ~~trains~~ loops may not be in operation during planned heatup to MODE 4 when at least one RCS loop is in operation. 1

Applicability APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
3.4.1.4.1 Action A, B; DOC M01 — A. One required SDC ~~train~~ loop inoperable. AND DOC A02; 3.4.1.4.1 Action A, B — One SDC ~~train~~ loop OPERABLE.	A.1	Initiate action to restore a second SDC ~~train~~ loop to OPERABLE status.	Immediately 1
	OR		
	A.2	Initiate action to restore required SGs secondary side water level to within limit.	Immediately 1
B. One or more required SGs with secondary side water level not within limit. AND 3.4.1.4.1 Action A, B; DOC A02 — One SDC ~~train~~ loop OPERABLE.	B.1	Initiate action to restore a second SDC ~~train~~ loop to OPERABLE status.	Immediately 1
	OR		
	B.2	Initiate action to restore required SGs secondary side water level to within limit.	Immediately 1
3.4.1.4.1 Action C; DOC M01 — C. No required SDC ~~trains~~ loops OPERABLE. OR Required SDC ~~train~~ loop not in operation.	C.1	Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately 1 1
	AND		
	C.2	Initiate action to restore one SDC ~~train~~ loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.1.4.1.2	SR 3.4.7.1	Verify required SDC ~~train~~ loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1 2 2
4.4.1.4.1.1	SR 3.4.7.2	Verify required SG secondary side water level is ≥ ~~[25]~~ 10 % narrow range.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2
DOC M02	SR 3.4.7.3	------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required SDC pump.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.1.4.1.3	SR 3.4.7.4	Verify required SDC train loop locations susceptible to gas accumulation are sufficiently filled with water.	[31 days OR In accordance with the Surveillance Frequency Control Program]	1 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.7 RCS Loops - MODE 5, Loops Filled

3.4.1.4.1 LCO 3.4.7 One shutdown cooling (SDC) ~~train~~ loop shall be OPERABLE and in operation and either: (1)

a. One additional SDC ~~train~~ loop shall be OPERABLE or (1)

b. The secondary side water level of each steam generator (SG) shall be ≥ ~~[25~~ 10 % ~~]~~ narrow range. (2)

-----------------------------------loop-NOTES-----------------------------------

3.4.1.4.1 Note * 1. The SDC pump of the ~~train~~ loop in operation may be removed from operation for ≤ 1 hour per 8 hour period provided: (1)

a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," and (1)

b. Core outlet temperature is maintained at ≥ 10°F below saturation temperature.

3.4.1.4.1 Note # 2. One SDC ~~train~~ loop may be inoperable for up to 2 hours for surveillance testing provided that the other SDC ~~train~~ loop is OPERABLE and in operation. (1)

3.4.1.4.1 Note ##
3.4.14
3. No reactor coolant pump (RCP) shall be started with two idle RCS loops unless ~~any RCS cold leg temperature less than or equal to the LTOP enable temperature specified in the PTLR unless:~~ (1)

~~a. The pressurizer water level is < [60]% or~~

~~b.~~ ~~The~~ secondary side water temperature in each SG is < ~~[100]~~ 40 °F above each of the RCS cold leg temperatures. (2)

DOC L01 4. All SDC ~~trains~~ loops may not be in operation during planned heatup to MODE 4 when at least one RCS loop is in operation. (1)

Applicability APPLICABILITY: MODE 5 with RCS loops filled.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
3.4.1.4.1 Action A, B; DOC A02; 3.4.1.4.1 Action A, B — A. One required SDC ~~train~~ loop inoperable. AND One SDC ~~train~~ loop OPERABLE.	A.1	Initiate action to restore a second SDC ~~train~~ loop to OPERABLE status.	Immediately (1)
	OR		
	A.2	Initiate action to restore required SGs secondary side water level to within limit.	Immediately (1)
3.4.1.4.1 Action A, B; DOC A02 — B. One or more required SGs with secondary side water level not within limit. AND One SDC ~~train~~ loop OPERABLE.	B.1	Initiate action to restore a second SDC ~~train~~ loop to OPERABLE status.	Immediately (1)
	OR		
	B.2	Initiate action to restore required SGs secondary side water level to within limit.	Immediately (1)
3.4.1.4.1 Action C; DOC M01 — C. No required SDC ~~trains~~ loops OPERABLE. OR Required SDC ~~train~~ loop not in operation.	C.1	Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately (1)
	AND		(1)
	C.2	Initiate action to restore one SDC ~~train~~ loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

		SURVEILLANCE	FREQUENCY	
4.4.1.4.1.2	SR 3.4.7.1	Verify required SDC ~~train~~ loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1 2 2
4.4.1.4.1.1	SR 3.4.7.2	Verify required SG secondary side water level is ≥ ~~[25]~~ 10 % narrow range.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2
DOC M02	SR 3.4.7.3	-----------------------------NOTE----------------------------- Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required SDC pump.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.1.4.1.3	SR 3.4.7.4	Verify required SDC train loop locations susceptible to gas accumulation are sufficiently filled with water.	[31 days OR In accordance with the Surveillance Frequency Control Program]	1 2 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.7, RCS LOOPS – MODE 5, LOOPS FILLED

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.7 RCS Loops - MODE 5, Loops Filled

BASES

BACKGROUND

In MODE 5 with the RCS loops filled, the primary function of the reactor coolant is the removal of decay heat and the transfer of this heat either to the steam generator (SG) secondary side coolant via natural circulation (Ref. 1) or the component cooling water via the shutdown cooling (SDC) heat exchangers. While the principal means for decay heat removal is via the SDC System, the SGs via natural circulation (Ref. 1) are specified as a backup means for redundancy. Even though the SGs cannot produce steam in this MODE, they are capable of being a heat sink due to their large contained volume of secondary side water. As long as the SG secondary side water is at a lower temperature than the reactor coolant, heat transfer will occur. The rate of heat transfer is directly proportional to the temperature difference. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 5 with RCS loops filled, the SDC loops ~~trains~~ are the principal means for decay heat removal. The number of loops ~~trains~~ in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one SDC loop ~~train~~ for decay heat removal and transport. The flow provided by one SDC loop ~~train~~ is adequate for decay heat removal. The other intent of this LCO is to require that a second path be available to provide redundancy for decay heat removal.

The LCO provides for redundant paths of decay heat removal capability. The first path can be an SDC loop ~~train~~ that must be OPERABLE and in operation. The second path can be another OPERABLE SDC loop ~~train~~, or through the SGs via natural circulation (Ref. 1), each having an adequate water level.

APPLICABLE SAFETY ANALYSES

In MODE 5, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The SDC loops ~~trains~~ provide this circulation.

RCS Loops - MODE 5 (Loops Filled) satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The purpose of this LCO is to require at least one of the SDC trains be OPERABLE and in operation with the other SDC train OPERABLE or secondary side water level of each SG shall be ≥ [25]%. One SDC train provides sufficient forced circulation to perform the safety functions of the reactor coolant under these conditions. The second SDC train is normally maintained OPERABLE as a backup to the operating SDC train to provide redundant paths for decay heat removal. However, if the standby SDC train is not OPERABLE, a sufficient alternate method to provide redundant paths for decay heat removal is two SGs with their secondary side water levels ≥ [25%]. Should the operating SDC train fail, the SGs could be used to remove the decay heat via natural circulation.

Note 1 permits all SDC pumps to be removed from operation ≤ 1 hour per 8 hour period. The circumstances for stopping both SDC trains are to be limited to situations where pressure and temperature increases can be maintained well within the allowable pressure (pressure and temperature and low temperature overpressure protection) and 10°F subcooling limits, or an alternate heat removal path through the SG(s) is in operation.

This LCO is modified by a Note that prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained when SDC forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature, so that no vapor bubble would form and possibly cause a natural circulation flow obstruction. In this MODE, the SG(s) can be used as the backup for SDC heat removal. To ensure their availability, the RCS loop flow path is to be maintained with subcooled liquid.

In MODE 5, it is sometimes necessary to stop all RCP or SDC forced circulation. This is permitted to change operation from one SDC train to the other, perform surveillance or startup testing, perform the transition to and from the SDC, or to avoid operation below the RCP minimum net positive suction head limit. The time period is acceptable because natural circulation is acceptable for decay heat removal, the reactor coolant temperature can be maintained subcooled, and boron stratification affecting reactivity control is not expected.

Note 2 allows one SDC train to be inoperable for a period of up to 2 hours provided that the other SDC train is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable train during the only time when such testing is safe and possible.

BASES

LCO (continued)

Note 3 requires that ~~either of the following two conditions be satisfied~~ before an RCP may be started with [two idle RCS loops, the] ~~any RCS cold leg temperature less than or equal to the LTOP enable temperature specified in the PTLR:~~ 1

~~a. Pressurizer water level must be < [60]% or~~

~~b.~~ Secondary side water temperature in each SG must be < ~~[100]~~ [30] °F above each of the RCS cold leg temperatures. 2

Satisfying ~~either of~~ the ~~above~~ condition~~s~~ will preclude a low temperature overpressure event due to a thermal transient when the RCP is started. 1

Note 4 provides for an orderly transition from MODE 5 to MODE 4 during a planned heatup by permitting SDC [loops] ~~trains~~ to not be in operation when at least one RCP is in operation. This Note provides for the transition to MODE 4 where an RCP is permitted to be in operation and replaces the RCS circulation function provided by the SDC [loops] ~~trains~~. 1

An OPERABLE SDC [loop] ~~train~~ is composed of an OPERABLE SDC pump and an OPERABLE SDC heat exchanger. Management of gas voids is important to SDC System OPERABILITY. 1

SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. A SG can perform as a heat sink via natural circulation when it has an adequate water level and is OPERABLE.

APPLICABILITY

In MODE 5 with RCS loops filled, this LCO requires forced circulation to remove decay heat from the core and to provide proper boron mixing. One SDC [loop] ~~train~~ provides sufficient circulation for these purposes. 1

Operation in other MODES is covered by:

LCO 3.4.4,	"RCS Loops - MODES 1 and 2,"
LCO 3.4.5,	"RCS Loops - MODE 3,"
LCO 3.4.6,	"RCS Loops – MODE 4,"
LCO 3.4.8,	"RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4,	"Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5,	"Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

BASES

ACTIONS

A.1, A.2, B.1 and B.2

narrow range

loop If one SDC train is OPERABLE and any required SGs has secondary side 1 2
10 water levels < [25%], or one required SDC train is inoperable, redundancy loop
for heat removal is lost. Action must be initiated immediately to restore a
loop second SDC train to OPERABLE status or to restore the water level in the 1
required SGs. Either Required Action will restore redundant decay heat removal paths. The immediate Completion Times reflect the importance of maintaining the availability of two paths for decay heat removal.

C.1 and C.2

1
loop If a required SDC train is not in operation, or no required SDC train is loop
OPERABLE, except as permitted in Note 1, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended.
loop Action to restore one SDC train to OPERABLE status and operation must 1
be initiated. The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal.

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

1
This SR requires verification that one SDC train is in operation. loop
Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. [The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 2

The SDC flow is established to ensure that core outlet temperature is maintained sufficiently below saturation to allow time for swapover to the standby SDC ~~train~~ loop should the operating ~~train~~ loop be lost. 1

SR 3.4.7.2

Verifying the SGs narrow range are OPERABLE by ensuring their secondary side water levels are ≥ 10 ~~[25%]~~ ensures that redundant heat removal paths are available if the second SDC loop ~~train~~ is inoperable. The Surveillance is required to be performed when the LCO requirement is being met by use of the SGs. If both SDC ~~trains~~ are OPERABLE, this SR is not needed. ~~[The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions.~~ 2 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 2

SR 3.4.7.3

Verification that each required SDC loop ~~train~~ is OPERABLE ensures that redundant paths for decay heat removal are available. The requirement also ensures that the additional loop ~~train~~ can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~The Surveillance is required to be performed when the LCO requirement is being met by one of two SDC trains, e.g., both SGs have < [25]% water level. [The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~ 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------REVIEWER'S NOTE-----------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

SR 3.4.7.4

SDC System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the required SDC ~~train(s)~~ loop(s) and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel. 1

Selection of SDC System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The SDC System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the Surveillance is met and past system OPERABILITY is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the SDC System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

SDC System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

~~[The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the SDC System piping and the procedural controls governing system operation.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

BASES

SURVEILLANCE REQUIREMENTS (continued)

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]

2

REFERENCES

1. NRC Information Notice 95-35, "Degraded Ability of Steam Generators to Remove Decay Heat by Natural Circulation."

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.7 RCS Loops - MODE 5, Loops Filled

BASES

BACKGROUND

In MODE 5 with the RCS loops filled, the primary function of the reactor coolant is the removal of decay heat and the transfer of this heat either to the steam generator (SG) secondary side coolant via natural circulation (Ref. 1) or the component cooling water via the shutdown cooling (SDC) heat exchangers. While the principal means for decay heat removal is via the SDC System, the SGs via natural circulation (Ref. 1) are specified as a backup means for redundancy. Even though the SGs cannot produce steam in this MODE, they are capable of being a heat sink due to their large contained volume of secondary side water. As long as the SG secondary side water is at a lower temperature than the reactor coolant, heat transfer will occur. The rate of heat transfer is directly proportional to the temperature difference. The secondary function of the reactor coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 5 with RCS loops filled, the SDC loops ~~trains~~ are the principal means for decay heat removal. The number of loops ~~trains~~ in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one SDC loop ~~train~~ for decay heat removal and transport. The flow provided by one SDC loop ~~train~~ is adequate for decay heat removal. The other intent of this LCO is to require that a second path be available to provide redundancy for decay heat removal. 1

The LCO provides for redundant paths of decay heat removal capability. The first path can be an SDC loop ~~train~~ that must be OPERABLE and in operation. The second path can be another OPERABLE SDC loop ~~train~~, or through the SGs via natural circulation (Ref. 1), each having an adequate water level. 1

APPLICABLE SAFETY ANALYSES

In MODE 5, RCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The SDC loops ~~trains~~ provide this circulation. 1

RCS Loops - MODE 5 (Loops Filled) satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The purpose of this LCO is to require at least one of the SDC trains be OPERABLE and in operation with the other SDC train OPERABLE or secondary side water level of each SG shall be ≥ [25]%. One SDC train provides sufficient forced circulation to perform the safety functions of the reactor coolant under these conditions. The second SDC train is normally maintained OPERABLE as a backup to the operating SDC train to provide redundant paths for decay heat removal. However, if the standby SDC train is not OPERABLE, a sufficient alternate method to provide redundant paths for decay heat removal is two SGs with their secondary side water levels ≥ [25%]. Should the operating SDC train fail, the SGs could be used to remove the decay heat via natural circulation.

Note 1 permits all SDC pumps to be removed from operation ≤ 1 hour per 8 hour period. The circumstances for stopping both SDC trains are to be limited to situations where pressure and temperature increases can be maintained well within the allowable pressure (pressure and temperature and low temperature overpressure protection) and 10°F subcooling limits, or an alternate heat removal path through the SG(s) is in operation.

This LCO is modified by a Note that prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained when SDC forced flow is stopped because an even concentration distribution cannot be ensured. Core outlet temperature is to be maintained at least 10°F below saturation temperature, so that no vapor bubble would form and possibly cause a natural circulation flow obstruction. In this MODE, the SG(s) can be used as the backup for SDC heat removal. To ensure their availability, the RCS loop flow path is to be maintained with subcooled liquid.

In MODE 5, it is sometimes necessary to stop all RCP or SDC forced circulation. This is permitted to change operation from one SDC train to the other, perform surveillance or startup testing, perform the transition to and from the SDC, or to avoid operation below the RCP minimum net positive suction head limit. The time period is acceptable because natural circulation is acceptable for decay heat removal, the reactor coolant temperature can be maintained subcooled, and boron stratification affecting reactivity control is not expected.

Note 2 allows one SDC train to be inoperable for a period of up to 2 hours provided that the other SDC train is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable train during the only time when such testing is safe and possible.

BASES

LCO (continued)

Note 3 requires that ~~either of the following two conditions be satisfied~~ before an RCP may be started with ~~any RCS cold leg temperature less than or equal to the LTOP enable temperature specified in the PTLR:~~ two idle RCS loops, the 1

~~a. Pressurizer water level must be < [60]% or~~

~~b.~~ Secondary side water temperature in each SG must be < ~~[100]~~ 40°F above each of the RCS cold leg temperatures. 2

Satisfying ~~either of~~ the ~~above~~ condition~~s~~ will preclude a low temperature overpressure event due to a thermal transient when the RCP is started. 1

Note 4 provides for an orderly transition from MODE 5 to MODE 4 during a planned heatup by permitting SDC loops ~~trains~~ to not be in operation when at least one RCP is in operation. This Note provides for the transition to MODE 4 where an RCP is permitted to be in operation and replaces the RCS circulation function provided by the SDC loops ~~trains~~. 1

An OPERABLE SDC loop ~~train~~ is composed of an OPERABLE SDC pump and an OPERABLE SDC heat exchanger. Management of gas voids is important to SDC System OPERABILITY. 1

SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. A SG can perform as a heat sink via natural circulation when it has an adequate water level and is OPERABLE.

APPLICABILITY

In MODE 5 with RCS loops filled, this LCO requires forced circulation to remove decay heat from the core and to provide proper boron mixing. One SDC loop ~~train~~ provides sufficient circulation for these purposes. 1

Operation in other MODES is covered by:

LCO 3.4.4,	"RCS Loops - MODES 1 and 2,"
LCO 3.4.5,	"RCS Loops - MODE 3,"
LCO 3.4.6,	"RCS Loops – MODE 4,"
LCO 3.4.8,	"RCS Loops - MODE 5, Loops Not Filled,"
LCO 3.9.4,	"Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5,	"Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

BASES

ACTIONS

A.1, A.2, B.1 and B.2

If one SDC loop ~~train~~ is OPERABLE and any required SGs has secondary side water levels < narrow range ~~[25%]~~ 10, or one required SDC loop ~~train~~ is inoperable, redundancy for heat removal is lost. Action must be initiated immediately to restore a second SDC loop ~~train~~ to OPERABLE status or to restore the water level in the required SGs. Either Required Action will restore redundant decay heat removal paths. The immediate Completion Times reflect the importance of maintaining the availability of two paths for decay heat removal. 1 2 1

C.1 and C.2

If a required SDC loop ~~train~~ is not in operation, or no required SDC loop ~~train~~ is OPERABLE, except as permitted in Note 1, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended. Action to restore one SDC loop ~~train~~ to OPERABLE status and operation must be initiated. The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. 1 1

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

This SR requires verification that one SDC loop ~~train~~ is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. ~~[The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions. In addition, control room indication and alarms will normally indicate loop status.~~ 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

------------------------------------REVIEWER'S NOTE------------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--] 2

The SDC flow is established to ensure that core outlet temperature is maintained sufficiently below saturation to allow time for swapover to the standby SDC train loop should the operating train loop be lost. 1

SR 3.4.7.2

Verifying the SGs narrow range are OPERABLE by ensuring their secondary side water levels are ≥ 10 [25%] ensures that redundant heat removal paths are available if the second SDC loop train is inoperable. The Surveillance is required to be performed when the LCO requirement is being met by use of the SGs. If both SDC trains are OPERABLE, this SR is not needed. [The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation within safety analyses assumptions. 2 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------------REVIEWER'S NOTE------------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--] 2

SR 3.4.7.3

Verification that each required SDC loop train is OPERABLE ensures that redundant paths for decay heat removal are available. The requirement also ensures that the additional loop train can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~The Surveillance is required to be performed when the LCO requirement is being met by one of two SDC trains, e.g., both SGs have < [25]% water level. [The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~ 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~--]~~

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

SR 3.4.7.4

SDC System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the required SDC ~~train(s)~~ loop(s) and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel. 1

Selection of SDC System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The SDC System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the Surveillance is met and past system OPERABILITY is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the SDC System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

SDC System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

~~[The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the SDC System piping and the procedural controls governing system operation.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

BASES

SURVEILLANCE REQUIREMENTS (continued)

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]

2

REFERENCES

1. NRC Information Notice 95-35, "Degraded Ability of Steam Generators to Remove Decay Heat by Natural Circulation."

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.7, BASES, RCS LOOPS – MODE 5, LOOPS FILLED

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to reflect the correct Specification Title.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.7, RCS LOOPS – MODE 5, LOOPS FILLED

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 8

3.4.8, RCS Loops – MODE 5, Loops Not Filled

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS NOT FILLED

LIMITING CONDITION FOR OPERATION

LCO 3.4.8 ~~3.4.1.4.2~~ Two shutdown cooling (SDC) loops shall be OPERABLE# and ~~at least~~ one ~~shutdown cooling~~ SDC loop shall be in operation*.

Applicability **APPLICABILITY:** MODE 5 with ~~reactor coolant~~ RCS loops not filled.

ACTION:

ACTION A ~~a.~~ ~~With less than the above~~ One required SDC loop~~s~~ IN OPERABLE, ~~within one (1) hour~~ immediately initiate ~~corrective~~ action to ~~return the required~~ restore SDC loop~~s~~ to OPERABLE status. M01

ACTION B ~~b.~~ ~~With no shutdown cooling~~ No required SDC loop OPERABLE OR Required SDC loop not in operation, immediately suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of ~~Technical Specification~~ LCO 3.1.1~~.2~~ and ~~within one (1) hour~~ immediately initiate ~~corrective~~ action to ~~return the required shutdown cooling~~ restore one SDC loop to OPERABLE status and operation. M01 M01 M01

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1 ~~4.4.1.4.2~~ ~~At least one shutdown cooling~~ Verify required SDC loop ~~shall be determined to be~~ is in operation ~~and circulating reactor coolant~~ in accordance with the Surveillance Frequency Control Program. LA01

Insert proposed SR 3.4.8.2 M02

SR 3.4.8.3 ~~4.4.1.4.2.1~~ Verify ~~shutdown cooling train~~ SDC loop locations susceptible to gas accumulation are sufficiently filled with water in accordance with the Surveillance Frequency Control Program.

LCO 3.4.8 Note 2 # One ~~shutdown cooling~~ SDC loop may be inoperable for ~~up to~~ ≤ 2 hours for surveillance testing provided the other ~~shutdown cooling~~ SDC loop is OPERABLE and in operation.

LCO 3.4.8 Note 1 * ~~The shutdown cooling~~ SDC pump~~s~~ may be ~~de-energized~~ removed from operation for ~~up to 1 hour~~ ≤ 15 minutes when switching from one loop to another provided 1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of ~~Technical Specification~~ LCO 3.1.1~~.2~~ and 2) core outlet temperature is maintained ~~at least~~ > 10°F below saturation temperature. M03

Insert proposed LCO 3.4.8 Note 1.c M03

~~DELETED~~

REACTOR COOLANT SYSTEM

COLD SHUTDOWN – LOOPS NOT FILLED

LIMITING CONDITION FOR OPERATION

LCO 3.4.8 ~~3.4.1.4.2~~ Two ~~shutdown cooling~~ (SDC) loops shall be OPERABLE# and ~~at least~~ one ~~shutdown cooling~~ SDC loop shall be in operation.*

Applicability **APPLICABILITY**: MODE 5 with ~~reactor coolant~~ RCS loops not filled.

ACTION:

ACTION A ~~a.~~ ~~With less than the above~~ One required loop~~s~~ IN OPERABLE, ~~within 1 hour~~ immediately initiate ~~corrective~~ action to ~~return the required~~ restore SDC loop~~s~~ to OPERABLE status ~~as soon as possible~~. M01

ACTION B ~~b.~~ No required SDC loop OPERABLE OR Required SDC ~~With no shutdown cooling~~ loop not in operation, immediately suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of ~~Technical Specification~~ LCO 3.1.1~~.2~~ and ~~within 1 hour~~ immediately initiate ~~corrective~~ action to ~~return the required shutdown cooling~~ restore one SDC loop to OPERABLE status and operation. M01

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1 ~~4.4.1.4.2~~ ~~At least one shutdown cooling~~ Verify required SDC loop ~~shall be determined to be~~ is in operation ~~and circulating reactor coolant~~ in accordance with the Surveillance Frequency Control Program. LA01

Insert proposed SR 3.4.8.2 M02

SR 3.4.8.3 ~~4.4.1.4.2.1~~ Verify ~~shutdown cooling trains~~ SDC loop locations susceptible to gas accumulation are sufficiently filled with water in accordance with the Surveillance Frequency Control Program.

LCO 3.4.8 Note 2 # One ~~shutdown cooling~~ SDC loop may be inoperable for ~~up to~~ ≤ 2 hours for surveillance testing provided the other ~~shutdown cooling~~ SDC loop is OPERABLE and in operation.

LCO 3.4.8 Note 1 * ~~The shutdown cooling~~ SDC pump~~s~~ may be ~~deenergized~~ removed from operation for ~~up to~~ ≤ ~~1 hour~~ 15 minutes when switching from one loop to another provided (1) no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SHUTDOWN MARGIN of ~~Technical Specification~~ LCO 3.1.1~~.2~~ and (2) core outlet temperature is maintained ~~at least~~ > 10°F below saturation temperature. M03

Insert proposed LCO 3.4.8 Note 1.c M03

A01

~~DELETED~~

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.4.1.4.2 Action a. states, in part, with less than the above required loops OPERABLE, within one (1) hour initiate corrective action to return the required loops to OPERABLE status. ITS 3.4.8 ACTION A states that with one required SDC loop inoperable “immediately” initiate action to restore SDC loop to OPERABLE status. This changes the CTS by adding the requirement to “immediately” initiate corrective action to return the required loops to OPERABLE status.

CTS 3.4.1.4.2 Action b. states, with no shutdown cooling loop in operation, suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SHUTDOWN MARGIN of Technical Specification 3.1.1.2 and within one (1) hour initiate corrective action to return the required shutdown cooling loop to operation. ITS 3.4.8 ACTION B states that with no required SDC loop OPERABLE or required SDC loop not in operation, “immediately” suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1, and “immediately” initiate action to restore one SDC loop to OPERABLE status and operation. This changes the CTS by adding the requirement to “immediately” suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1 and to “immediately” initiate corrective action to return the required shutdown cooling loop to operation. Additionally, this changes the CTS by adding the requirement to restore the loop to OPERABLE status.

This change is acceptable because it provides appropriate actions if one required SDC loop is inoperable, no required SDC loop is OPERABLE, or a required SDC loop is not in operation. Under these conditions immediate action is necessary to ensure unit transients do not occur, and action is immediately taken to restore SDC to OPERABLE status and operation to be able to remove the decay heat generated by the reactor. These actions are required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operation. Action to restore one SDC loop to OPERABLE status and operation is necessary to be able to remove the decay heat generated by the reactor. The immediate Completion Times reflect the importance of maintaining operation for decay heat removal. This change is designated as more restrictive, because it requires immediate action to return the required reactor coolant loop to operation and adds the requirement to restore the loop to OPERABLE status.

M02 ITS SR 3.4.8.2 requires verification that correct breaker alignment and indicated power are available to each required SDC pump. A Note further explains that the Surveillance is not required to be performed until 24 hours after a required pump is not in operation. This Surveillance is not required by the CTS. This changes the CTS by requiring verification of correct breaker alignment and indicated power availability on required SDC pumps that are not in operation.

The purpose of ITS SR 3.4.8.2 is to ensure a standby SDC pump is available to provide RCS cooling should the operating pump fail. This change is acceptable because the verification of proper breaker alignment and power availability ensures that an additional SDC pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. This change is designated as more restrictive because it adds a Surveillance Requirement to the CTS.

M03 CTS 3.4.1.4.2 states, in part, that two shutdown cooling loops shall be OPERABLE and at least one shutdown cooling loop shall be in operation. CTS 3.4.1.4.2 is modified by a footnote (*) that states, in part, that the shutdown cooling pump may be de-energized for up to 1 hour under the conditions specified therein. ITS 3.4.8 Note 1 allows all SDC pumps to be removed from operation for ≤ 15 minutes “when switching from one train to another” under the conditions specified therein (i.e., part 1.a and 1.b which are the same as the conditions specified in the CTS), and also requires that no draining operations to further reduce the RCS water volume are permitted (part c). This changes the CTS by reducing the time allowed for the SDC pump to be de-energized from 1 hour to 15 minutes, restricts the allowance to only during pump switching operations, and adds a restriction that no draining operations are permitted to further reduce the RCS water volume.

The purpose of the CTS 3.4.1.4.2 Footnote * in MODE 5 with RCS loops not filled is to allow the SDC loops to be removed from operation for switching from one loop to the other. This change is acceptable because ITS LCO 3.4.8 Note 1 provides sufficient time to perform loop switching operations and provides adequate controls. Stopping all operating SDC loops when the RCS is not filled should be limited to short periods of time because of the reduced inventory of water available to absorb decay heat. Stopping all SDC pumps during loop swapping operations may be necessary. Fifteen minutes is sufficient time to perform the loop swapping operation without excessive increases in RCS average temperature due to lack of decay heat removal. Adding the additional condition that no draining operations be performed when the pumps are stopped is reasonable given the potential for low RCS water level. This change is more restrictive because it reduces the time a SDC loop may be out of service and adds an additional restriction.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.4.1.4.2 states, in part, at least one shutdown cooling loop shall be determined to be in operation and circulating reactor coolant. ITS SR 3.4.8.1 states verify required SDC loop is in operation. This changes the CTS by moving the Surveillance Requirement to verify that the SDC loops are circulating reactor coolant, to the Bases.

The removal of this detail for determining LCO requirements and performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be in the Technical Specifications in order to provide adequate protection of the public health and safety. The ITS retains the requirement that two shutdown cooling (SDC) loops shall be OPERABLE and one SDC loop shall be in operation. Any loop in operation provides enough flow to remove the decay heat from the core with forced circulation. An additional loop is required to be OPERABLE to provide redundancy for heat removal. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

None

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops - MODE 5, Loops Not Filled

3.4.1.4.2 LCO 3.4.8 Two shutdown cooling (SDC) ~~trains~~ loops shall be OPERABLE and one SDC ~~train~~ loop shall be in operation. 1

-----NOTES-----

3.4.1.4.2 Note * 1. All SDC pumps may be removed from operation for ≤ 15 minutes when switching from one ~~train~~ loop to another provided: 1

[a. The core outlet temperature is maintained > 10°F below saturation temperature,] 2

b. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1 and

DOC M03 c. No draining operations to further reduce the RCS water volume are permitted.

3.4.1.4.2 Note # 2. One SDC ~~train~~ loop may be inoperable for ≤ 2 hours for surveillance testing provided the other SDC ~~train~~ loop is OPERABLE and in operation. 1

Applicability APPLICABILITY: MODE 5 with RCS loops not filled.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.4.2.a DOC M01 A. One required SDC ~~train~~ loop inoperable.	A.1 Initiate action to restore SDC ~~train~~ loop to OPERABLE status.	Immediately 1

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.1.4.2.b DOC M01	B. No required SDC ~~train~~ loop OPERABLE. OR Required SDC ~~train~~ loop not in operation.	B.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. AND B.2 Initiate action to restore one SDC ~~train~~ loop to OPERABLE status and operation.	Immediately Immediately	1 1 1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.4.1.4.2	SR 3.4.8.1 Verify required SDC ~~train~~ loop is in operation.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1 2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
DOC M02	SR 3.4.8.2	------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required SDC pump.	~~[7 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2
4.4.1.4.2.1	SR 3.4.8.3	Verify SDC ~~train~~ loop locations susceptible to gas accumulation are sufficiently filled with water.	~~[31 days~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1 2 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.8 RCS Loops - MODE 5, Loops Not Filled

3.4.1.4.2 LCO 3.4.8 Two shutdown cooling (SDC) ~~trains~~ loops shall be OPERABLE and one SDC ~~train~~ loop shall be in operation. 1

---NOTES---

3.4.1.4.2 Note * 1. All SDC pumps may be removed from operation for ≤ 15 minutes when switching from one ~~train~~ loop to another provided: 1

[a. The core outlet temperature is maintained > 10°F below saturation temperature,] 2

b. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1 and

DOC M03 c. No draining operations to further reduce the RCS water volume are permitted.

3.4.1.4.2 Note # 2. One SDC ~~train~~ loop may be inoperable for ≤ 2 hours for surveillance testing provided the other SDC ~~train~~ loop is OPERABLE and in operation. 1

Applicability APPLICABILITY: MODE 5 with RCS loops not filled.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.1.4.2.a DOC M01	A. One required SDC ~~train~~ loop inoperable.	A.1 Initiate action to restore SDC ~~train~~ loop to OPERABLE status.	Immediately	1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.1.4.2.b DOC M01 B. No required SDC ~~train~~ loop OPERABLE. OR Required SDC ~~train~~ loop not in operation.	B.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. AND B.2 Initiate action to restore one SDC ~~train~~ loop to OPERABLE status and operation.	Immediately 1 1 Immediately 1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.4.1.4.2 SR 3.4.8.1	Verify required SDC ~~train~~ loop is in operation.	~~[12 hours~~ 1 2 ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
DOC M02	SR 3.4.8.2	-------------------------------NOTE------------------------------ Not required to be performed until 24 hours after a required pump is not in operation. --- Verify correct breaker alignment and indicated power available to each required SDC pump.	[7 days OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.1.4.2.1	SR 3.4.8.3	Verify SDC ~~train~~ loop locations susceptible to gas accumulation are sufficiently filled with water.	[31 days OR In accordance with the Surveillance Frequency Control Program]	1 2 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.8, RCS LOOPS – MODE 5, LOOPS NOT FILLED

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.8 RCS Loops - MODE 5, Loops Not Filled

BASES

BACKGROUND

In MODE 5 with the RCS loops not filled, the primary function of the reactor coolant is the removal of decay heat and transfer of this heat to the shutdown cooling (SDC) heat exchangers. The steam generators (SGs) are not available as a heat sink when the loops are not filled. The secondary function of the reactor coolant is to act as a carrier for the soluble neutron poison, boric acid.

In MODE 5 with loops not filled, only the SDC System can be used for coolant circulation. The number of loops ~~trains~~ in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one SDC loop ~~train~~ for decay heat removal and transport and to require that two paths be available to provide redundancy for heat removal. 1 1

APPLICABLE SAFETY ANALYSES

In MODE 5, RCS circulation is considered in determining the time available for mitigation of the accidental boron dilution event. The SDC loops ~~trains~~ provide this circulation. The flow provided by one SDC loop ~~train~~ is adequate for decay heat removal and for boron mixing. 1

RCS loops - MODE 5 (loops not filled) satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require a minimum of two SDC loops ~~trains~~ be OPERABLE and one of these loops ~~trains~~ be in operation. An OPERABLE loop ~~train~~ is one that is capable of transferring heat from the reactor coolant at a controlled rate. Heat cannot be removed via the SDC System unless forced flow is used. A minimum of one running SDC pump meets the LCO requirement for one loop ~~train~~ in operation. An additional SDC loop ~~train~~ is required to be OPERABLE to meet the single failure criterion. 1 1

Note 1 permits the SDC pumps to be removed from operation for ≤ 15 minutes when switching from one loop ~~train~~ to another. The circumstances for stopping both SDC pumps are to be limited to situations when the outage time is short ~~[~~and the core outlet temperature is maintained > 10°F below saturation temperature~~]~~. The Note prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained or draining operations when SDC forced flow is stopped. 1 2

Note 2 allows one SDC loop ~~train~~ to be inoperable for a period of 2 hours provided that the other loop ~~train~~ is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop ~~train~~ during the only time when these tests are safe and possible. 1

BASES

LCO (continued)

An OPERABLE SDC loop ~~train~~ is composed of an OPERABLE SDC pump capable of providing forced flow to an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control, protection, and indication. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. Management of gas voids is important to SDC System OPERABILITY. 1

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4,	"RCS Loops - MODES 1 and 2,"
LCO 3.4.5,	"RCS Loops - MODE 3,"
LCO 3.4.6,	"RCS Loops - MODE 4,"
LCO 3.4.7,	"RCS Loops - MODE 5, Loops Filled,"
LCO 3.9.4,	"Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5,	"Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

ACTIONS

A.1

If one required SDC loop ~~train~~ is inoperable, redundancy for heat removal is lost. Action must be initiated immediately to restore a second loop ~~train~~ to OPERABLE status. The Completion Time reflects the importance of maintaining the availability of two paths for heat removal. 1

B.1 and B.2

If no required SDC loop ~~train~~ is OPERABLE or the required loop ~~train~~ is not in operation, except as provided in Note 1, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended. 1 Action to restore one SDC loop ~~train~~ to OPERABLE status and operation must be initiated immediately. 1 The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This SR requires verification that the required SDC ~~train~~ loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. ~~[The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions.~~ 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 2

SR 3.4.8.2

Verification that each required ~~train~~ loop is OPERABLE ensures that redundant paths for heat removal are available and that an additional ~~train~~ loop can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and indicated power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. ~~[The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience.~~ 1 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

SR 3.4.8.3

SDC System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the SDC ~~trains~~ loops and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel. 1

Selection of SDC System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The SDC System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the Surveillance is met and past system OPERABILITY is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the SDC System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

SDC System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating

BASES

SURVEILLANCE REQUIREMENTS (continued)

parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

~~[The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the SDC System piping and the procedural controls governing system operation.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

REFERENCES None.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.8 RCS Loops - MODE 5, Loops Not Filled

BASES

BACKGROUND

In MODE 5 with the RCS loops not filled, the primary function of the reactor coolant is the removal of decay heat and transfer of this heat to the shutdown cooling (SDC) heat exchangers. The steam generators (SGs) are not available as a heat sink when the loops are not filled. The secondary function of the reactor coolant is to act as a carrier for the soluble neutron poison, boric acid.

In MODE 5 with loops not filled, only the SDC System can be used for coolant circulation. The number of loops ~~trains~~ in operation can vary to suit the operational needs. The intent of this LCO is to provide forced flow from at least one SDC loop ~~train~~ for decay heat removal and transport and to require that two paths be available to provide redundancy for heat removal. (1) (1)

APPLICABLE SAFETY ANALYSES

In MODE 5, RCS circulation is considered in determining the time available for mitigation of the accidental boron dilution event. The SDC loops ~~trains~~ provide this circulation. The flow provided by one SDC loop ~~train~~ is adequate for decay heat removal and for boron mixing. (1)

RCS loops - MODE 5 (loops not filled) satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The purpose of this LCO is to require a minimum of two SDC loops ~~trains~~ be OPERABLE and one of these loops ~~trains~~ be in operation. An OPERABLE loop ~~train~~ is one that is capable of transferring heat from the reactor coolant at a controlled rate. Heat cannot be removed via the SDC System unless forced flow is used. A minimum of one running SDC pump meets the LCO requirement for one loop ~~train~~ in operation. An additional SDC loop ~~train~~ is required to be OPERABLE to meet the single failure criterion. (1) (1)

Note 1 permits the SDC pumps to be removed from operation for ≤ 15 minutes when switching from one loop ~~train~~ to another. The circumstances for stopping both SDC pumps are to be limited to situations when the outage time is short [and the core outlet temperature is maintained > 10°F below saturation temperature]. The Note prohibits boron dilution with coolant at boron concentrations less than required to assure the SDM of LCO 3.1.1 is maintained or draining operations when SDC forced flow is stopped. (1) (2)

Note 2 allows one SDC loop ~~train~~ to be inoperable for a period of 2 hours provided that the other loop ~~train~~ is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop ~~train~~ during the only time when these tests are safe and possible. (1)

BASES

LCO (continued)

loop An OPERABLE SDC ~~train~~ is composed of an OPERABLE SDC pump capable of providing forced flow to an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control, protection, and indication. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. Management of gas voids is important to SDC System OPERABILITY. 1

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4,	"RCS Loops - MODES 1 and 2,"
LCO 3.4.5,	"RCS Loops - MODE 3,"
LCO 3.4.6,	"RCS Loops - MODE 4,"
LCO 3.4.7,	"RCS Loops - MODE 5, Loops Filled,"
LCO 3.9.4,	"Shutdown Cooling (SDC) and Coolant Circulation - High Water Level" ~~(MODE 6)~~, and 3
LCO 3.9.5,	"Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level" ~~(MODE 6)~~. 3

ACTIONS

A.1

loop If one required SDC ~~train~~ is inoperable, redundancy for heat removal is lost. Action must be initiated immediately to restore a second ~~train~~ loop to OPERABLE status. The Completion Time reflects the importance of maintaining the availability of two paths for heat removal. 1

B.1 and B.2

loop If no required SDC ~~train~~ is OPERABLE or the required ~~train~~ loop is not in operation, except as provided in Note 1, all operations involving introduction of coolant into the RCS with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 must be suspended. 1 loop Action to restore one SDC ~~train~~ to OPERABLE status and operation must be initiated immediately. 1 The required margin to criticality must not be reduced in this type of operation. Suspending the introduction of coolant into the RCS of coolant with boron concentration less than required to meet the minimum SDM of LCO 3.1.1 is required to assure continued safe operation. With coolant added without forced circulation, unmixed coolant could be introduced to the core, however coolant added with boron concentration meeting the minimum SDM maintains acceptable margin to subcritical operations. The immediate Completion Time reflects the importance of maintaining operation for decay heat removal.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This SR requires verification that the required SDC train loop is in operation. Verification includes flow rate, temperature, or pump status monitoring, which help ensure that forced flow is providing decay heat removal. [The 12 hour Frequency has been shown by operating practice to be sufficient to regularly assess degradation and verify operation is within safety analyses assumptions. 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

SR 3.4.8.2

Verification that each required train loop is OPERABLE ensures that redundant paths for heat removal are available and that an additional train loop can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and indicated power available to each required pump. Alternatively, verification that a pump is in operation also verifies proper breaker alignment and power availability. [The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience. 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.

SR 3.4.8.3

SDC System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the SDC ~~trains~~ loops and may also prevent water hammer, pump cavitation, and pumping of noncondensible gas into the reactor vessel. 1

Selection of SDC System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The SDC System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If the accumulated gas is eliminated or brought within the acceptance criteria limits during performance of the Surveillance, the Surveillance is met and past system OPERABILITY is evaluated under the Corrective Action Program. If it is determined by subsequent evaluation that the SDC System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

SDC System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating

BASES

SURVEILLANCE REQUIREMENTS (continued)

parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

[The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the SDC System piping and the procedural controls governing system operation. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

REFERENCES None.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.8, BASES, RCS LOOPS – MODE 5, LOOPS NOT FILLED

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to reflect the Specification Title.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.8, RCS LOOPS – MODE 5, LOOPS NOT FILLED

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 9

3.4.9, Pressurizer

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

PRESSURIZER

LIMITING CONDITION FOR OPERATION

LCO 3.4.9 | A02

pressurizer heaters OPERABLE with the capacity of ≥ | Pressurizer water level ≤ 68%

~~3.4.4~~ The pressurizer shall be OPERABLE with ~~a steam bubble~~, and ~~with at least~~ 150 kw ~~of pressurizer heaters~~ capable of ~~being supplied by~~ emergency power.

and | being powered from an | supply

Applicability

APPLICABILITY: MODES 1 and 2. ← Insert proposed MODE 3 Applicability — M01

ACTION:

ACTION A

water level not within limit | MODE 3

~~With the~~ pressurizer ~~inoperable~~, be in ~~at least HOT STANDBY~~ with ~~the~~ reactor trip breakers open within 6 hours. ← Insert proposed Required Action A.2 — M01

← Insert proposed ACTIONS B and C — L02 M01

SURVEILLANCE REQUIREMENTS

~~4.4.4~~ ~~In accordance with 4.8.1.1.2 .~~ A03

← Insert proposed SR 3.4.9.1 — M02

← Insert proposed SR 3.4.9.2 — M02

← Insert proposed SR 3.4.9.3 — M03

REACTOR COOLANT SYSTEM

3/4.4.3 PRESSURIZER

LIMITING CONDITION FOR OPERATION

LCO 3.4.9 / LCO 3.4.9.a / LCO 3.4.9.b — 3.4.3 The pressurizer shall be OPERABLE with a minimum [Pressurizer] water level of greater than or equal to 27% indicated level and a maximum water level of less than or equal to [≤] 68% indicated level and at least two groups of pressurizer heaters capable of being powered from 1E buses each having a nominal [an emergency power supply] [with the] capacity of at least [each group ≥] 150 kW. L01

Applicability — **APPLICABILITY**: MODES 1, 2 and 3.

ACTION:

ACTION B — a. With one [required] group of the above required pressurizer heaters inoperable, restore at least two [required] groups [of pressurizer heaters] to OPERABLE status within 72 hours or be in at least

ACTION D — HOT STANDBY [MODE 3] within the next 6 hours and in HOT SHUTDOWN [MODE 4] within the following 6 [12] hours.

Condition C Note

NOTE
Action not applicable when second group of required pressurizer heaters intentionally made inoperable.

ACTION C — b. With two [required] groups of required pressurizer heaters inoperable, restore at least one group of required pressurizer heaters to OPERABLE status within 24 hours or

ACTION D — be in at least HOT STANDBY [MODE 3] within the next 6 hours and in HOT SHUTDOWN [MODE 4] within the following 6 [12] hours.

ACTION A — c. With the pressurizer otherwise inoperable [water level not within limit], be in at least HOT STANDBY [MODE 3] with the reactor trip breakers open within 6 hours and in HOT SHUTDOWN [MODE 4] within the following 6 [12] hours. A04

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1 — 4.4.3.1 The [Verify] pressurizer water volume shall be determined to be within its limits [level is ≤ 68%] in accordance with the Surveillance Frequency Control Program.

SR 3.4.9.2 — 4.4.3.2 The [Verify] capacity of each of the above required groups of pressurizer heaters shall be verified to be at least [≥] 150 kW in accordance with the Surveillance Frequency Control Program.

4.4.3.3 The [Verify required] emergency power supply for the pressurizer heaters [are capable of being powered from an emergency power supply] shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by verifying that on an Engineered Safety Features Actuation test signal concurrent with a loss of offsite power: A03

a. the pressurizer heaters are automatically shed from the emergency power sources, and

b. the pressurizer heaters can be reconnected to their respective buses manually from the control room after resetting of the ESFAS test signal. LA01

DISCUSSION OF CHANGES
ITS 3.4.9, PRESSURIZER

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 **Unit 1 only:** CTS 3.4.4 states that the pressurizer shall be OPERABLE with a steam bubble. ITS 3.4.9 requires that the pressurizer water level be ≤ 68% to be OPERABLE. This changes the CTS by replacing the generic statement, "…with a steam bubble," with a specific pressurizer water level requirement.

This change is acceptable because when the unit is in MODE 1, 2, or 3, maintaining pressurizer water level ≤ 68% ensures a steam bubble exists. Since the ITS continues to require a steam bubble (i.e., pressurizer water level ≤ 68%) there is no need to require a steam bubble in the pressurizer. The change is designated as administrative because it does not result in a technical change to the CTS but clarifies the maximum level to support a steam bubble.

A03 Unit 1 CTS 4.4.4 states the Surveillance is in accordance with 4.8.1.1.2. Unit 2 CTS 4.4.3.3.a states, in part, that the emergency power supply for the pressurizer heaters shall be demonstrated OPERABLE by verifying that upon an safety injection actuation signal (SIAS) test signal concurrent with a loss of offsite power, the pressurizer heaters are automatically shed from the emergency power sources. Unit 1 CTS 4.8.1.1.2.e.5 and Unit 2 CTS 4.8.1.1.2.e.6 verify that upon an actual or simulated loss of offsite power in conjunction with an SIAS actuation signal, load shedding from the emergency busses occurs. Similarly, ITS SR 3.8.1.17 verifies that upon an actual or simulated loss of offsite power in conjunction with an SIAS actuation signal, load shedding from the emergency busses occurs.

The purpose of Unit 1 CTS 4.4.4 and Unit 2 CTS 4.4.3.3.a is to demonstrate that the pressurizer heaters are automatically shed from the emergency power supplies upon an actual or simulated loss of offsite power in conjunction with an SIAS actuation signal. This requirement is addressed in Unit 1 CTS 4.8.1.1.2.e.5 and Unit 2 CTS 4.8.1.1.2.e.6 Surveillances, and in ITS Unit 1 and Unit 2 SR 3.8.1.17 Surveillances. This change is acceptable because the condition under which the CTS Surveillance applies has not changed. This change is designated as administrative as it results in no technical change to the CTS.

A04 **Unit 2 Only:** CTS 3.4.3 states the LCO requirements for pressurizer water level and pressurizer heater capacity. CTS 3.4.3 Actions a. and b. provide actions for one group of required pressurizer heaters inoperable and two groups of required pressurizer heaters, respectively. ITS 3.4.9 similarly, provides ACTIONS B, C, and D for inoperable group(s) of required pressure heaters. CTS 3.4.3 Action c. states, in part, with the "pressurizer otherwise inoperable" be in at least HOT

STANDBY (i.e., MODE 3) with the reactor trip breakers open within 6 hours and in HOT SHUTDOWN (i.e., MODE 4) within the following 6 hours. Similarly, ITS 3.4.9 ACTION A states that with the pressurizer level not within limit, be in MODE 3 with the reactor trip breakers open within 6 hours and MODE 4 within 12 hours. This changes the CTS to specifically state the reason the pressurizer is inoperable for reasons other than pressurizer heaters.

The purpose of CTS 3.4.3 is to require the pressurizer to be OPERABLE and two conditions of OPERABILITY are supplied. The conditions are pressurizer water level and pressurizer heater OPERABILITY. CTS 3.4.4 Action c. only applies when water level is not within limit. This is the same condition for which ITS 3.4.9 Condition A applies. This change is acceptable because the condition under which CTS 3.4.3 Action c. applies has not changed. This change is designated as administrative as it results in no technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 **Unit 1 only:** CTS 3.4.4 only requires the pressurizer to be OPERABLE in MODES 1 and 2. If the pressurizer is inoperable, the CTS Action requires the unit be in at least HOT STANDBY (i.e., MODE 3) with the reactor trip breakers open within 6 hours. ITS 3.4.9 requires the pressurizer to be OPERABLE in MODES 1, 2, and 3. ITS ACTION A requires that if pressurizer water level is not within limits, the unit must be in MODE 3 with reactor trip breakers open within 6 hours and in MODE 4 within 12 hours. ITS ACTION C requires that if the heater capacity is not within limits and is not restored to OPERABLE status within 24 hours, the unit must be in MODE 3 within 6 hours and in MODE 4 within 12 hours. ITS 3.4.9 Required Action A.2 and Required Action C.2 each require the unit be in MODE 4 within 12 hours. This changes the CTS by expanding the Applicability of the Pressurizer to include MODE 3 and requiring the unit to exit this new Applicability within 12 hours when pressurizer water level is not within limits, or when pressurizer heater capacity is not within limits and is not restored to within limits within 24 hours.

The purpose of the ITS MODE 3 Applicability is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation. This change is acceptable because it provides appropriate requirements in MODE 3 to achieve this purpose. This change is designated as more restrictive because it requires the pressurizer and associated heaters to be OPERABLE under more conditions than is currently required.

M02 **Unit 1 only:** CTS 4.4.4 requires testing in accordance with CTS 4.8.1.1.2. ITS proposes additional Surveillances to verify the LCO is met. ITS SR 3.4.9.1 requires verification that the pressurizer water level is ≤ 68% and ITS SR 3.4.9.2 requires verification that the required pressurizer heater capacity is ≥ 150 kW. This changes the CTS by adding additional Surveillances.

This change is necessary to periodically verify pressurizer level is within the required limit to ensure conformance with a safety analysis assumption and to periodically verify the required pressurizer heater group has adequate capability to perform its function. The Frequencies for these SRs will be in accordance with the Surveillance Frequency Control Program. PSL controls periodic Frequencies for Surveillances in accordance with the Surveillance Frequency Control Program per CTS 6.8.4.o. Therefore, SR 3.4.9.1, and SR 3.4.9.2 will be performed at a Frequency in accordance with the Surveillance Frequency Control Program with an initial 12 hour Frequency for SR 3.4.9.1, and an initial 18 month Frequency for SR 3.4.9.2, consistent with the ISTS SR 3.4.9.1 and SR 3.4.9.2, respectively.

M03 **Unit 1 only:** CTS 4.4.4 states that Surveillance Requirements are in accordance with 4.8.1.1.2. CTS 4.8.2.1.1 demonstrates the emergency power supplies for the pressurizer heaters are OPERABLE by verifying that on an SIAS test signal concurrent with a loss of offsite power, the pressurizer heaters shed from the emergency power supplies. ITS SR 3.4.9.3 demonstrates that the heaters are capable of being powered from an emergency power supply. This changes the CTS by adding a Surveillance. The Frequency for this SR will be in accordance with the Surveillance Frequency Control Program. PSL controls periodic Frequencies for Surveillances in accordance with the Surveillance Frequency Control Program per CTS 6.8.4.o. Therefore, SR 3.4.9.3 will be performed at a Frequency in accordance with the Surveillance Frequency Control Program with an initial Frequency of 18 months consistent with the ISTS SR 3.4.9.3.

The purpose of the Surveillance, in part, is to demonstrate that the pressurizer heaters can be manually transferred to and energized by emergency power supplies after reset of the SIAS. ITS SR 3.4.9.3 is added to establish the requirement that the pressurizer heaters be capable of being powered from an emergency power supply, which will also demonstrate that the required pressurizer heater group can be reconnected to its respective bus manually from the control room after resetting the SIAS test signal. This change is designated as a more restrictive because a Surveillance is added to the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 **Unit 2 only:** *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.4.3.3 states, in part, that the emergency power supply for the pressurizer heaters shall be demonstrated OPERABLE by verifying that on an SIAS test signal concurrent with a loss of offsite power, the pressurizer heaters which have been shed from the emergency power supplies, can be reconnected to their respective buses manually from the control room after resetting of the SIAS test signal. ITS SR 3.4.9.3 requires that pressurizer heaters are capable of being powered from an emergency power supply. ITS SR 3.4.9.3 does not contain the detail for pressurizer heaters reconnection to emergency power. This changes the CTS by deleting these procedural details.

The purpose of CTS 4.4.3.3. is to demonstrate that the pressurizer heaters can be manually transferred to and energized by emergency power supplies after reset of the SIAS. The requirement that the pressurizer heaters be automatically shed from the emergency power sources upon receipt of an SIAS test signal is provided in LCO 3.8.1 Surveillances. ITS SR 3.4.9.3 retains the requirement that the pressurizer heaters are capable of being powered from an emergency power supply. The requirement that the pressurizer heaters can be reconnected to their respective emergency buses manually after reset of the SIAS test signal is relocated to the ITS Bases, which states the Surveillance demonstrates that the heaters can be manually transferred to and energized by emergency power supplies following an actual or simulated loss of offsite power concurrent with an SIAS actuation signal. This change is acceptable because this type of procedural detail will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 **Unit 2 only:** *(Category 1 - Relaxation of LCO Requirements)* CTS 3.4.3 states, in part, that the pressurizer shall be OPERABLE with a minimum water level of ≥ 27% indicated level and a maximum water level of ≤ 68% indicated level. ITS LCO 3.4.9.a states that the pressurizer shall be OPERABLE with pressurizer water level ≤ 68%. This changes the CTS by eliminating the lower water level limit of ≥ 27%.

The purpose of the CTS 3.4.3 lower limit is to preserve the steam space during normal operation, allowing both sprays and heaters to maintain the design operating pressure. The lower level limit prevents the low level interlock from deenergizing the pressurizer heaters during steady state operations. This change is acceptable because the low water level limit is not necessary for accident mitigation and is not a process variable that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The pressurizer water level is routinely monitored by operations personnel to ensure a low level in the pressurizer does not occur, similar to other plant parameters not specified in the Technical Specifications. Therefore, the low level limit is not necessary to be included in the Technical Specifications. This change is designated as less restrictive because less stringent LCO requirements are being applied in the ITS than are being applied in the CTS.

L02 **Unit 1 only:** *(Category 3 - Relaxation of Completion Time)* CTS 3.4.4 does not contain separate Actions for the pressurizer water level and the pressurizer heaters. ITS provides separate ACTIONS (A and B) for LCO 3.4.9.a (pressurizer water level) and LCO 3.4.9.b (pressurizer heaters capacity), respectively. ITS 3.4.9 ACTIONS A and B provide compensatory measures when the pressurizer water level > 68% (ACTION A) and when the capacity of the required pressurizer heaters is less than 150 kW (ACTION B). ITS 3.49 ACTION A requires the unit be in MODE 3 with reactor trip breakers open within 6 hours, and in MODE 4 within 12 hours. ITS 3.4.9 ACTION B requires restoration of the pressurizer heater capability within 24 hours. If the required pressurizer heaters are not restored within 24 hours, ITS 3.4.9 ACTION C requires the unit be in MODE 3 within 6 hours and MODE 4 within 12 hours. This changes the CTS by separating out conditions when the LCO is not met and provides additional time to restore the required pressurizer heaters before a plant shutdown is required.

The purpose of the CTS actions is to provide appropriate remedial actions to ensure continued safe operation until the LCO can be restored. This change is acceptable because the proposed ITS Completion Time to restore the required pressurizer heaters to OPERABLE status has been shown to be acceptable based on the infrequent use of the Required Action and the small incremental effect on plant risk as discussed in WCAP-16125-NP-A, "Justification for Risk-Informed Modifications to Selected Technical Specifications for Conditions Leading to Exigent Plant Shutdown," Revision 2, August 2010. The ITS action is also consistent with the equivalent ISTS condition with no pressurizer heater groups OPERABLE. This change is designated as less restrictive because more time will be allowed to complete a Required Action in the ITS than is allowed in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

3.4.4 LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≤ 68% < [60]% and 2

b. Two groups of pressurizer heaters OPERABLE with a the capacity [of each group] ≥ [150] kW [and capable of being powered from an emergency power supply]. 2

Applicability M01 APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.4 Action.	A. Pressurizer water level not within limit.	A.1 Be in MODE 3 with reactor trip breakers open.	6 hours	
		AND		
M01		A.2 Be in MODE 4.	[12] hours	2
	B. One required group of pressurizer heaters inoperable.	B.1 Restore required group of pressurizer heaters to OPERABLE status.	72 hours [OR In accordance with the Risk Informed Completion Time Program]	2

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
L01 3.4.4 Action	B C. ------------ NOTE ------------ Not applicable when second group of required pressurizer heaters intentionally made inoperable. ------------------------------ Two required groups of pressurizer heaters inoperable.	B C.1	Restore at least one group of required pressurizer heaters to OPERABLE status.	24 hours	1 1
3.4.4 Action M01	C D. Required Action and associated Completion Time of Condition B or C not met.	C D.1 AND C D.2	Be in MODE 3. Be in MODE 4.	6 hours [12] hours	1 1 2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
M02	SR 3.4.9.1	Verify pressurizer water level is ≤ 68% < [60]%.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
------REVIEWER'S NOTE------ The frequency for performing pressurizer heater capacity testing shall be either 18 months or 92 days, depending on whether or not the plant has dedicated safety-related heaters. For dedicated safety-related heaters, which do not normally operate, 92 days is applied. For non-dedicated safety-related heaters, which normally operate, 18 months is applied. ------------		
M02 SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters ≥ [150] kW.	[[18] months OR In accordance with the Surveillance Frequency Control Program]
M03 SR 3.4.9.3	[Verify required pressurizer heaters are capable of being powered from an emergency power supply.	[[18] months OR In accordance with the Surveillance Frequency Control Program]]

2

1

2

2

1

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

3.4.3 LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level ≤ [60]% and (≤ 68%) 2

b. Two groups of pressurizer heaters OPERABLE with the capacity [of each group] ≥ [150] kW [and capable of being powered from an emergency power supply]. 2

Applicability APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.3 Action c.	A. Pressurizer water level not within limit.	A.1 Be in MODE 3 with reactor trip breakers open. AND A.2 Be in MODE 4.	6 hours [12] hours	2
3.4.3 Action a.	B. One required group of pressurizer heaters inoperable.	B.1 Restore required group of pressurizer heaters to OPERABLE status.	72 hours ~~[OR~~ ~~In accordance with the Risk Informed Completion Time Program]~~	2

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.3 Action b. Note	C. ------------ NOTE ----------- Not applicable when second group of required pressurizer heaters intentionally made inoperable. --------------------------------	C.1 Restore at least one group of required pressurizer heaters to OPERABLE status.	24 hours
3.4.3 Action b.	Two required groups of pressurizer heaters inoperable.		
3.4.3 Action a., b.	D. Required Action and associated Completion Time of Condition B or C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	6 hours [12] hours 2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.4.3.1	SR 3.4.9.1 Verify pressurizer water level is ≤ 68% ~~< [60]~~%.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program] 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE			FREQUENCY	
	-------------------------------REVIEWER'S NOTE------------------------------ The frequency for performing pressurizer heater capacity testing shall be either 18 months or 92 days, depending on whether or not the plant has dedicated safety-related heaters. For dedicated safety-related heaters, which do not normally operate, 92 days is applied. For non-dedicated safety-related heaters, which normally operate, 18 months is applied. --			2
4.4.3.2 SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters ≥ [150] kW.		[[18] months OR In accordance with the Surveillance Frequency Control Program]	2
4.4.3.3 SR 3.4.9.3	[Verify required pressurizer heaters are capable of being powered from an emergency power supply.		[[18] months OR In accordance with the Surveillance Frequency Control Program]]	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.9, PRESSURIZER

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.9 Pressurizer

BASES

BACKGROUND

The pressurizer provides a point in the RCS where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the RCS. Key functions include maintaining required primary system pressure during steady state operation and limiting the pressure changes caused by reactor coolant thermal expansion and contraction during normal load transients.

The pressure control components addressed by this LCO include the pressurizer water level, the required heaters and their backup heater controls, and emergency power supplies. Pressurizer safety valves and ~~pressurizer~~ power operated relief valves (PORVs) [block valves] are addressed by LCO 3.4.10, "Pressurizer Safety Valves," and LCO 3.4.11, "~~Pressurizer~~ Power Operated Relief Valve~~s~~ (PORV~~s~~) [Block Valves]," respectively. 1

The maximum water level limit has been established to ensure that a liquid to vapor interface exists to permit RCS pressure control, using the sprays and heaters during normal operation and proper pressure response for anticipated design basis transients. The water level limit serves two purposes:

a. Pressure control during normal operation maintains subcooled reactor coolant in the loops and thus in the preferred state for heat transport and

b. By restricting the level to a maximum, expected transient reactor coolant volume increases (pressurizer insurge) will not cause excessive level changes that could result in degraded ability for pressure control.

The maximum water level limit permits pressure control equipment to function as designed. The limit preserves the steam space during normal operation, thus, both sprays and heaters can operate to maintain the design operating pressure. The level limit also prevents filling the pressurizer (water solid) for anticipated design basis transients, thus ensuring that pressure relief devices (PORVs or pressurizer safety valves) can control pressure by steam relief rather than water relief. If the level limits were exceeded prior to a transient that creates a large pressurizer insurge volume leading to water relief, the maximum RCS pressure might exceed the Safety Limit of 2750 ~~psig~~ [psia]. 1

BASES

BACKGROUND (continued)

≥ 150 kw capacity 1

The requirement to have ~~two groups~~ of pressurizer heater~~s~~ ensures that RCS pressure can be maintained. The pressurizer heaters maintain RCS pressure to keep the reactor coolant subcooled. Inability to control RCS pressure during natural circulation flow could result in loss of single phase flow and decreased capability to remove core decay heat.

APPLICABLE SAFETY ANALYSES

In MODES 1, 2, and 3, the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. No safety analyses are performed in lower MODES. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present.

U 1

Safety analyses presented in the FSAR do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure.

Although the heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 1), is the reason for their inclusion. The requirement for emergency power supplies is based on NUREG-0737 (Ref. 1). The intent is to keep the reactor coolant in a subcooled condition with natural circulation at hot, high pressure conditions for an undefined, but extended, time period after a loss of offsite power. While loss of offsite power is a coincident occurrence assumed in the accident analyses, maintaining hot, high pressure conditions over an extended time period is not evaluated in the accident analyses.

The pressurizer satisfies Criterion 2 and Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants licensed prior to the issuance of NUREG-0737 may not have a requirement on the number of pressurizer groups.~~ 2
~~---~~

≤ 68 2

The LCO requirement for the pressurizer to be OPERABLE with water level ~~≤ [60]~~% ensures that a steam bubble exists. Limiting the maximum operating water level preserves the steam space for pressure control. The LCO has been established to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with analytical assumptions.

BASES

LCO (continued)

The LCO requires two groups of OPERABLE pressurizer heaters, [each] with a capacity ≥ [150] kW [and capable of being powered from an emergency power supply]. The minimum heater capacity required is sufficient to maintain the RCS near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide subcooling margin to saturation can be obtained in the loops. The exact design value of [150] kW is derived from the use of 12 heaters rated at 12.5 kW each. The amount needed to maintain pressure is dependent on the ambient heat losses. 2 1

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature resulting in the greatest effect on pressurizer level and RCS pressure control. Thus, Applicability has been designated for MODES 1 and 2. The Applicability is also provided for MODE 3. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation, such as reactor coolant pump startup. The LCO does not apply to MODE 5 (Loops Filled) because LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," applies. The LCO does not apply to MODES 5 and 6 with partial loop operation. 3

In MODES 1, 2, and 3, there is the need to maintain the availability of pressurizer heaters capable of being powered from an emergency power supply. In the event of a loss of offsite power, the initial conditions of these MODES gives the greatest demand for maintaining the RCS in a hot pressurized condition with loop subcooling for an extended period. For MODE 4, 5, or 6, it is not necessary to control pressure (by heaters) to ensure loop subcooling for heat transfer when the Shutdown Cooling System is in service and therefore the LCO is not applicable.

ACTIONS

A.1 and A.2

With pressurizer water level not within the limit, action must be taken to restore the plant to operation within the bounds of the safety analyses. To achieve this status, the unit must be brought to MODE 3, with the reactor trip breakers open, within 6 hours and to MODE 4 within [12] hours. This takes the plant out of the applicable MODES and restores the plant to operation within the bounds of the safety analyses. 2

BASES

ACTIONS (continued)

Six hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Further pressure and temperature reduction to MODE 4 brings the plant to a MODE where the LCO is not applicable. The 12 hour time to reach the nonapplicable MODE is reasonable based on operating experience for that evolution.

~~B.1~~

~~If one required group of pressurizer heaters is inoperable, restoration is required within 72 hours [or in accordance with the Risk Informed Completion Time Program]. The Completion Time of 72 hours is~~ 4
~~reasonable considering that a demand caused by loss of offsite power would be unlikely in this period. Pressure control may be maintained during this time using normal station powered heaters.~~

~~C~~B.1

If ~~two~~ the required ~~groups of~~ pressurizer heaters are inoperable, restoring ~~at least one group of~~ the pressurizer heaters to OPERABLE status is required within 24 hours. ~~The Condition is modified by a Note stating it is not applicable if the second group of required pressurized heaters is intentionally declared inoperable. The Condition does not apply to voluntary removal of redundant systems or components from service.~~ 4
~~The Condition is only applicable if one group of required pressurized heaters is inoperable for any reason and the second group of required pressurized heaters is discovered to be inoperable, or if both groups of required pressurized heaters are discovered to be inoperable at the same time.~~ If the ~~both~~ required ~~groups of~~ pressurizer heaters are inoperable, the pressurizer heaters may not be available to help maintain subcooling in the RCS loops during a natural circulation cooldown following a loss of offsite power. The inoperability of the ~~two groups of~~ required pressurizer heaters during the 24 hour Completion Time has been shown to be acceptable based on the infrequent use of the Required Action and the small incremental effect on plant risk (Ref. 2).

~~D~~C.1 and ~~D~~C.2 4

If ~~one or more~~ the required ~~group of~~ pressurizer heaters ~~is~~ are inoperable and cannot be restored within the allowed Completion Times, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 4 within ~~[~~12~~]~~ hours. The Completion Time of 6 hours is 2

BASES

ACTIONS (continued)

reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of [12] hours is reasonable, based on operating experience, to reach MODE 4 from full power in an orderly manner and without challenging plant systems. 2

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

This Surveillance ensures that during steady state operation, pressurizer water level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The Surveillance is performed by observing the indicated level. [The 12 hour interval has been shown by operating practice to be sufficient to regularly assess the level for any deviation and verify that operation is within safety analyses assumptions. Alarms are also available for early detection of abnormal level indications. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

SR 3.4.9.2

-----------------------------------REVIEWER'S NOTE-----------------------------------
The frequency for performing pressurizer heater capacity testing shall be either 18 months or 92 days, depending on whether or not the plant has dedicated safety-related heaters. For dedicated safety-related heaters, which do not normally operate, 92 days is applied. For non-dedicated safety-related heaters, which normally operate, 18 months is applied. 2

The Surveillance is satisfied when the power supplies are demonstrated to be capable of producing the minimum power and the associated pressurizer heaters are verified to be at their design rating. (This may be done by testing the power supply output and by performing an electrical check on heater element continuity and resistance.) [The Frequency of [18] months is considered adequate to detect heater degradation and has been shown by operating experience to be acceptable. 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~-----]~~

~~[~~ SR 3.4.9.3

~~This SR is not applicable if the heaters are permanently powered by 1E power supplies.~~ 2

This Surveillance demonstrates that the heaters can be manually transferred to and energized by emergency power supplies following an actual or simulated loss of offsite power concurrent with a safety injection actuation signal. ~~[The Frequency of [18] months is based on a typical fuel cycle and industry accepted practice. This is consistent with similar verifications of emergency power.~~ 2 1

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~-----]]~~

REFERENCES

1. NUREG-0737, November 1980.

2. WCAP-16125-NP-A, "Justification for Risk-Informed Modifications to Selected Technical Specifications for Conditions Leading to Exigent Plant Shutdown," Revision 2, August 2010.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.9 Pressurizer

BASES

BACKGROUND

The pressurizer provides a point in the RCS where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the RCS. Key functions include maintaining required primary system pressure during steady state operation and limiting the pressure changes caused by reactor coolant thermal expansion and contraction during normal load transients.

The pressure control components addressed by this LCO include the pressurizer water level, the required heaters and their backup heater controls, and emergency power supplies. Pressurizer safety valves and ~~pressurizer~~ power operated relief valves (PORVs) block valves are addressed by LCO 3.4.10, "Pressurizer Safety Valves," and LCO 3.4.11, "~~Pressurizer~~ Power Operated Relief Valves (PORV~~s~~) Block Valves," respectively. 1

The maximum water level limit has been established to ensure that a liquid to vapor interface exists to permit RCS pressure control, using the sprays and heaters during normal operation and proper pressure response for anticipated design basis transients. The water level limit serves two purposes:

a. Pressure control during normal operation maintains subcooled reactor coolant in the loops and thus in the preferred state for heat transport and

b. By restricting the level to a maximum, expected transient reactor coolant volume increases (pressurizer insurge) will not cause excessive level changes that could result in degraded ability for pressure control.

The maximum water level limit permits pressure control equipment to function as designed. The limit preserves the steam space during normal operation, thus, both sprays and heaters can operate to maintain the design operating pressure. The level limit also prevents filling the pressurizer (water solid) for anticipated design basis transients, thus ensuring that pressure relief devices (PORVs or pressurizer safety valves) can control pressure by steam relief rather than water relief. If the level limits were exceeded prior to a transient that creates a large pressurizer insurge volume leading to water relief, the maximum RCS pressure might exceed the Safety Limit of 2750 ~~psig~~ psia. 1

BASES

BACKGROUND (continued)

The requirement to have two groups of pressurizer heaters ensures that RCS pressure can be maintained. The pressurizer heaters maintain RCS pressure to keep the reactor coolant subcooled. Inability to control RCS pressure during natural circulation flow could result in loss of single phase flow and decreased capability to remove core decay heat.

APPLICABLE SAFETY ANALYSES

In MODES 1, 2, and 3, the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. No safety analyses are performed in lower MODES. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present.

Safety analyses presented in the U FSAR do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure. 1

Although the heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 1), is the reason for their inclusion. The requirement for emergency power supplies is based on NUREG-0737 (Ref. 1). The intent is to keep the reactor coolant in a subcooled condition with natural circulation at hot, high pressure conditions for an undefined, but extended, time period after a loss of offsite power. While loss of offsite power is a coincident occurrence assumed in the accident analyses, maintaining hot, high pressure conditions over an extended time period is not evaluated in the accident analyses.

The pressurizer satisfies Criterion 2 and Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants licensed prior to the issuance of NUREG-0737 may not have a requirement on the number of pressurizer groups.~~ 2
~~---~~

The LCO requirement for the pressurizer to be OPERABLE with water level ≤ 68 ~~< [60]~~% ensures that a steam bubble exists. Limiting the maximum operating water level preserves the steam space for pressure control. The LCO has been established to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with analytical assumptions. 2

BASES

LCO (continued)

The LCO requires two groups of OPERABLE pressurizer heaters, [each] with a capacity ≥ [150] kW [and capable of being powered from an emergency power supply]. The minimum heater capacity required is sufficient to maintain the RCS near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide subcooling margin to saturation can be obtained in the loops. The exact design value of [150] kW is derived from the use of ~~12~~ 3 heaters rated at ~~12.5~~ 50 kW each. The amount needed to maintain pressure is dependent on the ambient heat losses. 2 1

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature resulting in the greatest effect on pressurizer level and RCS pressure control. Thus, Applicability has been designated for MODES 1 and 2. The Applicability is also provided for MODE 3. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation, such as reactor coolant pump startup. ~~The LCO does not apply to MODE 5 (Loops Filled) because LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," applies. The LCO does not apply to MODES 5 and 6 with partial loop operation.~~ 3

In MODES 1, 2, and 3, there is the need to maintain the availability of pressurizer heaters capable of being powered from an emergency power supply. In the event of a loss of offsite power, the initial conditions of these MODES gives the greatest demand for maintaining the RCS in a hot pressurized condition with loop subcooling for an extended period. For MODE 4, 5, or 6, it is not necessary to control pressure (by heaters) to ensure loop subcooling for heat transfer when the Shutdown Cooling System is in service and therefore the LCO is not applicable.

ACTIONS

<u>A.1 and A.2</u>

With pressurizer water level not within the limit, action must be taken to restore the plant to operation within the bounds of the safety analyses. To achieve this status, the unit must be brought to MODE 3, with the reactor trip breakers open, within 6 hours and to MODE 4 within [12] hours. This takes the plant out of the applicable MODES and restores the plant to operation within the bounds of the safety analyses. 2

BASES

ACTIONS (continued)

Six hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Further pressure and temperature reduction to MODE 4 brings the plant to a MODE where the LCO is not applicable. The 12 hour time to reach the nonapplicable MODE is reasonable based on operating experience for that evolution.

B.1

If one required group of pressurizer heaters is inoperable, restoration is required within 72 hours ~~[or in accordance with the Risk Informed Completion Time Program]~~. The Completion Time of 72 hours is reasonable considering that a demand caused by loss of offsite power would be unlikely in this period. Pressure control may be maintained during this time using normal station powered heaters. 2

C.1

If two required groups of pressurizer heaters are inoperable, restoring at least one group of pressurizer heaters to OPERABLE status is required within 24 hours. The Condition is modified by a Note stating it is not applicable if the second group of required pressurized heaters is intentionally declared inoperable. The Condition does not apply to voluntary removal of redundant systems or components from service. The Condition is only applicable if one group of required pressurized heaters is inoperable for any reason and the second group of required pressurized heaters is discovered to be inoperable, or if both groups of required pressurized heaters are discovered to be inoperable at the same time. If both required groups of pressurizer heaters are inoperable, the pressurizer heaters may not be available to help maintain subcooling in the RCS loops during a natural circulation cooldown following a loss of offsite power. The inoperability of two groups of required pressurizer heaters during the 24 hour Completion Time has been shown to be acceptable based on the infrequent use of the Required Action and the small incremental effect on plant risk (Ref. 2).

D.1 and D.2

If one or more required group of pressurizer heaters is inoperable and cannot be restored within the allowed Completion Times, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 4 within ~~[~~12~~]~~ hours. The Completion Time of 6 hours is 2

BASES

ACTIONS (continued)

reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of [12] hours is reasonable, based on operating experience, to reach MODE 4 from full power in an orderly manner and without challenging plant systems. 2

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

This Surveillance ensures that during steady state operation, pressurizer water level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The Surveillance is performed by observing the indicated level. [The 12 hour interval has been shown by operating practice to be sufficient to regularly assess the level for any deviation and verify that operation is within safety analyses assumptions. Alarms are also available for early detection of abnormal level indications. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

SR 3.4.9.2

-----------------------------------REVIEWER'S NOTE-----------------------------------
The frequency for performing pressurizer heater capacity testing shall be either 18 months or 92 days, depending on whether or not the plant has dedicated safety-related heaters. For dedicated safety-related heaters, which do not normally operate, 92 days is applied. For non-dedicated safety-related heaters, which normally operate, 18 months is applied. 2

The Surveillance is satisfied when the power supplies are demonstrated to be capable of producing the minimum power and the associated pressurizer heaters are verified to be at their design rating. (This may be done by testing the power supply output and by performing an electrical check on heater element continuity and resistance.) [The Frequency of [18] months is considered adequate to detect heater degradation and has been shown by operating experience to be acceptable. 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

~~[~~ SR 3.4.9.3

~~This SR is not applicable if the heaters are permanently powered by 1E power supplies.~~ 2

This Surveillance demonstrates that the heaters can be manually transferred to and energized by emergency power supplies following an actual or simulated loss of offsite power concurrent with a safety injection actuation signal. ~~[The Frequency of [18] months is based on a typical fuel cycle and industry accepted practice. This is consistent with similar verifications of emergency power.~~ 2 1

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]]~~

REFERENCES

1. NUREG-0737, November 1980.

2. WCAP-16125-NP-A, "Justification for Risk-Informed Modifications to Selected Technical Specifications for Conditions Leading to Exigent Plant Shutdown," Revision 2, August 2010.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.9, BASES, PRESSURIZER

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The ISTS Applicability discussion related to when the LCO does not apply in MODES 5 and 6 is unnecessary detail. Therefore, this information is not included in the St. Lucie Unit 1 and Unit 2 ITS Bases.

4. Changes have been made to be consistent with changes made to the Specifications.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.9, PRESSURIZER

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 10

3.4.10, Pressurizer Safety Valves

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

SAFETY VALVES - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.4.10 3.4.3 Three All pressurizer code safety valves shall be OPERABLE with a lift settings of ≥ 2422.8 psig and ≤ 2560.3 psig.

Applicability **APPLICABILITY:** MODES 1, 2, 3, and 4 with all RCS cold leg temperatures > 281°F.

Add proposed 3.4.10 Applicability Note L01

ACTION:

ACTION A a. With one pressurizer code safety valve inoperable, either restore the inoperable valve to OPERABLE status within 15 minutes or be in HOT 12

ACTION B MODE 3 STANDBY within 6 hours and in HOT SHUTDOWN within the next 6 hours.

MODE 4 with any RCS RCS cold leg temperature ≤ 281°F M01

ACTION B b. With two or more pressurizer code safety valves inoperable, be in HOT MODE 3 STANDBY within 6 hours and in HOT SHUTDOWN with all RCS cold leg temperatures ≤ 281°F within the next 6 hours. MODE 4 any 12

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1 4.4.3 Verify each pressurizer code safety valves is OPERABLE in accordance with the INSERVICE TESTING PROGRAM. Following testing, as-left lift settings shall be within +/- 1% of 2500 psia. LA01

REACTOR COOLANT SYSTEM

OPERATING

LIMITING CONDITION FOR OPERATION

NOTE
The lift setting pressure shall correspond to ambient conditions of the valve at nominal operating temperature and pressure.

LA02

LCO 3.4.10 3.4.2.2 Three All pressurizer code safety valves shall be OPERABLE with a lift settings of ≥ 2410.3 psig and ≤ 2560.3 psig.

Applicability **APPLICABILITY:** MODES 1, 2, 3, and 4 with all RCS cold leg temperatures > 230°F.

Add proposed 3.4.10 Applicability Note L01

ACTION:

ACTION A a. With one pressurizer code safety valve inoperable, either restore the inoperable valve to OPERABLE status within 15 minutes or be in HOT

ACTION B MODE 3 STANDBY within 6 hours and in HOT SHUTDOWN within the next 6 12 hours.

MODE 4 with any RCS RCS cold leg temperature ≤ 230°F M01

ACTION B b. With two or more pressurizer code safety valves inoperable, be in HOT MODE 3 STANDBY within 6 hours and in HOT SHUTDOWN MODE 4 with all any RCS cold leg temperatures at ≤ 230°F within the next 6 12 hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1 4.4.2.2 Verify each pressurizer code safety valve is OPERABLE in accordance with the INSERVICE TESTING PROGRAM. Following testing, as-left lift settings shall be within +/- 1% of 2500 psia. LA01

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 Unit 1 CTS 3.4.3 and Unit 2 CTS 3.4.2.2 Action a. requires, with one pressurizer safety valve inoperable, either restore the inoperable valve to OPERABLE status within 15 minutes or be in HOT STANDBY (i.e., MODE 3) within 6 hours and in HOT SHUTDOWN (i.e., MODE 4) within the next 6 hours.

ITS 3.4.10 ACTION A states, with one pressurizer safety valve inoperable, the valve must be restored to OPERABLE status within 15 minutes. If this cannot be met, ITS 3.4.10 ACTION B requires the unit to be in MODE 3 in 6 hours and MODE 4 with any RCS cold leg temperature < 281°F (Unit 1) and < 230°F (Unit 2) in 12 hours. This changes the CTS by requiring the unit, in addition to transitioning to MODE 4, to also reduce RCS cold leg temperature < 281°F (Unit 1) and < 230°F (Unit 2) when only one pressurizer safety valve is inoperable and cannot be restored to OPERABLE status.

The purpose of Unit 1 CTS 3.4.3 and Unit 2 CTS 3.4.2.2 actions is to provide requirements on pressurizer safety valves during MODES 1, 2, 3, and MODE 4 with all RCS cold leg temperatures > 281°F (Unit 1) and > 230°F (Unit 2), and if the Required Action cannot be met within the required Completion Time, the plant must be brought to a MODE in which the requirement does not apply. This change is designated as more restrictive as it provides an explicit RCS cold leg temperature that must be met in MODE 4 to exit the MODE of Applicability when one safety valve is inoperable and cannot be restored to OPERABLE status.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* Unit 1 CTS 4.4.3 and Unit 2 CTS 4.4.2.2 require verification that each pressurizer code safety valve is OPERABLE with an additional statement that following testing, as left lift settings shall be within ± 1% of 2500 psia. ITS SR 3.4.10.1 provides a similar requirement. However, the design pressure of

2500 psia is moved to the ITS Bases. This changes the CTS by moving the RCS system design pressure from the CTS to the ITS Bases.

The purpose of the Surveillance is to ensure the pressurizer safety valves setpoints are within ± 1% of their setpoint, which corresponds to the RCS system design pressure of 2500 psia. The removal of the system design pressure from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for the pressurizer safety valves to be verified OPERABLE in accordance with the INSERVICE TESTING PROGRM and that following testing, the lift settings shall be within ± 1%. The RCS system design pressure corresponding to the lift setting is described in the Bases. This change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA02 **Unit 2 only:** *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.4.2.2 is modified by a note that states that the pressurizer safety valves lift setting pressure shall correspond to ambient conditions of the valve at nominal operating temperature and pressure. This information is not provided in ITS 3.4.10. This changes the CTS by moving this information to the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.4.10 still retains a requirement for the pressurizer safety valves to be OPERABLE. Under the definition of OPERABILITY, the pressurizer safety valves must be capable of lifting at the assumed conditions, which includes the ambient operating conditions of the pressurizer safety valves themselves. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being moved from the Technical Specifications to the ITS Bases.

<u>LESS RESTRICTIVE CHANGES</u>

L01 *(Category 2 – Relaxation of Applicability)* Unit 1 CTS 3.4.3 and Unit 2 CTS 3.4.2.2, in part, provide requirements for the pressurizer code safety valves. ITS LCO 3.4.10 Applicability is modified by a Note that allows the lift settings to not be within the LCO limits during MODES 3 and 4 for the purpose of (in-situ) setting of the pressurizer safety valves under ambient (hot) conditions. The exception is allowed for 54 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup. This changes the CTS by allowing entry into MODES 3 and 4 without verifying that the pressurizer code safety valve lift settings are within the LCO limits.

The purpose of the Applicability Note is to allow entry into MODE 3 to perform testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. This change is acceptable because the requirements continue to ensure that the components are maintained in the MODES and other specified conditions assumed in the safety analyses and licensing basis. The cold lift settings give assurance that the valves are OPERABLE near their design condition during the short period of time allowed to verify the settings at the hot condition. While PSL does not set pressurizer safety valves while installed at this time, this Applicability Note provides the flexibility to utilize this method in the future. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves

3.4.3 LCO 3.4.10 Three [Two] pressurizer safety valves shall be OPERABLE with lift settings ≥ 2422.8 psig [2475] psia and ≤ 2560.3 psig [2525] psia. 2

Applicability APPLICABILITY: MODES 1, 2, and 3,
MODE 4 with all RCS cold leg temperatures > 281°F greater than the LTOP enable temperature specified in the PTLR. 1

DOC L01

---NOTE---
The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for 54 [36] hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup. 1

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action a.	A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes	
Action a., b.	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours	
		AND		
Action b.	OR	B.2 Be in MODE 4 with any RCS cold leg temperature ≤ 281°F less than or equal to the LTOP enable temperature specified in the PTLR.	12 [24] hours	2
Action b.	Two [or more] pressurizer safety valves inoperable.			1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.4.3	SR 3.4.10.1	Verify each pressurizer safety valve is OPERABLE in accordance with the INSERVICE TESTING PROGRAM. Following testing, lift settings shall be within ± 1%.	In accordance with the INSERVICE TESTING PROGRAM

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.10 Pressurizer Safety Valves

3.4.2.2 LCO 3.4.10 [Two] Three pressurizer safety valves shall be OPERABLE with lift settings ≥ [2475] psia 2410.3 psig and ≤ [2525] psia 2560.3 psig. 2

Applicability APPLICABILITY: MODES 1, 2, and 3,
MODE 4 with all RCS cold leg temperatures > 230°F greater than the LTOP enable temperature specified in the PTLR. 1

DOC L01

---NOTE---

The lift settings are not required to be within LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for [36] 54 hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup. 1

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action a.	A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes	
Action a., b.	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours	
		AND		
Action b.	OR	B.2 Be in MODE 4 with any RCS cold leg temperature ≤ 230°F less than or equal to the LTOP enable temperature specified in the PTLR.	[24] 12 hours	2
Action b.	Two [or more] pressurizer safety valves inoperable.			1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
4.4.2.2	SR 3.4.10.1	Verify each pressurizer safety valve is OPERABLE in accordance with the INSERVICE TESTING PROGRAM. Following testing, lift settings shall be within ± 1%.	In accordance with the INSERVICE TESTING PROGRAM

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.10, PRESSURIZER SAFETY VALVES

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.10 Pressurizer Safety Valves

BASES

BACKGROUND

The purpose of the three ~~two~~ spring loaded pressurizer safety valves is to provide RCS overpressure protection. Operating in conjunction with the Reactor Protection System, three ~~two~~ valves are used to ensure that the Safety Limit (SL) of 2750 psia is not exceeded for analyzed transients during operation in MODES 1 and 2. Three ~~Two~~ safety valves are used for MODE 3 and portions of MODE 4. For the remainder of MODE 4, MODE 5, and MODE 6 with the head on, overpressure protection is provided by operating procedures and the LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System." 1

The self actuated pressurizer safety valves are designed in accordance with the requirements set forth in the ASME, Boiler and Pressure Vessel Code, Section III (Ref. 1). The required lift pressure is 2500 psia ± 1%. The safety valves discharge steam from the pressurizer to a quench tank located in the containment. The discharge flow is indicated by an increase in temperature downstream of the safety valves and by an increase in the quench tank temperature and level.

The upper and lower pressure limits are based on the ± 1%-tolerance requirement (Ref. 1) for lifting pressures above 1000 psig. The lift setting is for the ambient conditions associated with MODES 1, 2, and 3. This requires either that the valves be set hot or that a correlation between hot and cold settings be established.

The pressurizer safety valves are part of the primary success path and mitigate the effects of postulated accidents. OPERABILITY of the safety valves ensures that the RCS pressure will be limited to 110% of design pressure. The consequences of exceeding the ASME pressure limit (Ref. 1) could include damage to RCS components, increased leakage, or a requirement to perform additional stress analyses prior to resumption of reactor operation.

APPLICABLE SAFETY ANALYSES

All accident analyses in the UFSAR that require safety valve actuation assume operation of three ~~both~~ pressurizer safety valves to limit increasing reactor coolant pressure. The overpressure protection analysis is also based on operation of all ~~both~~ safety valves and assumes that the valves open at the high range of the setting (2500-psia system design pressure plus 1%). These valves must accommodate pressurizer insurges that 1 1 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

could occur during a startup, rod withdrawal, ejected rod, loss of main feedwater, or main feedwater line break accident. The startup accident establishes the minimum safety valve capacity. The startup accident is assumed to occur at < 15% power. Single failure of a safety valve is neither assumed in the accident analysis nor required to be addressed by the ASME Code. Compliance with this specification is required to ensure that the accident analysis and design basis calculations remain valid.

The pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

three

The ~~[two]~~ pressurizer safety valves are set to open at the RCS design pressure (2500 psia) and within the ASME specified tolerance to avoid exceeding the maximum RCS design pressure SL, to maintain accident analysis assumptions, and to comply with ASME Code requirements. The upper and lower pressure tolerance limits are based on the ± 1% tolerance requirements (Ref. 1) for lifting pressures above 1000 psig. The limit protected by this specification is the reactor coolant pressure boundary (RCPB) SL of 110% of design pressure. Inoperability of one or ~~both~~ valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation. 2 1

more

APPLICABILITY

In MODES 1, 2, and 3, and portions of MODE 4 above ~~the LTOP temperature~~, OPERABILITY of ~~[two]~~ valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents. MODE 3 and portions of MODE 4 are conservatively included, although the listed accidents may not require ~~both~~ safety valves for protection. 1 2 1

281°F

three

three

The LCO is not applicable in MODE 4 when any RCS cold leg temperature is ~~less than or equal to the LTOP enable temperature specified in the PTLR and~~ MODE 5 because LTOP protection is provided. ~~Overpressure protection is not required in MODE 6 with the reactor vessel head detensioned.~~ 1

≤ 281°F,

, and MODE 6 when the reactor vessel head is on

The Note allows entry into MODES 3 and 4 with the lift settings outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. Only one valve at a time will be removed from service for testing. The ~~[36]~~ hour exception is based on 18 hour outage time for each of the ~~two~~ valves. The 18 hour period is derived from operating experience that hot testing can be performed within this timeframe. 2 1

54

BASES

ACTIONS

A.1

With one pressurizer safety valve inoperable, restoration must take place within 15 minutes. The Completion Time of 15 minutes reflects the importance of maintaining the RCS overpressure protection system. An inoperable safety valve coincident with an RCS overpressure event could challenge the integrity of the RCPB.

B.1 and B.2

If the Required Action cannot be met within the required Completion Time or if two or more pressurizer safety valves are inoperable, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 with any RCS cold leg temperature ~~less than or equal to the LTOP enable temperature specified in the PTLR~~ ≤ 281°F within ~~[24]~~ 12 hours. The 6 hours allowed is reasonable, based on operating experience, to reach MODE 3 from full power without challenging plant systems. Similarly, the ~~[24]~~ 12 hours allowed is reasonable, based on operating experience, to reach MODE 4 without challenging plant systems. With any RCS cold leg temperature ~~less than or equal to the LTOP enable temperature specified in the PTLR~~ ≤ 281°F, overpressure protection is provided by LTOP. The change from MODE 1, 2, or 3 to MODE 4 reduces the RCS energy (core power and pressure), lowers the potential for large pressurizer insurges, and thereby removes the need for overpressure protection by ~~[two]~~ pressurizer safety valves.

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1

SRs are specified in the INSERVICE TESTING PROGRAM. Pressurizer safety valves are to be tested in accordance with the requirements of the ASME Code (Ref. 1), which provides the activities and the Frequency necessary to satisfy the SRs. No additional requirements are specified.

The pressurizer safety valve setpoint is ~~± [3]%~~ -2.5% / +3% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

REFERENCES

1. ASME Code for Operation and Maintenance of Nuclear Power Plants.

1 2 2 1 2 2 2 1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.10 Pressurizer Safety Valves

BASES

BACKGROUND

The purpose of the three ~~two~~ spring loaded pressurizer safety valves is to provide RCS overpressure protection. Operating in conjunction with the Reactor Protection System, three ~~two~~ valves are used to ensure that the Safety Limit (SL) of 2750 psia is not exceeded for analyzed transients during operation in MODES 1 and 2. Three ~~Two~~ safety valves are used for MODE 3 and portions of MODE 4. For the remainder of MODE 4, MODE 5, and MODE 6 with the head on, overpressure protection is provided by operating procedures and the LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System." (1)

The self actuated pressurizer safety valves are designed in accordance with the requirements set forth in the ASME, Boiler and Pressure Vessel Code, Section III (Ref. 1). The required lift pressure is 2500 psia ± 1%. The safety valves discharge steam from the pressurizer to a quench tank located in the containment. The discharge flow is indicated by an increase in temperature downstream of the safety valves and by an increase in the quench tank temperature and level.

The upper and lower pressure limits are based on the ± 1%-tolerance requirement (Ref. 1) for lifting pressures above 1000 psig. The lift setting is for the ambient conditions associated with MODES 1, 2, and 3. This requires either that the valves be set hot or that a correlation between hot and cold settings be established.

The pressurizer safety valves are part of the primary success path and mitigate the effects of postulated accidents. OPERABILITY of the safety valves ensures that the RCS pressure will be limited to 110% of design pressure. The consequences of exceeding the ASME pressure limit (Ref. 1) could include damage to RCS components, increased leakage, or a requirement to perform additional stress analyses prior to resumption of reactor operation.

APPLICABLE SAFETY ANALYSES

All accident analyses in the UFSAR that require safety valve actuation (1) assume operation of three ~~both~~ pressurizer safety valves to limit increasing (1) reactor coolant pressure. The overpressure protection analysis is also based on operation of all ~~both~~ safety valves and assumes that the valves (1) open at the high range of the setting (2500-psia system design pressure plus 1%). These valves must accommodate pressurizer insurges that

BASES

APPLICABLE SAFETY ANALYSES (continued)

could occur during a startup, rod withdrawal, ejected rod, loss of main feedwater, or main feedwater line break accident. The startup accident establishes the minimum safety valve capacity. The startup accident is assumed to occur at < 15% power. Single failure of a safety valve is neither assumed in the accident analysis nor required to be addressed by the ASME Code. Compliance with this specification is required to ensure that the accident analysis and design basis calculations remain valid.

The pressurizer safety valves satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

three The ~~[two]~~ pressurizer safety valves are set to open at the RCS design pressure (2500 psia) and within the ASME specified tolerance to avoid exceeding the maximum RCS design pressure SL, to maintain accident analysis assumptions, and to comply with ASME Code requirements. The upper and lower pressure tolerance limits are based on the ± 1% tolerance requirements (Ref. 1) for lifting pressures above 1000 psig. The limit protected by this specification is the reactor coolant pressure boundary (RCPB) SL of 110% of design pressure. Inoperability of one or more ~~both~~ valves could result in exceeding the SL if a transient were to occur. The consequences of exceeding the ASME pressure limit could include damage to one or more RCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation. 2 1

APPLICABILITY

In MODES 1, 2, and 3, and portions of MODE 4 above ~~the LTOP temperature~~ 230°F, OPERABILITY of three ~~[two]~~ valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents. MODE 3 and portions of MODE 4 are conservatively included, although the listed accidents may not require three ~~both~~ safety valves for protection. 1 2 1

The LCO is not applicable in MODE 4 when any RCS cold leg temperature is ≤ 230°F, ~~less than or equal to the LTOP enable temperature specified in the PTLR and~~ MODE 5, and MODE 6 when the reactor vessel head is on because LTOP protection is provided. ~~Overpressure protection is not required in MODE 6 with the reactor vessel head detensioned.~~ 1

The Note allows entry into MODES 3 and 4 with the lift settings outside the LCO limits. This permits testing and examination of the safety valves at high pressure and temperature near their normal operating range, but only after the valves have had a preliminary cold setting. The cold setting gives assurance that the valves are OPERABLE near their design condition. Only one valve at a time will be removed from service for testing. The 54 ~~[36]~~ hour exception is based on 18 hour outage time for each of the ~~two~~ valves. The 18 hour period is derived from operating experience that hot testing can be performed within this timeframe. 2 1

BASES

ACTIONS

A.1

With one pressurizer safety valve inoperable, restoration must take place within 15 minutes. The Completion Time of 15 minutes reflects the importance of maintaining the RCS overpressure protection system. An inoperable safety valve coincident with an RCS overpressure event could challenge the integrity of the RCPB.

B.1 and B.2

If the Required Action cannot be met within the required Completion Time or if two or more pressurizer safety valves are inoperable, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 with any RCS cold leg temperature ~~less than or equal to the LTOP enable temperature specified in the PTLR~~ ≤ 230°F within ~~[24]~~ 12 hours. The 6 hours allowed is reasonable, based on operating experience, to reach MODE 3 from full power without challenging plant systems. Similarly, the ~~[24]~~ 12 hours allowed is reasonable, based on operating experience, to reach MODE 4 without challenging plant systems. With any RCS cold leg temperature ~~less than or equal to the LTOP enable temperature specified in the PTLR~~ ≤ 230°F, overpressure protection is provided by LTOP. The change from MODE 1, 2, or 3 to MODE 4 reduces the RCS energy (core power and pressure), lowers the potential for large pressurizer insurges, and thereby removes the need for overpressure protection by ~~[two]~~ pressurizer safety valves.

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1

SRs are specified in the INSERVICE TESTING PROGRAM. Pressurizer safety valves are to be tested in accordance with the requirements of the ASME Code (Ref. 1), which provides the activities and the Frequency necessary to satisfy the SRs. No additional requirements are specified.

The pressurizer safety valve setpoint is ± ~~[~~3~~]~~% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

REFERENCES

1. ASME Code for Operation and Maintenance of Nuclear Power Plants.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.10, BASES, PRESSURIZER SAFETY VALVES

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.10, PRESSURIZER SAFETY VALVES

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 11

3.4.11, Power Operated Relief Valve (PORV) Block Valves

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

A01

REACTOR COOLANT SYSTEM

PORV BLOCK VALVES

LIMITING CONDITION FOR OPERATION

LCO 3.4.11 3.4.12 Each Power Operated Relief Valve (PORV) Block Valve shall be OPERABLE.

Applicability **APPLICABILITY:** MODES 1, 2, and 3.

ACTION: Insert proposed ITS 3.4.11 ACTIONS Note L01

ACTION A With one PORV or more PORV block valve(s) inoperable, within 1 hour or in accordance with the Risk Informed Completion Time Program either restore the block valve(s) to OPERABLE status or close the block valve(s) and remove power from the PORV block valve(s); otherwise, be in at least

ACTION B HOT STANDBY MODE 3 within the next 6 hours and in COLD SHUTDOWN MODE 4 within the following 30 12 hours. A02

SURVEILLANCE REQUIREMENTS

Insert proposed SR 3.4.11.1 Note 1 L02

Insert proposed SR 3.4.11.1 Note 2 L03

SR 3.4.11.1 4.4.12 Each block valve shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by operating the each PORV block valve through one a complete cycle of full travel.

.

REACTOR COOLANT SYSTEM

3/4.4.4 PORV BLOCK VALVES

LIMITING CONDITION FOR OPERATION

LCO 3.4.11 ~~3.4.4~~ Each ~~Power Operated Relief Valve (~~PORV~~)~~ Block valve shall be OPERABLE~~.~~ ~~No more than one block valve shall be open at any one time~~. [and one PORV block valve shall be closed.]

Applicability **APPLICABILITY:** MODES 1, 2 and 3.

ACTION: [Insert proposed ITS 3.4.11 ACTIONS Note] L01

ACTION A ~~a.~~ With one or more [PORV] block valve~~(s)~~ inoperable, within 1 hour or in accordance with the Risk Informed Completion Time Program ~~either restore the block valve(s) to OPERABLE status or~~ close ~~the~~ [PORV] block valve~~(s)~~ and remove power from ~~the~~ [PORV] block valve~~(s)~~;

ACTION C otherwise, be in ~~at least HOT STANDBY~~ [MODE 3] within ~~the next~~ 6 hours and ~~in COLD SHUTDOWN~~ [MODE 4] within ~~the following 30~~ [12] hours. A02

ACTION B ~~b.~~ With both [PORV] block valves open, close one [PORV] block valve within 1 hour,

ACTION C otherwise be in ~~at least HOT STANDBY~~ [MODE 3] within ~~the next~~ 6 hours and ~~in COLD SHUTDOWN~~ [MODE 4] within ~~the following 30~~ [12] hours. A02

SURVEILLANCE REQUIREMENTS

[Insert proposed SR 3.4.11.1 Note 2] L03

SR 3.4.11.1 ~~4.4.4~~ ~~Each block valve shall be demonstrated OPERABLE~~ in accordance with the Surveillance Frequency Control Program by operating ~~the~~ [each PORV block] valve ~~through one~~ [a] complete cycle ~~of full travel~~

SR 3.4.11.1 Note 1 unless ~~the~~ [PORV] block valve ~~is~~ [is] closed ~~with power removed in order to meet the requirements of Action a. or b. above~~ [in accordance with the Required Actions of this LCO].

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 Unit 1 CTS 3.4.12 Action and Unit 2 CTS 3.4.4 Action a. state that with one or more block valve(s) inoperable, within 1 hour or in accordance with the Risk Informed Completion Time Program either restore the block valve(s) to OPERABLE status or close the block valve(s) and remove power from the block valve(s); otherwise, be in at least HOT STANDBY (i.e., MODE 3) within the next 6 hours and in COLD SHUTDOWN (i.e., MODE 5) within the following 30 hours. ITS 3.4.11 ACTION A states that with one or more PORV block valves inoperable, close the PORV block valve and remove power from the PORV block valve within 1 hour or in accordance with the Risk Informed Completion Time Program, otherwise ITS 3.4.11 ACTION B requires the unit be in MODE 3 within 6 hours and MODE 4 within 12 hours. This changes the CTS by changing the requirement to be in COLD SHUTDOWN (i.e., MODE 5) within 36 hours, to be in MODE 4 in 12 hours.

The purpose of Unit 1 CTS 3.4.12 Action and Unit 2 CTS 3.4.4 Action a. is to provide the appropriate compensatory actions for one or more inoperable PORV block valves inoperable. However, if the Required Action and Completion Time are not met, the current action places the unit in MODE 5 within 36 hours, rather than placing the unit outside the MODE of Applicability (i.e., MODE 4) if the Required Action and Completion Time are not met. Therefore, in accordance with CTS 3.0.2 (ITS LCO 3.0.2) when the unit is in MODE 4, the requirements to be in MODE 5 in Unit 1 CTS 3.4.12 Action and Unit 2 CTS 3.4.4 Action a. are no longer required to be completed. The PORV block valves, when in MODE 4, are no longer required to be OPERABLE. Additionally, the Completion Time to exit the MODE of Applicability is reduced to 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

These changes are designated as administrative changes and are acceptable because they maintain the current requirement to place the unit in a condition in which the PORV block valves are no longer required consistent with the requirements of CTS 3.0.2 (ITS LCO 3.0.2) and, therefore, do not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* Unit 1 CTS 3.4.12 Action and Unit 2 CTS 3.4.4 Action a. describe the Actions to be taken when PORV block valve(s) are inoperable. ITS 3.4.11 also describes Actions to be taken when PORV block valve(s) are inoperable and contains a statement (ITS 3.4.11 ACTION Note 1) that separate condition entry is allowed for each PORV block valve. This changes the CTS by adding a Note stating that separate condition entry is allowed for each PORV block valve.

The purpose of the Unit 1 CTS 3.4.12 and Unit 2 CTS 3.4.4 Actions are to provide the appropriate compensatory actions for inoperable PORV block valves. This proposed change will allow separate condition entry for each PORV block valve. The Note clarifies that PORV block valves are treated as separate entities, each with separate Completion Times. These changes are acceptable since the proposed Required Actions provide sufficient time to satisfy the Required Actions. Valve inoperabilities are normally found one at a time, not concurrently. Therefore, the actions to close a PORV block valve and remove its power will apply as each valve is found to be inoperable and not at the same time. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 **Unit 1 Only:** *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.4.12 states, in part, that each PORV block valve be demonstrated OPERABLE by operating the valve through one complete cycle of full travel. ITS SR 3.4.11.1 states, in part, that each PORV block valve be demonstrated OPERABLE by performing a complete cycle of each PORV block valve. It is modified by Note 1 that states "Not required to be performed with block valve closed in accordance with the Required Actions of this LCO." This changes the CTS by not requiring the Surveillance Requirement to be performed with the block valve closed in accordance with the Actions.

The purpose of CTS 4.4.12 is to ensure that the PORV block valve is ready to operate. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. The Note provides time to perform the Surveillance to verify the PORV block valve can operate through a complete cycle. Without the Note, the Surveillance would not be met immediately after closing and removing power from the PORV block valve. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

L03 *(Category 7 – Relaxation of Surveillance Frequency)* Unit 1 CTS 4.4.12 and Unit 2 CTS 4.4.4 state, in part, that each PORV block valve be demonstrated OPERABLE by operating the valve through one complete cycle of full travel. ITS SR 3.4.11.1 states, in part, that each PORV block valve be demonstrated OPERABLE by performing a complete cycle of each PORV block valve. It is modified by Note 2 that states "Only required to be performed in MODES 1 and 2." This changes the CTS by not requiring the Surveillance Requirement to be performed in certain MODES.

The purpose of Unit 1 CTS 4.4.12 and Unit 2 CTS 4.4.4 is to perform the complete cycle of each PORV block valve in accordance with the Surveillance Frequency Control Program. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. The ITS SR 3.4.11.1 Note 2 states that the PORV block valve Surveillance is only required to be performed in MODES 1 and 2. Note 2 modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

Block Valves

3.4.11 Pressurizer Power Operated Relief Valves (PORVs) 1

3.4.12 LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE. 1

Applicability APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

--NOTE--

L01 Separate Condition entry is allowed for each PORV and each block valve. 1

CONDITION	REQUIRED ACTION		COMPLETION TIME	
A. One or more PORVs inoperable and capable of being manually cycled.	A.1	Close and maintain power to associated block valve.	1 hour	1
B. One PORV inoperable and not capable of being manually cycled.	B.1	Close associated block valve.	1 hour	
	AND			
	B.2	Remove power from associated block valve.	1 hour	1
	AND			
	B.3	Restore PORV to OPERABLE status.	72 hours [OR In accordance with the Risk Informed Completion Time Program]	

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
3.4.12 Action A C. One or more PORV block valves inoperable.	C.1	Place associated PORV in manual control.	1 hour
	AND		
	C.2	Restore block valve to OPERABLE status.	72 hours [OR In accordance with the Risk Informed Completion Time Program]
3.4.12 Action B D. Required Action and associated Completion Time of Condition A, B, or C not met.	B D.1	Be in MODE 3.	6 hours
	AND		
	B D.2	Be in MODE 4.	[12] hours
E. ------------ NOTE ------------ Not applicable when second PORV intentionally made inoperable. ------------------------------- Two PORVs inoperable and not capable of being manually cycled.	A E.1	Close associated PORV block valves.	1 hour
	AND		
	A E.2	Remove power from PORV associated block valves.	1 hour
	AND		
	E.3	Verify LCO 3.7.5, "Auxiliary Feedwater System," is met.	1 hour
	AND		
	E.4	Restore at least one PORV to OPERABLE status.	8 hours

1

1

1 2

1

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
F. Required Actions and Associated Completion Times of Condition E not met.	F.1	Be in MODE 3.	6 hours
	AND		
	F.2	Be in MODE 4.	[12] hours
G. ------------ NOTE ------------ Not applicable when second block valve intentionally made inoperable. ------------------------------- Two block valves inoperable.	G.1	Verify LCO 3.7.5, "Auxiliary Feedwater System," is met.	1 hour
	AND		
	G.2	Restore at least one block valve to OPERABLE status.	8 hours
H. Required Action and associated Completion Time of Condition G not met.	H.1	Be in MODE 3.	6 hours
	AND		
	H.2	Be in MODE 4.	[12] hours

1

1

1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
4.4.12 L02 L03 SR 3.4.11.1	------------------------------NOTES------------------------------ 1. Not required to be performed with PORV block valve closed in accordance with the Required Actions of this LCO. 2. Only required to be performed in MODES 1 and 2. -- Perform a complete cycle of each PORV block valve.	[[92] days OR In accordance with the Surveillance Frequency Control Program] (1) (2)
SR 3.4.11.2	------------------------------NOTE------------------------------ Only required to be performed in MODES 1 and 2. -- Perform a complete cycle of each PORV.	[[18] months OR In accordance with the Surveillance Frequency Control Program] (1)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.11.3	[Perform a complete cycle of each solenoid air control valve and check valve on the air accumulators in PORV control systems.	[[18] months] OR In accordance with the Surveillance Frequency Control Program]] (1)
SR 3.4.11.4	[Verify PORVs and block valve(s) are capable of being powered from an emergency power supply.	[[18] months OR In accordance with the Surveillance Frequency Control Program]] (1)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs) Block Valves 1

3.4.4 LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE. and one PORV block valve shall be closed 1

Applicability APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

---NOTE---

L01 Separate Condition entry is allowed for each PORV and each block valve. 1

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour
B. One PORV inoperable and not capable of being manually cycled.	B.1 Close associated block valve. AND B.2 Remove power from associated block valve. AND B.3 Restore PORV to OPERABLE status.	1 hour 1 hour 72 hours [OR In accordance with the Risk Informed Completion Time Program]

1

1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.4 Action a — A C. One or more PORV block valves inoperable.	C.1 Place associated PORV in manual control. AND C.2 Restore block valve to OPERABLE status.	1 hour 72 hours [OR In accordance with the Risk Informed Completion Time Program] 1
3.4.4 Action a, 3.4.4 Action b — C D. Required Action and associated Completion Time of Condition A, or B, or C not met.	C D.1 Be in MODE 3. AND C D.2 Be in MODE 4.	6 hours 1 [12] hours 1 2
E. ----------NOTE---------- Not applicable when second PORV intentionally made inoperable. ------------------------ Two PORVs inoperable and not capable of being manually cycled.	A E.1 Close associated PORV block valves. AND A E.2 Remove power from associated PORV block valves. AND E.3 Verify LCO 3.7.5, "Auxiliary Feedwater System," is met. AND E.4 Restore at least one PORV to OPERABLE status.	1 hour 1 1 hour 1 hour 8 hours

3.4.4 Action b

B. Both PORV block valves open.	B.1 Close one PORV block valve.	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Actions and Associated Completion Times of Condition E not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 4.	6 hours [12] hours
G. ------------ NOTE ------------ Not applicable when second block valve intentionally made inoperable. -------------------------------- Two block valves inoperable.	G.1 Verify LCO 3.7.5, "Auxiliary Feedwater System," is met. AND G.2 Restore at least one block valve to OPERABLE status.	1 hour 8 hours
H. Required Action and associated Completion Time of Condition G not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	6 hours [12] hours

1

1

1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.4.4 SR 3.4.11.1	-----------------------------NOTES------PORV-------------- 1. Not required to be performed with block valve closed in accordance with the Required Actions of this LCO. 4.4.4 L03 2. Only required to be performed in MODES 1 and 2. --	1
	Perform a complete cycle of each block valve. PORV	[[92] days OR In accordance with the Surveillance Frequency Control Program] 1 2
SR 3.4.11.2	----------------------------NOTE---------------------------- Only required to be performed in MODES 1 and 2. --	
	Perform a complete cycle of each PORV.	[[18] months OR In accordance with the Surveillance Frequency Control Program] 1

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY	
SR 3.4.11.3	[Perform a complete cycle of each solenoid air control valve and check valve on the air accumulators in PORV control systems.	[[18] months] OR In accordance with the Surveillance Frequency Control Program]]	1
SR 3.4.11.4	[Verify PORVs and block valve(s) are capable of being powered from an emergency power supply.	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.11, POWER OPERATED RELIEF VALVE (PORV) BLOCK VALVES

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

Block Valves

B 3.4.11 ~~Pressurizer~~ Power Operated Relief Valve~~s~~ (PORV~~s~~) 1

BASES

BACKGROUND

The pressurizer is equipped with two types of devices for pressure relief: pressurizer safety valves and PORVs. The PORV is ~~an air operated valve that is~~ automatically opened at a specific set pressure when the pressurizer pressure increases and is automatically closed on decreasing pressure. ~~The PORV may also be manually operated using controls installed in the control room.~~ 1 3

An electric, motor operated, normally open, block valve is installed between the pressurizer and the PORV. The function of the block valve is to isolate the PORV. Block valve closure is accomplished manually using controls in the control room ~~and may be used to isolate a leaking PORV to permit continued power operation~~. Most importantly, the block ~~valve is~~ [valves are] used to isolate ~~a stuck open PORV to isolate the resulting small break loss of coolant accident (LOCA)~~ [an inadvertent opening of one or both PORVs.]. Closure terminates the RCS depressurization and coolant inventory loss. 1

The ~~PORV and its~~ block valve controls are powered from normal power supplies. Their controls are also capable of being powered from emergency supplies. ~~Power supplies for the PORV are separate from those for the block valve.~~ Power supply requirements are defined in NUREG-0737, Paragraph II, G.1 (Ref. 1). 1

~~The PORV setpoint is above the high pressure reactor trip setpoint and below the opening setpoint for the pressurizer safety valves as required by Reference 2. The purpose of the relationship of these setpoints is to limit the number of transient pressure increase challenges that might open the PORV, which, if opened, could fail in the open position. The PORV setpoint thus limits the frequency of challenges from transients and limits the possibility of a small break LOCA from a failed open PORV. Placing the setpoint below the pressurizer safety valve opening setpoint reduces the frequency of challenges to the safety valves, which, unlike the PORV, cannot be isolated if they were to fail to open.~~ 3

The primary purpose of this LCO is to ensure that the PORV ~~and the~~ block valve[s] are operating correctly so the ~~potential for a small break LOCA through the PORV pathway is minimized, or if a small break LOCA were to occur through a failed open PORV, the~~ block valve could be manually operated to isolate the ~~path~~ [pathway from an inadvertent opening of one or both PORVs. The PORV block valves are maintained open during power operation to ensure the PORV function is available.]. 1

BASES

BACKGROUND (continued)

~~The PORV may be manually operated to depressurize the RCS as deemed necessary by the operator in response to normal or abnormal transients. The PORV may be used for depressurization when the pressurizer spray is not available, a condition that may be encountered during loss of offsite power. Operators can manually open the PORVs to reduce RCS pressure in the event of a steam generator tube rupture (SGTR) with offsite power unavailable.~~ 3

~~The PORV may also be used for feed and bleed core cooling in the case of multiple equipment failure events that are not within the design basis, such as a total loss of feedwater.~~ 3

The PORV functions as an automatic overpressure device and limits challenges to the safety valves. Although the PORV acts as an overpressure device for operational purposes, safety analyses ~~[~~do not take credit for PORV actuation~~, but] do take credit for the safety valves~~. 2

The PORV also provides low temperature overpressure protection (LTOP) during heatup and cooldown. LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," addresses this function.

APPLICABLE SAFETY ANALYSES

Insert 1

~~The PORV small break LOCA break size is bounded by the spectrum of piping breaks analyzed for plant licensing. Because the PORV small break LOCA is located at the top of the pressurizer, the RCS response characteristics are different from RCS loop piping breaks; analyses have been performed to investigate these characteristics.~~ 1

~~The possibility of a small break LOCA through the PORV is reduced when the PORV flow path is OPERABLE and the PORV opening setpoint is established to be reasonably remote from expected transient challenges. The possibility is minimized if the flow path is isolated.~~

~~The PORV opening setpoint has been established in accordance with Reference 2. It has been set so expected RCS pressure increases from anticipated transients will not challenge the PORV, minimizing the possibility of small break LOCA through the PORV.~~

~~Overpressure protection is provided by safety valves, and analyses do not take credit for the PORV opening for accident mitigation.~~

block valves

~~Pressurizer~~ PORV~~s~~ satisfy Criterion ~~3~~ 4 of 10 CFR 50.36(c)(2)(ii). 1

1

INSERT 1

The PORV block valves are not credited to mitigate any design basis accident or transient specified in Reference 2. NRC Regulatory Issue Summary 2005-29 (Ref. 3) describes limiting the probability of initiating a more safety significant event as a result of an anticipated transient. The inadvertent PORV opening is an anticipated operational occurrence (AOO) and could result in a pressurizer overfill condition. Such a condition could lead to an inability to isolate the PORV, resulting in a condition similar to a small break LOCA.

An accidental depressurization of the RCS could occur as a result of an inadvertent opening of both pressurizer PORVs. Initially the event results in a loss of RCS fluid and a rapid RCS depressurization. The challenge to the specified acceptable fuel design limits is terminated by the thermal margin / low pressure reactor trip signal, however, the RCS fluid loss and depressurization continue. Safety injection is actuated, and the pressurizer level increases with the potential to result in pressurizer overfill and liquid discharge through the stuck open PORV(s). The minimum time from event initiation to the pressurizer dome becoming liquid filled is 7 minutes. To prevent liquid discharge through the open PORV(s), the operator closes the associated open PORV block valve(s) within 7 minutes prior to the pressurizer dome becoming liquid filled.

BASES

to terminate a pressurizer overfill event following an inadvertent PORV opening. An OPERABLE block valve may be either closed and energized or open and energized.

LCO

The LCO requires the PORV and its associated block valve to be OPERABLE. The block valve is required to be OPERABLE so it may be used to isolate the flow path if the PORV is not OPERABLE. 1

Valve OPERABILITY also means the PORV setpoint is correct. By ensuring that the PORV opening setpoint is correct, the PORV is not subject to frequent challenges from possible pressure increase transients, and therefore the possibility of a small break LOCA through a failed open PORV is not a frequent event. 3

APPLICABILITY

In MODES 1, 2, and 3, the PORV and its block valve s are required to be OPERABLE to limit the potential for a small break LOCA through the flow path. A likely cause for PORV small break LOCA is a result of pressure increase transients that cause the PORV to open. Imbalances in the energy output of the core and heat removal by the secondary system can cause the RCS pressure to increase to the PORV opening setpoint. Pressure increase transients can occur any time the steam generators are used for heat removal. The most rapid increases will occur at higher operating power and pressure conditions of MODES 1 and 2. 1

Pressure increases are less prominent in MODE 3 because the core input energy is reduced, but the RCS pressure is high. Therefore, this LCO is applicable in MODES 1, 2, and 3. The LCO is not applicable in MODE 4 when both pressure and core energy are decreased and the pressure surges become much less significant. The PORV setpoint is reduced for LTOP in MODES 4, 5, and 6 with the reactor vessel head in place. LCO 3.4.12 addresses the PORV requirements in these MODES.

ACTIONS

The ACTIONS are modified by a Note. The Note clarifies that the all pressurizer PORVs and block valves are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis). 1

A.1

With the PORV inoperable and capable of being manually cycled, either the PORV must be restored or the flow path isolated within 1 hour. The block valve should be closed but power must be maintained to the associated block valve, since removal of power would render the block valve inoperable. Although the PORV may be designated inoperable, it may be able to be manually opened and closed and in this manner can be used to perform its function. PORV inoperability may be due to seat leakage, instrumentation problems, automatic control problems, or other causes that do not prevent manual use and do not create a possibility for 3

BASES

ACTIONS (continued)

a small break LOCA. For these reasons, the block valve may be closed but the Action requires power be maintained to the valve. This Condition is only intended to permit operation of the plant for a limited period of time not to exceed the next refueling outage (MODE 6) so that maintenance can be performed on the PORVs to eliminate the problem condition. The PORVs should normally be available for automatic mitigation of overpressure events and should be returned to OPERABLE status prior to entering startup (MODE 2).

Quick access to the PORV for pressure control can be made when power remains on the closed block valve. The Completion Time of 1 hour is based on plant operating experience that minor problems can be corrected or closure can be accomplished in this time period. 3

B.1, B.2, and B.3

If one PORV is inoperable and not capable of being manually cycled, it must either be isolated, by closing the associated block valve and removing the power from the block valve, or restored to OPERABLE status. The Completion Time of 1 hour is reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. If the inoperable valve cannot be restored to OPERABLE status, it must be isolated within the specified time of 1 hour. Because there is at least one PORV that remains OPERABLE, an additional 72 hours is provided to restore the inoperable PORV to OPERABLE status. [Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.]

A A
C.1 and C.2

or more PORV | s are | it must be closed with power removed

If one block valve is inoperable, then it must be restored to OPERABLE status, or the associated PORV placed in manual control. The prime importance for the capability to close the block valve is to isolate a stuck open PORV. Therefore, if the block valve cannot be restored to OPERABLE status within 1 hour, the Required Action is to place the PORV in manual control to preclude its automatic opening for an overpressure event and to avoid the potential for a stuck open PORV at a time that the block valve is inoperable. The Completion Times of 1 hour are reasonable based on the small potential for challenges to the system during this time period and provide the operator time to correct the situation. Because at least one PORV remains OPERABLE, the operator 1 1 3

or in accordance with the Risk Informed Completion Time Program

block valve in the closed position with power removed

1

BASES

ACTIONS (continued)

is permitted a Completion Time of 72 hours to restore the inoperable block valve to OPERABLE status. [Alternatively, a Completion Time s can be determined in accordance with the Risk Informed Completion Time Program.] The time allowed to restore the block valve is based upon the Completion Time for restoring an inoperable PORV in Condition B since the PORVs are not capable of automatically mitigating an overpressure event when placed in manual control. If the block valve is restored within the Completion Time of 72 hours, the power will be restored and the PORV restored to OPERABLE status. 3

B B
D.1 and D.2 1

If the Required Action cannot be met within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

E.1, E.2, E.3, and E.4

If two PORVs are inoperable and not capable of being manually cycled, it is necessary to isolate the flow path by closing and removing the power to the associated block valves within 1 hour and restore at least one PORV within 8 hours. The Condition is modified by a Note stating it is not applicable if the second PORV train is intentionally declared inoperable. The Condition does not apply to voluntary removal of redundant systems or components from service. The Condition is applicable if one PORV is inoperable for any reason and the second PORV is discovered to be inoperable, or if both PORVs are discovered to be inoperable at the same time. 3

In the event of a loss of feedwater, the PORVs would be used to remove core heat. In order to minimize the consequences of a loss of feedwater while two PORVs are inoperable, Required Action E.3 requires that LCO 3.7.5, "Auxiliary Feedwater System," be met to ensure AFW is available. The inoperability of two PORVs during the 8 hour Completion Time has been shown to be acceptable based on the infrequent use of the Required Action and the small incremental effect on plant risk (Ref. 3). If one PORV is restored and one PORV remains inoperable, then the plant will be in Condition B with the time clock started at the original declaration of having two PORVs inoperable.

BASES

ACTIONS (continued)

F.1 and F.2

If two PORVs are inoperable and are not capable of being manually cycled and are not restored within the Completion Time, then the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Similarly, the Completion Time of 12 hours to reach MODE 4 is reasonable, considering that a plant can cool down within that time frame on one safety system train. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

G.1 and G.2

If two block valves are inoperable, it is necessary to restore at least one block valve to OPERABLE status within 8 hours. The Condition is modified by a Note stating it is not applicable if the second block valve is intentionally declared inoperable. The Condition does not apply to voluntary removal of redundant systems or components from service. The Condition is only applicable if one block valve is inoperable for any reason and the second block valve is discovered to be inoperable, or if both block valves are discovered to be inoperable at the same time. In the event of a loss of feedwater, the PORVs would be used to remove core heat. In order to minimize the consequences of a loss of feedwater while two block valves are inoperable, Required Action G.2 requires that LCO 3.7.5, "Auxiliary Feedwater System," be verified to be met within 1 hour. The inoperability of two block valves during the 8 hour Completion Time has been shown to be acceptable based on the infrequent use of the Required Actions and the small incremental effect on plant risk (Ref. 3).

3

H.1 and H.2

If the Required Actions and associated Completion Times of Condition F or G are not met, then the plant must be brought to a MODE in which the LCO does not apply. The plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3

BASES

ACTIONS (continued)

from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of 12 hours to reach MODE 4 is reasonable considering that a plant can cool down within that time frame on one safety system train. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12. 3

SURVEILLANCE REQUIREMENTS

SR 3.4.11.1

PORV Block valve cycling verifies that it can be closed if necessary. [The basis for the Frequency of [92 days] is the ASME Code (Ref. 4). 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
---]

This SR is modified by two Notes. Note 1 modifies this SR by stating that this SR is not required to be performed with the block valve closed in accordance with the Required Actions of this LCO. Opening the block valve in this condition increases the risk of an unisolable leak from the RCS since the PORV is already inoperable. Note 2 modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. [In accordance with Reference 5, administrative controls require this test be performed in MODE 3 or 4 to adequately simulate operating temperature and pressure effects on PORV operation.] 1 2

SR 3.4.11.2

SR 3.4.11.2 requires complete cycling of each PORV. PORV cycling demonstrates its function. [The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice. 3

OR

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

The Note modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. [In accordance with Reference 4, administrative controls require this test be performed in MODE 3 or 4 to adequately simulate operating temperature and pressure effects on PORV operation.]

[SR 3.4.11.3

Operating the solenoid air control valves and check valves on the air accumulators ensures the PORV control system actuates properly when called upon. [The Frequency of [18] months is based on a typical refueling cycle and the Frequency of the other surveillances used to demonstrate PORV OPERABILITY.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]]

3

BASES

SURVEILLANCE REQUIREMENTS (continued)

[SR 3.4.11.4

This Surveillance is not required for plants with permanent 1E power supplies to the valves. The test demonstrates that emergency power can be provided and is performed by transferring power from the normal supply to the emergency supply and cycling the valves. [The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]]

3

REFERENCES

1. NUREG-0737, Paragraph II, G.I, November 1980.

2. Inspection and Enforcement (IE) Bulletin 79-05B, April 21, 1979.

3. WCAP-16125-NP-A, "Justification for Risk-Informed Modifications to Selected Technical Specifications for Conditions Leading to Exigent Plant Shutdown," Revision 2, August 2010.

4. ASME Code for Operation and Maintenance of Nuclear Power Plants.

[5. Generic Letter 90-06, "Resolution of Generic Issue 70, 'Power-Operated Relief Valve and Block Valve Reliability,' and Generic Issue 94, 'Additional Low-Temperature Overpressure for Light-Water Reactors,' Pursuant to 10 CFR 50.54(f)," June 25, 1990.]

1

2. UFSAR Chapter 15

3. NRC RIS 2005-29, "Anticipated Transients That Could Develop Into More Serious Events," December 14, 2005

1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.11 ~~Pressurizer~~ Power Operated Relief Valve~~s~~ (PORV~~s~~) [Block Valves] 1

BASES

BACKGROUND

The pressurizer is equipped with two types of devices for pressure relief: pressurizer safety valves and PORVs. The PORV is ~~an air operated valve that is~~ automatically opened at a specific set pressure when the pressurizer pressure increases and is automatically closed on decreasing pressure. ~~The PORV may also be manually operated using controls installed in the control room.~~ 1 3

An electric, motor operated, normally open, block valve is installed between the pressurizer and the PORV. The function of the block valve is to isolate the PORV. Block valve closure is accomplished manually using controls in the control room ~~and may be used to isolate a leaking PORV to permit continued power operation~~. Most importantly, the block [valves are] ~~valve is~~ used to isolate [an inadvertent opening of one or both PORVs.] ~~a stuck open PORV to isolate the resulting small break loss of coolant accident (LOCA)~~. Closure terminates the RCS depressurization and coolant inventory loss. 1

The ~~PORV and its~~ block valve controls are powered from normal power supplies. Their controls are also capable of being powered from emergency supplies. ~~Power supplies for the PORV are separate from those for the block valve.~~ Power supply requirements are defined in NUREG-0737, Paragraph II, G.1 (Ref. 1). 1

~~The PORV setpoint is above the high pressure reactor trip setpoint and below the opening setpoint for the pressurizer safety valves as required by Reference 2. The purpose of the relationship of these setpoints is to limit the number of transient pressure increase challenges that might open the PORV, which, if opened, could fail in the open position. The PORV setpoint thus limits the frequency of challenges from transients and limits the possibility of a small break LOCA from a failed open PORV. Placing the setpoint below the pressurizer safety valve opening setpoint reduces the frequency of challenges to the safety valves, which, unlike the PORV, cannot be isolated if they were to fail to open.~~ 3

The primary purpose of this LCO is to ensure that the PORV ~~and the~~ block valve[s] are operating correctly so the ~~potential for a small break LOCA through the PORV pathway is minimized, or if a small break LOCA were to occur through a failed open PORV, the~~ block valve could be manually operated to isolate the ~~path~~. 1

[pathway from an inadvertent opening of one or both PORVs. Each PORV capacity is sufficient to avoid lifting the safety valves during power operations. Therefore, one PORV block valve is maintained open during power operation to ensure the PORV function is available. The second PORV block valve is closed to avoid excessive loss of reactor coolant inventory upon PORV actuation.]

1

BASES

BACKGROUND (continued)

The PORV may be manually operated to depressurize the RCS as deemed necessary by the operator in response to normal or abnormal transients. The PORV may be used for depressurization when the pressurizer spray is not available, a condition that may be encountered during loss of offsite power. Operators can manually open the PORVs to reduce RCS pressure in the event of a steam generator tube rupture (SGTR) with offsite power unavailable. 3

The PORV may also be used for feed and bleed core cooling in the case of multiple equipment failure events that are not within the design basis, such as a total loss of feedwater. 3

The PORV functions as an automatic overpressure device and limits challenges to the safety valves. Although the PORV acts as an overpressure device for operational purposes, safety analyses [do not take credit for PORV actuation, but] do take credit for the safety valves. 2

The PORV also provides low temperature overpressure protection (LTOP) during heatup and cooldown. LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," addresses this function.

APPLICABLE SAFETY ANALYSES

Insert 1

The PORV small break LOCA break size is bounded by the spectrum of piping breaks analyzed for plant licensing. Because the PORV small break LOCA is located at the top of the pressurizer, the RCS response characteristics are different from RCS loop piping breaks; analyses have been performed to investigate these characteristics. 1

The possibility of a small break LOCA through the PORV is reduced when the PORV flow path is OPERABLE and the PORV opening setpoint is established to be reasonably remote from expected transient challenges. The possibility is minimized if the flow path is isolated.

The PORV opening setpoint has been established in accordance with Reference 2. It has been set so expected RCS pressure increases from anticipated transients will not challenge the PORV, minimizing the possibility of small break LOCA through the PORV.

Overpressure protection is provided by safety valves, and analyses do not take credit for the PORV opening for accident mitigation.

block valves

Pressurizer PORVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). 1

4

1

INSERT 1

The PORV block valves are not credited to mitigate any design basis accident or transient specified in Reference 2. NRC Regulatory Issue Summary 2005-29 (Ref. 3) describes limiting the probability of initiating a more safety significant event as a result of an anticipated transient. The inadvertent PORV opening is an anticipated operational occurrence (AOO) and could result in a pressurizer overfill condition. Such a condition could lead to an inability to isolate the PORV, resulting in a condition similar to a small break LOCA.

An accidental depressurization of the RCS could occur as a result of an inadvertent opening of one pressurizer PORV. Initially the event results in a loss of RCS fluid and a rapid RCS depressurization. The challenge to the specified acceptable fuel design limits is terminated by the thermal margin / low pressure reactor trip signal, however, the RCS fluid loss and depressurization continue. Safety injection is actuated, and the pressurizer level increases with the potential to result in pressurizer overfill and liquid discharge through the stuck open PORV(s). The minimum time from event initiation to the pressurizer dome becoming liquid filled is just under 3 minutes. To prevent liquid discharge through the open PORV(s), the operator closes the associated open PORV block valve(s) within just under 3 minutes prior to the pressurizer dome becoming liquid filled.

 1

BASES

to terminate a pressurizer overfill event following an inadvertent PORV opening. An OPERABLE PORV block valve may be either closed and energized or open and energized. Additionally, one PORV block valve must be closed to preclude RCS blowdown from both PORV pathways as a result of inadvertent opening of both PORVs.

LCO

The LCO requires the PORV and its associated block valve to be OPERABLE. The block valve is required to be OPERABLE so it may be used to isolate the flow path if the PORV is not OPERABLE. 1

Valve OPERABILITY also means the PORV setpoint is correct. By ensuring that the PORV opening setpoint is correct, the PORV is not subject to frequent challenges from possible pressure increase transients, and therefore the possibility of a small break LOCA through a failed open PORV is not a frequent event. 3

APPLICABILITY

In MODES 1, 2, and 3, the PORV and its block valve s are required to be OPERABLE to limit the potential for a small break LOCA through the flow path. A likely cause for PORV small break LOCA is a result of pressure increase transients that cause the PORV to open. Imbalances in the energy output of the core and heat removal by the secondary system can cause the RCS pressure to increase to the PORV opening setpoint. Pressure increase transients can occur any time the steam generators are used for heat removal. The most rapid increases will occur at higher operating power and pressure conditions of MODES 1 and 2. 1

Pressure increases are less prominent in MODE 3 because the core input energy is reduced, but the RCS pressure is high. Therefore, this LCO is applicable in MODES 1, 2, and 3. The LCO is not applicable in MODE 4 when both pressure and core energy are decreased and the pressure surges become much less significant. The PORV setpoint is reduced for LTOP in MODES 4, 5, and 6 with the reactor vessel head in place. LCO 3.4.12 addresses the PORV requirements in these MODES.

ACTIONS

The ACTIONS are modified by a Note. The Note clarifies that all the pressurizer PORVs and block valves are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis). 1

A.1

With the PORV inoperable and capable of being manually cycled, either the PORV must be restored or the flow path isolated within 1 hour. The block valve should be closed but power must be maintained to the associated block valve, since removal of power would render the block valve inoperable. Although the PORV may be designated inoperable, it may be able to be manually opened and closed and in this manner can be used to perform its function. PORV inoperability may be due to seat leakage, instrumentation problems, automatic control problems, or other causes that do not prevent manual use and do not create a possibility for 3

 1

BASES

ACTIONS (continued)

~~a small break LOCA. For these reasons, the block valve may be closed but the Action requires power be maintained to the valve. This Condition is only intended to permit operation of the plant for a limited period of time not to exceed the next refueling outage (MODE 6) so that maintenance can be performed on the PORVs to eliminate the problem condition. The PORVs should normally be available for automatic mitigation of overpressure events and should be returned to OPERABLE status prior to entering startup (MODE 2).~~

~~Quick access to the PORV for pressure control can be made when power remains on the closed block valve. The Completion Time of 1 hour is based on plant operating experience that minor problems can be corrected or closure can be accomplished in this time period.~~ 3

~~B.1, B.2, and B.3~~

~~If one PORV is inoperable and not capable of being manually cycled, it must either be isolated, by closing the associated block valve and removing the power from the block valve, or restored to OPERABLE status. The Completion Time of 1 hour is reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. If the inoperable valve cannot be restored to OPERABLE status, it must be isolated within the specified time of 1 hour. Because there is at least one PORV that remains OPERABLE, an additional 72 hours is provided to restore the inoperable PORV to OPERABLE status. [Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program.]~~

A ~~C~~.1 and A ~~C~~.2

If one [or more PORV] block valve[s are] ~~is~~ inoperable, ~~then~~ [it must be closed with power removed] it must be restored to OPERABLE status, or ~~the associated PORV placed in manual control~~. The prime importance for the capability to close the block valve is to isolate a stuck open PORV. Therefore, if the block valve cannot be restored to OPERABLE status within 1 hour[, or in accordance with the Risk Informed Completion Time Program], the Required Action is to place the PORV [block valve in the closed position with power removed] ~~in manual control to preclude its automatic opening for an overpressure event and to avoid the potential for a stuck open PORV at a time that the block valve is inoperable~~. The Completion Times of 1 hour are reasonable based on the small potential for challenges to the system during this time period and provide the operator time to correct the situation. ~~Because at least one PORV remains OPERABLE, the operator~~ 3

1 (margin, beside "If one … block valve …")
1 (margin, beside "PORV in manual control …")

BASES

ACTIONS (continued)

is permitted a Completion Time of 72 hours to restore the inoperable block valve to OPERABLE status. [Alternatively, a Completion Time s can be determined in accordance with the Risk Informed Completion Time Program.] The time allowed to restore the block valve is based upon the Completion Time for restoring an inoperable PORV in Condition B since the PORVs are not capable of automatically mitigating an overpressure event when placed in manual control. If the block valve is restored within the Completion Time of 72 hours, the power will be restored and the PORV restored to OPERABLE status. 3

B.1
If both PORV block valves are open, it is necessary to isolate one PORV flow path by closing one PORV block valve within 1 hour. The Completion Time of 1 hour is reasonable based on the small potential for challenges to the system during this time period and provide the operator time to correct the situation. 1

C D.1 and C D.2

If the Required Action cannot be met within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

E.1, E.2, E.3, and E.4

If two PORVs are inoperable and not capable of being manually cycled, it is necessary to isolate the flow path by closing and removing the power to the associated block valves within 1 hour and restore at least one PORV within 8 hours. The Condition is modified by a Note stating it is not applicable if the second PORV train is intentionally declared inoperable. The Condition does not apply to voluntary removal of redundant systems or components from service. The Condition is applicable if one PORV is inoperable for any reason and the second PORV is discovered to be inoperable, or if both PORVs are discovered to be inoperable at the same time. 3

In the event of a loss of feedwater, the PORVs would be used to remove core heat. In order to minimize the consequences of a loss of feedwater while two PORVs are inoperable, Required Action E.3 requires that LCO 3.7.5, "Auxiliary Feedwater System," be met to ensure AFW is available. The inoperability of two PORVs during the 8 hour Completion Time has been shown to be acceptable based on the infrequent use of the Required Action and the small incremental effect on plant risk (Ref. 3). If one PORV is restored and one PORV remains inoperable, then the plant will be in Condition B with the time clock started at the original declaration of having two PORVs inoperable.

BASES

ACTIONS (continued)

F.1 and F.2

If two PORVs are inoperable and are not capable of being manually cycled and are not restored within the Completion Time, then the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. Similarly, the Completion Time of 12 hours to reach MODE 4 is reasonable, considering that a plant can cool down within that time frame on one safety system train. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

G.1 and G.2

If two block valves are inoperable, it is necessary to restore at least one block valve to OPERABLE status within 8 hours. The Condition is modified by a Note stating it is not applicable if the second block valve is intentionally declared inoperable. The Condition does not apply to voluntary removal of redundant systems or components from service. The Condition is only applicable if one block valve is inoperable for any reason and the second block valve is discovered to be inoperable, or if both block valves are discovered to be inoperable at the same time. In the event of a loss of feedwater, the PORVs would be used to remove core heat. In order to minimize the consequences of a loss of feedwater while two block valves are inoperable, Required Action G.2 requires that LCO 3.7.5, "Auxiliary Feedwater System," be verified to be met within 1 hour. The inoperability of two block valves during the 8 hour Completion Time has been shown to be acceptable based on the infrequent use of the Required Actions and the small incremental effect on plant risk (Ref. 3).

H.1 and H.2

If the Required Actions and associated Completion Times of Condition F or G are not met, then the plant must be brought to a MODE in which the LCO does not apply. The plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3

3

BASES

ACTIONS (continued)

from full power in an orderly manner and without challenging safety systems. Similarly, the Completion Time of 12 hours to reach MODE 4 is reasonable considering that a plant can cool down within that time frame on one safety system train. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12. 3

SURVEILLANCE REQUIREMENTS

SR 3.4.11.1

PORV
Block valve cycling verifies that it can be closed if necessary. [The basis for the Frequency of [92 days] is the ASME Code (Ref. 4). 1 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

This SR is modified by two Notes. Note 1 modifies this SR by stating that this SR is not required to be performed with the block valve closed in accordance with the Required Actions of this LCO. Opening the block valve in this condition increases the risk of an unisolable leak from the RCS since the PORV is already inoperable. 1 Note 2 modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. [In accordance with Reference 5, administrative controls require this test be performed in MODE 3 or 4 to adequately simulate operating temperature and pressure effects on PORV operation.] 2

SR 3.4.11.2

SR 3.4.11.2 requires complete cycling of each PORV. PORV cycling demonstrates its function. [The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice. 3

OR

1

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
-----]

The Note modifies this SR to allow entry into and operation in MODE 3 prior to performing the SR. This allows the test to be performed in MODE 3 under operating temperature and pressure conditions, prior to entering MODE 1 or 2. [In accordance with Reference 4, administrative controls require this test be performed in MODE 3 or 4 to adequately simulate operating temperature and pressure effects on PORV operation.]

[SR 3.4.11.3

Operating the solenoid air control valves and check valves on the air accumulators ensures the PORV control system actuates properly when called upon. [The Frequency of [18] months is based on a typical refueling cycle and the Frequency of the other surveillances used to demonstrate PORV OPERABILITY.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
-----]]

3

1

1

BASES

SURVEILLANCE REQUIREMENTS (continued)

[SR 3.4.11.4

This Surveillance is not required for plants with permanent 1E power supplies to the valves. The test demonstrates that emergency power can be provided and is performed by transferring power from the normal supply to the emergency supply and cycling the valves. [The Frequency of [18] months is based on a typical refueling cycle and industry accepted practice.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]]

3

REFERENCES

1. NUREG-0737, Paragraph II, G.I, November 1980.

2. Inspection and Enforcement (IE) Bulletin 79-05B, April 21, 1979.

3. WCAP-16125-NP-A, "Justification for Risk-Informed Modifications to Selected Technical Specifications for Conditions Leading to Exigent Plant Shutdown," Revision 2, August 2010.

4. ASME Code for Operation and Maintenance of Nuclear Power Plants.

[5. Generic Letter 90-06, "Resolution of Generic Issue 70, 'Power-Operated Relief Valve and Block Valve Reliability,' and Generic Issue 94, 'Additional Low-Temperature Overpressure for Light-Water Reactors,' Pursuant to 10 CFR 50.54(f)," June 25, 1990.]

1

2. UFSAR Chapter 15

3. NRC RIS 2005-29, "Anticipated Transients That Could Develop Into More Serious Events," December 14, 2005

1

1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.11, BASES, POWER OPERATED RELIEF VALVE (PORV) BLOCK VALVES

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to reflect the changes to the Specification.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.11, POWER OPERATED RELIEF VALVE (PORV) BLOCK VALVES

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 12

3.4.12, Low Temperature Overpressure Protection (LTOP) System

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

Low Temperature Overpressure Protection (LTOP) System A01

REACTOR COOLANT SYSTEM

Add LCO 3.4.12 high pressure safety injection (HPSI) pump and charging pump requirements M01

POWER OPERATED RELIEF VALVES

Add LCO 3.4.12 safety injection tanks (SITs) requirements M02

LIMITING CONDITION FOR OPERATION

lift settings

LCO 3.4.12.a 3.4.13 Two power operated relief valves (PORVs) shall be OPERABLE, with their setpoints selected to the low temperature mode of operation as follows:

LCO 3.4.12.a a. A setpoint of less than or equal to ≤ 350 psia shall be selected during heatup, cooldown and isothermal conditions when the temperature of any RCS cold leg is less than or equal to temperature is ≤ 200°F.

LCO 3.4.12.a b. A setpoint of less than or equal to ≤ 530 psia shall be selected during heatup, cooldown and isothermal conditions when the temperature of any RCS cold leg is greater than temperature is > 200°F and less than or equal to ≤ 300°F.

APPLICABILITY: MODE 4 when the temperature of any RCS cold leg is less than or equal to 300°F, MODE 5, and MODE 6 when the head is on the reactor vessel; and the RCS is not vented through greater than a depressurized and an RCS vent of ≥ 1.75 square inch vent.

LCO 3.4.12.b

ACTION:

ACTION E a. With required one PORV inoperable in MODE 4, restore the inoperable required PORV to OPERABLE status within 7 days; or depressurize and vent the RCS through greater than a and establish RCS vent of ≥ 1.75 square inch vent within the next 8 12 hours. establish L01

ACTION G

ACTION F b. With required one PORV inoperable in MODES 5 or 6, either (1) restore the inoperable required PORV to OPERABLE status within 24 hours, or (2) complete depressurization and venting of the RCS through greater than a and establish RCS vent of ≥ 1.75 square inch vent within a total of 32 12 hours. e L01

ACTION G

Condition G c. With both two required PORVs inoperable, restore at least one PORV to operable status or complete depressurization and venting of the RCS through greater than a and establish RCS vent of ≥ 1.75 square inch vent within 24 12 hours. e M03

ACTION G

SR 3.4.12.4; 2nd Frequency d. With the RCS vented per ACTIONS a, b, or c, verify the vent pathway required RCS vent ≥ 1.75 inches is open at least once per 31 days when the pathway is provided by a valve(s) that is locked, sealed, or otherwise secured in the open position;

SR 3.4.12.4; 1st Frequency otherwise, verify the vent pathway required RCS vent ≥ 1.75 inches is open every 12 hours.

e. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence. L02

3.4.12 ACTIONS Note f. LCO 3.0.4.b is not applicable to PORVs when entering MODE 4.

Insert SR 3.4.12.1, SR 3.4.12.2 M01

SURVEILLANCE REQUIREMENTS

Insert SR 3.4.12.3 M02

4.4.13 Each PORV shall be demonstrated OPERABLE by:

SR 3.4.12.5 a. Verifying the PORV isolation block valve is open for each required PORV in accordance with the Surveillance Frequency Control Program; and

SR 3.4.12.6 b. Performance of a CHANNEL FUNCTION TEST on each required PORV, but excluding valve operation actuation, in accordance with the Surveillance Frequency Control Program; and

SR 3.4.12.7 c. Performance of a CHANNEL CALIBRATION on each required PORV actuation channel in accordance with the Surveillance Frequency Control Program.

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN - T_{avg} ≤ 200 °F

See ITS 3.1.1

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be:

LCO 3.4.12 Within the limits specified in the COLR, ~~and~~ in addition ~~with the Reactor Coolant System drained below the hot leg centerline,~~ [a maximum of] one charging pump shall be ~~rendered inoperable~~ [capable of injecting into the RCS].* M01

APPLICABILITY: MODE 5.

ACTION:

See ITS 3.1.1

If the SHUTDOWN MARGIN requirements cannot be met, immediately initiate and continue boration at ≥ 40 gpm of greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN requirements of Specification 3.1.1.2 shall be determined:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. (See ITS 3.1.4) If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s). (See ITS 1.1)

b. In accordance with the Surveillance Frequency Control Program by consideration of the following factors: (See ITS 3.1.1)

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

SR 3.4.12.2 ~~c.~~ ~~At least once per 24 hours~~ [In accordance with the Surveillance Frequency Control Program], ~~when the Reactor Coolant System is drained below the hot leg centerline,~~ ~~by consideration of the factors in 4.1.1.2.b and~~ (A06) ~~by~~ verify~~ing at least~~ [a maximum of] one charging pump is ~~rendered inoperable~~ [capable of injecting into the RCS].* M01

~~* Breaker racked-out.~~ LA03

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. In MODES 3* and 4#, one ECCS subsystem composed of one OPERABLE high pressure safety injection pump and one OPERABLE flow path capable of taking suction from the refueling water storage tank on a safety injection actuation signal and automatically transferring suction to the containment sump on a sump recirculation actuation signal. See ITS 3.5.3

LCO 3.4.12 ~~b.~~ Prior to decreasing the reactor coolant system temperature below ~~270~~ 300°F a maximum of only one high pressure safety injection pump shall be OPERABLE with its associated header stop valve open. M01

LCO 3.4.12 NOTE 3 ~~c.~~ Prior to decreasing the reactor coolant system temperature below 236°F all high pressure safety injection pumps shall be disabled and their associated header stop valves closed except as allowed by Specifications 3.1.2.1 and 3.1.2.3.

Applicability **APPLICABILITY:** MODES 3* and 4.
MODES 5 and 6 when the Pressurizer manway cover is in place and the reactor vessel head is on.

ACTION:

a. With no ECCS subsystems OPERABLE in MODES 3* and 4#, immediately restore one ECCS subsystem to OPERABLE status or be in COLD SHUTDOWN within 20 hours.

ACTION A b. With RCS temperature below ~~270~~ 300°F and with more than the allowed high pressure safety injection pump OPERABLE or injection valves and header isolation valves open, immediately disable the high pressure safety injection pump(s) or close the header isolation valves. M01

c. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

d. LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

SR 3.4.12.1 ~~4.5.3.2~~ The high pressure safety injection pumps shall be verified inoperable and the associated header stop valves closed prior to decreasing below the above specified Reactor Coolant System temperature and once per month when the Reactor Coolant System is at refueling temperatures.

* With pressurizer pressure < 1750 psia.

\# REACTOR COOLANT SYSTEM cold leg temperature above 250°F.

Low Temperature Overpressure Protection (LTOP) System

A01 Add LCO 3.4.12, HPSI and charging requirements M01

Add LCO 3.4.12, SIT requirements M02

Add LCO 3.4.12 Note 3
Power operated relief valves (PORVs) shall only be used when all RCS cold leg temperatures are ≥ 149°F during cooldown and when all RCS cold leg temperatures are ≥ 60°F during heatup. A05

REACTOR COOLANT SYSTEM

OVERPRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

an RCS vent of ≥

LCO 3.4.12.d 3.4.9.3 Unless the RCS is depressurized and vented by at least 3.58 square inches, at least one of the following overpressure protection systems shall be OPERABLE:

LCO 3.4.12.a a. Two [OPERABLE] power-operated relief valves (PORVs) with a lift setting[s] of less than or equal to [≤] 490 psia and with their associated block valves open. These valves may only be used to satisfy low temperature overpressure protection (LTOP) when the RCS cold leg temperature is greater than the temperature listed in Table 3.4-4. LA01

LCO 3.4.12.b b. Two shutdown cooling relief valves (SDCRVs) with a lift setting[s] of less than or equal to [≤] 350 psia.

LCO 3.4.12.c c. One PORV with a lift setting of less than or equal to [≤] 490 psia and with its associated block valve open in conjunction with the use of one SDCRV with a lift setting of less than or equal to [≤] 350 psia. This combination may only be used to satisfy LTOP when the RCS cold leg temperature is greater than the temperature listed in Table 3.4-4. LA01

Applicability **APPLICABILITY**: MODES 4#, 5 and 6 [when the reactor vessel head is on]. L03

ACTION:

ACTION E a. With either a [One required] PORV or an [one required] SDCRV being used for LTOP inoperable, restore at least two overpressure protection devices [required PORV or required SDCRV] to OPERABLE status within 7 days or:

ACTION F 1. Depressurize and vent the RCS with a minimum vent area [and establish an RCS vent of ≥] of 3.58 square inches within the next 8 [12] hours; OR L01

2. Be at a temperature above the LOW TEMPERATURE RCS OVERPRESSURE PROTECTION RANGE of Table 3.4-3 within the next 8 hours. A02

ACTION F b. With none of the overpressure protection devices being used for LTOP OPERABLE, within the next eight hours [12] either: L01

ACTION F 1. Restore at least one overpressure protection device to OPERABLE status or vent the RCS [Depressurize the RCS and establish an RCS vent of ≥ 3.58 square inches]; OR

2. Be at a temperature above the LOW TEMPERATURE RCS OVERPRESSURE PROTECTION RANGE of Table 3.4-3. A02

Applicability # With [when any RCS] cold leg temperature [Is ≤ 240°F following entry from MODE 3 and when any RCS cold leg temperature is ≤ 252°F following entry from MODE 5.] within the LOW TEMPERATURE RCS OVERPRESSURE PROTECTION RANGE of Table 3.4-3. A05

Low Temperature Overpressure Protection (LTOP) System

A01

REACTOR COOLANT SYSTEM

~~**OVERPRESSURE PROTECTION SYSTEMS**~~

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

~~c. In the event either the PORVs, SDCRVs or the RCS vent(s) are used to mitigate a RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs, SDCRVs or vent(s) on the transient and any corrective action necessary to prevent recurrence.~~ L02

LCO 3.4.12 ACTIONS Note ~~d.~~ LCO 3.0.4.b is not applicable to PORVs when entering MODE 4.

SURVEILLANCE REQUIREMENTS

~~4.4.9.3.1 Each PORV shall be demonstrated OPERABLE by:~~

~~a. In addition to the requirements of the INSERVICE TESTING PROGRAM, operating the PORV through one complete cycle of full travel in accordance with the Surveillance Frequency Control Program.~~ LA02

A01

REACTOR COOLANT SYSTEM

Insert SR 3.4.12.1, SR 3.4.12.2 M01

Insert SR 3.4.12.3 M02

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.4.12.6 b. Performance of a CHANNEL FUNCTIONAL TEST on the PORV actuation channel, but excluding valve operation, within 31 days prior to entering a condition in which the PORV is required OPERABLE and in accordance with the Surveillance Frequency Control Program thereafter when the PORV is required OPERABLE. [each required] A03

SR 3.4.12.7 c. Performance of a CHANNEL CALIBRATION on the PORV actuation channel in accordance with the Surveillance Frequency Control Program. [each required]

SR 3.4.12.5 d. Verifying the PORV isolation valve is open in accordance with the Surveillance Frequency Control Program when the PORV is being used for overpressure protection. [block] [for each required PORV]

SR 3.4.12.4 4.4.9.3.2 The RCS vent(s) shall be verified to be open in accordance with the Surveillance Frequency Control Program* when the vent(s) is being used for overpressure protection. [Verify required] [≥ 3.58 square inches is]

SR 3.4.12.4 * Except when the vent pathway is provided with a valve which is locked, sealed, or otherwise secured in the open position, then verify these valves open in accordance with the Surveillance Frequency Control Program.

A01

TABLE 3.4-3

LOW TEMPERATURE RCS OVERPRESSURE PROTECTION RANGE

A05

LCO 3.4.12 Applicability

Operating Period, EFPY	Cold Leg Temperature, °F During Heatup (following entry from MODE 5)	Cold Leg Temperature, °F During Cooldown (following entry from MODE 3)
≤ 55	≤ 252	≤ 240

A04

TABLE 3.4-4

MINIMUM COLD LEG TEMPERATURE FOR PORV USE FOR LTOP

LCO 3.4.12 Note 3

Operating Period EFPY	Cold Leg Temperature, °F During Heatup	Cold Leg Temperature, °F During Cooldown
≤ 55	60	149

A04

~~DELETED~~

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN - T_{avg} LESS THAN OR EQUAL TO 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN outside the COLR limits, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1900 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be within the COLR limits:

a. Within 1 hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

See ITS 3.1.4

See ITS 1.1

b. In accordance with the Surveillance Frequency Control Program by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

See ITS 3.1.1

SR 3.4.12.2

c. ~~At least once per 24 hours~~, ~~when the Reactor Coolant System is drained below the hot leg centerline, by consideration of the factors in 4.1.1.2b and~~ ~~by~~ verify~~ing~~ ~~at least two~~ charging pump~~s are rendered inoperable~~ ~~by racking out their motor circuit breakers~~.

In accordance with the Surveillance Frequency Control Program

is capable of injecting into the RCS

a maximum of one

A06

M01

LA03

EMERGENCY CORE COOLING SYSTEMS

3/4.5.3 ECCS SUBSYSTEMS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE high-pressure safety injection pump, and

b. An OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Sump Recirculation Actuation Signal.

See ITS 3.5.3

Applicability

APPLICABILITY: MODES 3* and 4#.
Footnote # shall remain applicable in MODES 5 and 6 when the Pressurizer manway cover is in place and the reactor vessel head is on.

ACTION:

a. With no ECCS subsystems OPERABLE, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

c. LCO 3.0.4.b is not applicable to ECCS High Pressure Safety Injection subsystem when entering MODE 4.

SURVEILLANCE REQUIREMENTS

4.5.3 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

---

* With pressurizer pressure less than 1750 psia.

LCO 3.4.12 # ~~One HPSI shall be rendered inoperable prior to entering MODE 5.~~ M01

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 **Unit 2 only:** CTS 3.4.9.3 Action a. and b. state, in part, that given the Conditions specified, depressurize and vent the RCS, or be at a temperature above the low temperature RCS overpressure protection range of Table 3.4-3 within the 8 hours. ITS 3.4.12, ACTION F retains the requirement to depressurize the RCS and establish an RCS vent; however, it does not contain the requirement to be at a temperature above the low temperature RCS overpressure protection range of Table 3.4-3.

The purpose of CTS 3.4.9.3 Action a.2 and b.2 is to place the unit in a condition in which the equipment is no longer required. CTS 3.4.9.3 Action a.1 provides appropriate actions (depressurize and vent the RCS) to take with an inoperable PORV or an SDCRV being used for LTOP, and at least one of the two overpressure protection devices is not restored to OPERABLE status within 7 days. CTS 3.4.9.3 Action b.1 provides appropriate actions (depressurize and vent the RCS) to take with none of the overpressure protection devices being used for LTOP are OPERABLE. The overpressure protection devices being used for LTOP are not required to be OPERABLE when the RCS cold leg temperatures are > 252°F, the temperature referenced in CTS Table 3.4-3, because the Mode of Applicability is exited. Therefore, in accordance with CTS 3.0.2 (ITS LCO 3.0.2), when RCS cold leg temperatures are > 252°F, the CTS Actions are no longer required to be completed.

These changes are designated as administrative changes and are acceptable because they maintain the current requirement to place the unit in a condition in which the overpressure protection devices (PORVs and SDCRVs) are no longer required consistent with the requirements of CTS 3.0.2 (ITS LCO 3.0.2) and, therefore, do not result in a technical change to the CTS.

A03 **Unit 2 only:** CTS 4.4.9.3.1.b states, in part, that each PORV shall be demonstrated OPERABLE by performance of a CHANNEL FUNCTIONAL TEST on the PORV actuation channel, “within 31 days prior to entering a condition in which the PORV is required OPERABLE” and in accordance with the Surveillance Frequency Control Program thereafter when the PORV is required OPERABLE. The statement “within 31 days prior to entering a condition in which the PORV is required OPERABLE,” is not included in ITS SR 3.4.16.6. This changes the CTS by removing a Frequency which is duplicative of CTS 4.0.4 (ITS SR 3.0.4). ITS SR 3.0.4 states, in part, that entry into a MODE or other specified condition in the Applicability of an LCO shall only be made when the LCO's Surveillances have been met within their specified Frequency. Therefore, ITS SR 3.0.4 will continue to require the Surveillance to be performed within 31 days prior to entering a condition in which the PORV is required OPERABLE.

This change is designated as an administrative change and is acceptable because it does not result in technical changes to the CTS.

A04 **Unit 2 only:** CTS 3.4.9.3 references Table 3.4-3, Low Temperature Overpressure Protection (LTOP) Range, and Table 3.4-4, Minimum cold Leg Temperature for PORV Use for LTOP. The "Operating Period, EFPY" and its value of "≤ 55" is deleted from both Tables. ITS 3.4.3, RCS Pressure and Temperature (P/T) Limits, retains the Operating Period and its value in ITS Figures 3.4.3-1 and 3.4.3-2.

This change is designated as an administrative change and is acceptable because it does not result in technical changes to the CTS.

A05 **Unit 2 only:** CTS 3.4.9.3 references Table 3.4-3, Low Temperature Overpressure Protection (LTOP) Range, and Table 3.4-4, Minimum cold Leg Temperature for PORV Use for LTOP. Table 3.4-3 provides RCS cold leg temperature requirements for LTOP protection. CTS Table 3.4-3 is deleted and the specific values are provided in the ITS 3.4.12 Applicability. To ensure LTOP is applicable when required, "during cooldown" specified in Table 3.4-3 is changed to "following entry from MODE 3" and "during heatup" specified in Table 3.4-3 is changed to "following entry from MODE 5." This change in presentation maintains the intent that during a plant cooldown when transitioning from MODE 3 to MODE 4, LTOP is required when RCS temperature is ≤ 240°F and remains in effect until RCS temperature reaches 252°F during a plant heatup when transitioning from MODE 5 to MODE 4 to MODE 3. CTS Table 3.4-4 provides minimum RCS cold leg temperature requirements for PORV use for LTOP. Table 3.4-4 is deleted and the values in the table are provided as ITS LCO 3.4.12 Note 3.

These presentation changes are designated as an administrative change and are acceptable because they do not result in technical changes to the CTS.

A06 CTS 4.1.1.2.c requires, in part, with the RCS drained below the hot leg centerline, a verification of SDM once per 24 hours by consideration of the factors in 4.1.1.2.b. CTS 4.1.1.2.b also requires a verification of SDM in accordance with the Surveillance Frequency Control Program while in MODE 5 regardless of the drained status of the RCS. The CTS 4.1.1.2.b Frequency specified in the Surveillance Frequency Control Program is 24 hours. ITS 3.4.12 does not include a verification of SDM once per 24 hours with the RCS drained below the hot leg centerline because it is duplicative to the requirement of CTS 4.1.1.2.b which is retained in ITS (SR 3.1.1.1). This change is designated as an administrative change and is acceptable because removal of a duplicative surveillance requirement does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 Unit 1 CTS 3.5.3 limits the OPERABILITY of high pressure safety injection (HPSI) pumps during LTOP conditions based on temperature. Unit 2 CTS 3.5.3, Footnote # requires rendering a HPSI pump inoperable prior to entering MODE 5. Neither Unit 1 CTS 3.4.13 nor Unit 2 CTS 3.4.9.3 (i.e., LTOP Specifications) require a restriction on HPSI pumps. Additionally, Unit 1 CTS 3.4.13 and 3.5.3, and Unit 2 CTS 3.4.9.3 and 3.5.3 do not place any limits on charging pumps. Unit 1 CTS 3.1.1.2 and Footnote * requires, in part, with the RCS drained below the hot leg centerline one charging pump shall be rendered inoperable with the breaker racked out and requires a verification once per 24 hours as specified in CTS 4.1.1.2.c. Unit 2 CTS 4.1.1.2.c provides a similar requirement to verify at least two charging pumps are rendered inoperable when the RCS is drained below the hot leg centerline. ITS LCO 3.4.12 states, in part, that an LTOP System shall be OPERABLE with a maximum of one HPSI pump and one charging pump capable of injecting into the RCS. The ITS LCO contains a Note (Note 1) that states two charging pumps may be made capable of injecting for ≤ 1 hour for pump swap operations. ITS 3.4.12 ACTION A states that if two HPSI pumps are capable of injecting into the RCS, immediately initiate action to verify a maximum of one HPSI pump is capable of injecting into the RCS. ITS 3.4.12 ACTION B states that if two or more charging pumps are capable of injecting into the RCS, immediately initiate action to verify a maximum of one charging pump is capable of injecting into the RCS. If the HPSI pumps or charging pumps Required Action is not met, then ITS 3.4.12 ACTION G states depressurize the RCS and establish an RCS vent of ≥ 1.75 square inches (Unit 1) and ≥ 3.58 square inches (Unit 2). Additionally, ITS SR 3.4.12.1 requires verification that a maximum of one HPSI pump is capable of injecting into the RCS and ITS SR 3.4.12.2 requires verification that a maximum of one charging pump is capable of injecting into the RCS. PSL controls periodic Frequencies for Surveillances in accordance with the Surveillance Frequency Control Program per Unit 1 CTS 6.8.4.o and Unit 2 CTS 6.8.4.q. Therefore, SR 3.4.12.1 and SR 3.4.12.2 will be performed at a Frequency in accordance with the Surveillance Frequency Control Program. An initial Frequency of 12 hours will be established for SR 3.4.12.1 consistent with the ISTS SR 3.4.12.1 and an initial Frequency of 24 hours will be established for SR 3.4.12.2 consistent with the Frequency specified in CTS 4.1.1.2.c.

This changes the CTS by requiring all but one charging pump be made incapable of injecting into the RCS during LTOP conditions and provides additional restriction on HPSI pumps during LTOP conditions (i.e., requiring one HPSI pump to be incapable of injecting into the RCS instead of just rendering the pump inoperable) and expands the temperature range on when one HPSI pump must be incapable of injecting into the RCS. This also changes the CTS by adding appropriate actions and Surveillances regarding the HPSI and charging pumps.

The purpose of the LCO is to provide RCS overpressure protection at low temperature conditions by having minimum coolant input capability and adequate RCS pressure relief capacity. Limiting coolant input capability is accomplished by isolating the safety injection tanks (SITs) and restricting high pressure pumps capable of injection into the RCS to a maximum of one high pressure safety injection (HPSI) pump and one charging pump. See DOC M02 for SIT discussion of change. The Completion Times are reasonable for the ACTIONS to be performed and minimize the time in which the design assumptions for the LTOP System are not being met. The Surveillance Frequency of in accordance with the Surveillance Frequency Control Program considers operating practice to regularly assess potential degradation and to verify operation within the safety analysis.

This change is designated as more restrictive because it adds additional requirements to the CTS.

M02 Unit 1 CTS 3.4.13 and Unit 2 CTS 3.4.9.3 do not place any limits on the safety injection tanks (SITs) during LTOP conditions. ITS LCO 3.4.12 states that the SITs shall be isolated. The ITS LCO contains a Note (Note 2) that states, "SIT may be unisolated when SIT pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in ITS 3.4.3, “RCS Pressure and Temperature (P/T) Limits.” ITS 3.4.12 ACTION C states that if a SIT is not isolated when SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed by the P/T limit curves in LCO 3.4.3, the affected SIT must be isolated within 1 hour. If this isolation is not accomplished, ITS 3.4.12 ACTION D states that the RCS cold leg temperature must be increased to > 300°F (Unit 1) and > 252°F (Unit 2) or the affected SIT must be depressurized and vented within 12 hours. ITS SR 3.4.12.3 requires verification that each SIT is isolated. PSL controls periodic Frequencies for Surveillances in accordance with the Surveillance Frequency Control Program per Unit 1 CTS 6.8.4.o and Unit 2 CTS 6.8.4.q. Therefore, SR 3.4.12.3 will be performed at a Frequency in accordance with the Surveillance Frequency Control Program with an initial Frequency of 12 hours consistent with the ISTS SR 3.4.12.3. This changes the CTS by adding specific limits on the SITs during LTOP conditions, including appropriate ACTIONS and Surveillance Requirements.

The purpose of the LCO is to provide RCS overpressure protection at low temperature conditions. These changes are necessary because the LTOP analyses assume that the SITs are isolated and therefore not capable of initiating a mass addition transient. The Completion Times are reasonable for the ACTIONS to be performed and minimize the time in which the design assumptions for the LTOP System are not being met. The SR 3.4.12.3 Frequency of in accordance with the Surveillance Frequency Control Program considers operating practice to regularly assess potential degradation and to verify operation within the safety analysis.

The initial frequency established in accordance with the SFCP will be 12 hours for SR 3.1.4.3. See FPL (PSL Unit 1 and Unit 2) “Application for Technical Specification Change Regarding Risk-Informed Justifications for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program” (ADAMS Accession No. ML14070A087). The NRC issued Amendment No. 223 to Renewed Facility Operating License No. DPR-67 and Amendment No. 173 to Renewed Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit Nos. 1 and 2 (St. Lucie 1 and 2), respectively (ADAMS Accession No. ML15127A066).

This change is designated as more restrictive because it adds additional requirements to the CTS.

M03 **Unit 1 only:** CTS 3.4.13 Action c. states, in part, that with both PORVs inoperable, actions must be completed within 24 hours. ITS 3.4.12 ACTION G requires the RCS to be depressurized and to establish an RCS vent within 12 hours. Optionally, to exit Condition G, one PORV can be restored to OPERABLE status within 12 hours, under the same conditions. This changes the CTS by allowing 12 hours instead of 24 hours to perform the necessary actions.

The purpose of CTS Actions a. and b. is to place the unit in a condition in which the PORVs are not needed. This change is acceptable because the time with inadequate pressure relief capability is minimized to the time required to establish an adequate RVS vent path. Twelve hours is a sufficient amount of time to allow to plan and execute the maintenance activity of opening an RCS vent. This change allows the necessary activities to be performed in a controlled manner. This change is designated as more restrictive because the required response was changed from 24 hours to 12 hours.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 **Unit 2 only:** (*Type 1 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements*) CTS 3.4.9.3 requires, in part, that the PORVs be OPERABLE with lift settings as specified and their associated block valves open. ITS LCO 3.4.12 does not explicitly require the associated block valve of a required PORV to be open. This changes the CTS by moving the procedural detail that the PORV block valves must be open to the ITS Bases.

The removal of these details for meeting Technical Specification requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for the required PORVs to be OPERABLE. The ITS definition of OPERABLE requires other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s). For a PORV to be capable of performing its relief function, its associated block valve must be open to support OPERABILITY. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LA02 **Unit 2 only:** *(Type 4 – Removal of LCO, SR, or other TS requirement to the TRM, UFSAR, ODCM, QAP, CLRT Program, IST Program, ISI Program, or Surveillance Frequency Control Program)* CTS 4.4.9.3.1.a requires, in part, that the PORVs be operated through one complete cycle of full travel in accordance with the Surveillance Frequency Control Program. ITS LCO 3.4.12 does not explicitly require the PORVs be manually operated through one complete cycle of full travel. This changes the CTS by moving the Surveillance Requirement that manually operates the PORVs through one complete cycle to the Technical Requirements Manual (TRM).

The removal of this Surveillance Requirement for meeting Technical Specification requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the PORV block valve, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION Surveillances to demonstrate automatic actuation for the PORVs to be OPERABLE consistent with the ISTS. The ITS definition of OPERABLE requires other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s). For a PORV to be capable of performing its pressure relief function, its automatic relief actuation must be demonstrated to support OPERABILITY. Also, this change is acceptable because these types of procedural details will be adequately controlled in the TRM. The TRM is incorporated by reference into the UFSAR and any changes to the TRM are made under 10 CFR 50.59, which ensures changes are properly evaluated. This change is designated as a less restrictive removal of detail change because a Surveillance Requirement for meeting Technical Specification requirements is being removed from the Technical Specifications.

LA03 (*Type 1 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements*) Unit 1 CTS 3.1.1.2 requires, in part, with the RCS drained below the hot leg centerline one charging pump shall be rendered inoperable. Unit 1 CTS 4.1.1.2.c also requires verification that at least one charging pump is rendered inoperable. The word inoperable is modified by Footnote * that clarifies the breaker racked out. Unit 2 CTS 4.1.1.2.c provides a similar requirement to render at least two charging pumps inoperable by racking out their motor circuit breakers. ITS SR 3.4.12.2 requires verifying a maximum of one charging pump is capable of injecting into the RCS. This changes the CTS by moving the procedural detail of how to make a charging pump inoperable (i.e., incapable of injecting into the RCS) to the ITS Bases.

The removal of these details for meeting Technical Specification requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for limiting the number of charging pumps capable of injecting into the RCS. The charging pumps are rendered incapable of injecting into the RCS through removing the power from the pumps by racking the breakers out under administrative control. An alternate method of LTOP control may also be employed using at least two independent means to prevent a pump start such that a single failure or single action will not result in an injection into the RCS. This may be accomplished through the pump control switch being placed in stop and at least one valve in the discharge flow path being closed. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 – Relaxation of Completion Time)* Unit 1 CTS 3.4.13 Action a. states, in part, that with one PORV inoperable in MODE 4 for > 7 days depressurize and vent the RCS within the next 8 hours. Unit 1 CTS 3.4.13 Action b. states, in part, that with one PORV inoperable in MODES 5 or 6 for > 24 hours depressurize and vent the RCS within a total of 32 hours (essentially 8 hours to depressurize and vent the RCS). Unit 1 ITS 3.4.12 ACTION G requires the RCS to be depressurized and to establish an RCS vent within 12 hours under the same conditions. This changes the CTS by allowing 12 hours instead of 8 hours to perform the required action.

Unit 2 CTS 3.4.9.3 Action a. states, in part, that with either a PORV or an SDCRV being used for LTOP inoperable for > 7 days either depressurize and vent the RCS or be at a temperature above the LTOP enabling temperature of 252°F within the next 8 hours. Unit 2 CTS 3.4.9.3 Action b. states, in part, that with none of the overpressure protection devices being used for LTOP OPERABLE, either restore at least one overpressure protection device to OPERABLE status, or vent the RCS, or be at a temperature above the LTOP enabling temperature of 252°F, within the next 8 hours. Unit 2 ITS 3.4.12 ACTION F requires the RCS to be depressurized and to establish an RCS vent within 12 hours under the same conditions. Optionally, to exit Condition F, RCS cold leg temperature can be raised above the LTOP enabling temperature of 252°F or restore the required relief valves to OPERABLE status. This changes the CTS by allowing 12 hours instead of 8 hours to perform the necessary actions.

The purpose of the Unit 1 CTS Actions a. and b. is to place the unit in a condition in which the PORVs are not needed for LTOP. Similarly, the purpose of the Unit 2 CTS Actions a. and b. is to place the unit in a condition in which the PORVs and SDC relief valves are not needed for LTOP. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition and considers the low probability of a DBA occurring during the allowed Completion Time. Any reduction in the margin of safety due to the extending the time to perform the remedial actions by 4 hours is offset by providing a reasonable time to perform the action to establish an adequate RCS vent path in a controlled manner, thus, minimizing the likelihood of human performance errors that may exacerbate the degraded condition. Twelve hours is a sufficient amount of time to allow to cool and depressurize the RCS (following the unit cooldown rate limits), change MODES, and plan and execute the maintenance activity of establishing an RCS vent path, or raise RCS cold leg temperature above the LTOP enabling temperature. This change allows the necessary activities to be performed in a controlled manner. This change is designated as less restrictive because additional time is allowed to complete Required Actions than was allowed in the CTS.

L02 *(Category 9 – Deletion of Reporting Requirements)* Unit 1 CTS 3.4.13 Action e and Unit 2 CTS 3.4.9.3 Action c. state that in the event either the PORVs, SDCRVs (Unit 2), or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs, SDCRVs (Unit 2), or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence. The ITS does not have a similar requirement. This changes the CTS by eliminating a Special Report.

The purpose of Unit 1 CTS 3.4.13 Action e and Unit 2 CTS 3.4.9.3 Action c is to inform the NRC of challenges to the RCS pressure relief capabilities. This change is acceptable because the regulations provide adequate reporting requirements, or the reports do not affect continued plant operation. The regulatory reporting requirements in 10 CFR 50 are adequate to inform the NRC of challenges to the PORVs, the SDCRVs, or RCS vents, when necessary. Neither the safety analysis assumptions or conditions for continued operation are dependent on the NRC review of the provided information. This change is designated as less restrictive because reports that would be submitted under the CTS will not be required under the ITS.

L03 **Unit 2 only:** *(Category 2 – Relaxation of Applicability)* CTS 3.4.9.3 Applicability states that the LCO is applicable in MODE 6. ITS 3.4.12 Applicability states that the LCO is applicable in MODE 6 when the reactor vessel head is on. This changes the CTS by only requiring the LCO Applicability in MODE 6 when the reactor vessel head is on.

The purpose of CTS 3.4.9.3 is to ensure there is sufficient low temperature overpressurization protection in all conditions. The definition of MODE 6 included in ITS Table 1.1-1 states that MODE 6 is when one or more reactor vessel head closure bolts are less than fully tensioned. The ITS 3.4.12 Applicability states that the LCO is applicable in MODE 6 when the reactor vessel head is on. This MODE 6 Applicability includes the situation when all reactor vessel head closure bolts are removed and the vessel head is still on. This change is acceptable since a low temperature overpressurization event is precluded because of the large vent path that is established when the reactor vessel head is removed. This change is designated as less restrictive because it relaxes the Applicability in which the CTS applies.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

3.5.3.b, M01 3.1.1.2

LCO 3.4.12 An LTOP System shall be OPERABLE with a maximum of one high pressure safety injection (HPSI) pump and one charging pump capable of injecting into the RCS and the safety injection tanks (SITs) isolated, and:

M02

---NOTES---

M01

1. [Two charging pumps] may be made capable of injecting for ≤ 1 hour for pump swap operations. 2

M02

2. SIT may be unisolated when SIT pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in ~~the PTLR~~ LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits".

3.5.3 Action C

3. All HPSI pumps shall be incapable of injecting into the RCS when any RCS cold leg temperature is ≤ 236°F except when no charging pumps are available for boration in MODES 5 and 6. 1

----

a. Two OPERABLE power operated relief valves (PORVs) with lift settings ~~within the limits specified in the PTLR~~ ≤ 530 psia when all RCS cold leg temperatures are > 200°F and ≤ 350 psia when any RCS cold leg temperature is ≤ 200°F or 1

Applicability

b. The RCS depressurized and an RCS vent of ≥ ~~[1.3]~~ 1.75 square inches. 2

3.4.13 Applicability

APPLICABILITY: MODE 4 when any RCS cold leg temperature is ~~less than or equal to the LTOP enable temperature specified in the PTLR,~~ ≤ 300°F 1
MODE 5,
MODE 6 when the reactor vessel head is on.

ACTIONS

---NOTE---

3.4.13 Action f.

LCO 3.0.4.b is not applicable to PORVs when entering MODE 4.

CONDITION	REQUIRED ACTION	COMPLETION TIME
M01 A. Two ~~or more~~ HPSI pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of one HPSI pump capable of injecting into the RCS.	Immediately 1

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
M01	B. Two or more charging pumps capable of injecting into the RCS.	B.1	Initiate action to verify a maximum of one charging pump capable of injecting into the RCS.	Immediately	
M02	C. A SIT not isolated when SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3.	C.1	Isolate affected SIT.	1 hour	1
	D. Required Action and associated Completion Time of Condition C not met.	D.1	Increase RCS cold leg temperature to > ~~[175]~~ 300°F.	12 hours	2
		<u>OR</u>			
		D.2	Depressurize affected SIT to less than the maximum RCS pressure for existing cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3.	12 hours	1
3.4.13 Action a.	E. One required PORV inoperable in MODE 4.	E.1	Restore required PORV to OPERABLE status.	7 days	
3.4.13 Action b.	F. One required PORV inoperable in MODE 5 or 6 when the reactor vessel head is on.	F.1	Restore required PORV to OPERABLE status.	24 hours	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.13 Action c. G. Two required PORVs inoperable. OR 3.4.13 Action a., b., c. Required Action and associated Completion Time of Condition A, [B], D, E, or F not met. OR LTOP System inoperable for any reason other than Condition A, [B], C, D, E, or F.	G.1 Depressurize RCS and establish RCS vent of ≥ [1.3] 1.75 square inches.	12 hours 2

2

2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
M01 SR 3.4.12.1	Verify a maximum of one HPSI pump is capable of injecting into the RCS.	[12 hours OR In accordance with the Surveillance Frequency Control Program] 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
M01 4.1.1.2.c	SR 3.4.12.2	Verify a maximum of one charging pump is capable of injecting into the RCS.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
M02	SR 3.4.12.3	Verify each SIT is isolated.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
3.4.13 Action d.	SR 3.4.12.4	Verify required RCS vent ≥ [1.3] 1.75 square inches is open.	[12 hours for unlocked open vent valve(s) AND 31 days for other vent path(s) OR In accordance with the Surveillance Frequency Control Program]	2, 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.13.a	SR 3.4.12.5	Verify PORV block valve is open for each required PORV.	[72 hours OR In accordance with the Surveillance Frequency Control Program]	2
M03	SR 3.4.12.6	-------------------NOTE------------------- Not required to be performed until [12] hours after decreasing RCS cold leg temperature to less than or equal to the LTOP enable temperature specified in the PTLR. ---		3
4.4.13.b		Perform CHANNEL FUNCTIONAL TEST on each required PORV, excluding actuation.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2
4.4.13.c	SR 3.4.12.7	Perform CHANNEL CALIBRATION on each required PORV actuation channel.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

3.5.3, M01 LCO 3.4.12 An LTOP System shall be OPERABLE with a maximum of one high pressure safety injection (HPSI) pump and one charging pump capable of injecting into the RCS and the safety injection tanks (SITs) isolated, and:

M02

---NOTES---

M01 1. [Two charging pumps] may be made capable of injecting for ≤ 1 hour for pump swap operations. (2)

M02 2. SIT may be unisolated when SIT pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in ~~the PTLR~~ LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits". (1)

3.4.9.3 Table 3.4-4: 3. Power operated relief valves (PORVs) shall only be used when all RCS cold leg temperatures are ≥ 149°F during cooldown and when all RCS cold leg temperatures are ≥ 60°F during heatup.

3.4.9.3.a a. Two OPERABLE ~~power operated relief valves (~~PORVs~~)~~ with lift settings ~~within the limits specified in the PTLR or~~ ≤ 490 psia; (1)

3.4.9.3.b b. Two shutdown cooling relief valves (SDCRVs) with lift settings ≤ 350 psia; (1)

3.4.9.3.c c. One PORV with lift setting ≤ 490 psia and one SDCRV with lift setting ≤ 350 psia; or

3.4.9.3 ~~b~~ d. The RCS depressurized and an RCS vent of ≥ ~~[1.3]~~ 3.58 square inches. (2)

3.4.9.3 Applicability, 3.4.9.3 Table 3.4-3

APPLICABILITY: MODE 4 when any RCS cold leg temperature is ~~less than or equal to the LTOP enable temperature specified in the PTLR,~~ ≤ 240°F following entry from MODE 3 and when any RCS cold leg temperature is ≤ 252°F following entry from MODE 5, (1)
MODE 5,
MODE 6 when the reactor vessel head is on.

ACTIONS

3.4.9.3.d Action d.

---NOTE---
LCO 3.0.4.b is not applicable to PORVs when entering MODE 4.

CONDITION	REQUIRED ACTION		COMPLETION TIME
M01 A. Two ~~or more~~ HPSI pumps capable of injecting into the RCS.	A.1	Initiate action to verify a maximum of one HPSI pump capable of injecting into the RCS.	Immediately (1)

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
M01	B. Two or more charging pumps capable of injecting into the RCS.	B.1	Initiate action to verify a maximum of one charging pump capable of injecting into the RCS.	Immediately	
M02	C. A SIT not isolated when SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3.	C.1	Isolate affected SIT.	1 hour	1
	D. Required Action and associated Completion Time of Condition C not met.	D.1	Increase RCS cold leg temperature to > ~~[175]~~ 252°F.	12 hours	2
		OR			
		D.2	Depressurize affected SIT to less than the maximum RCS pressure for existing cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3.	12 hours	1
3.4.9.3 Action a.	E. One required PORV inoperable ~~in MODE 4.~~ OR One required SCDRV inoperable	E.1	Restore required ~~PORV~~ relief valve to OPERABLE status.	7 days	1
	~~F. One required PORV inoperable in MODE 5 or 6.~~	~~F.1~~	~~Restore required PORV to OPERABLE status.~~	~~24 hours~~	1

1

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.9.3 Action a.1, b., b.1	~~G~~ F. Two required PORVs inoperable. OR One required PORV and one required SCDRV inoperable. OR Two required SDCRVs inoperable. OR	~~G~~ F.1 Depressurize RCS and establish RCS vent of ≥ ~~[1.3]~~ 3.58 square inches.	12 hours	1 2
3.4.9.3 Action a., b..	Required Action and associated Completion Time of Condition A, [B], D, or E, ~~or F~~ not met. OR LTOP System inoperable for any reason other than Condition A, [B], C, D, or E, ~~or F~~.			1 2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
M01	SR 3.4.12.1	Verify a maximum of one HPSI pump is capable of injecting into the RCS.	~~[12 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
M01 4.1.1.2.c	SR 3.4.12.2	Verify a maximum of one charging pump is capable of injecting into the RCS.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
M02	SR 3.4.12.3	Verify each SIT is isolated.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2
4.4.9.3.2	SR 3.4.12.4	Verify required RCS vent ≥ [1.3] 3.58 square inches is open.	[12 hours for unlocked open vent valve(s) AND 31 days for other vent path(s) OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.9.3.1.d	SR 3.4.12.5	Verify PORV block valve is open for each required PORV.	[72 hours OR In accordance with the Surveillance Frequency Control Program]	2
M03	SR 3.4.12.6	-----NOTE----- Not required to be performed until [12] hours after decreasing RCS cold leg temperature to less than or equal to the LTOP enable temperature specified in the PTLR. -----		3
4.4.9.3.1.b		Perform CHANNEL FUNCTIONAL TEST on each required PORV, excluding actuation.	[31 days OR In accordance with the Surveillance Frequency Control Program]	2
4.4.9.3.1.c	SR 3.4.12.7	Perform CHANNEL CALIBRATION on each required PORV actuation channel.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.12, LOW TEMPERATURE OVERPRESSURE PROTECTION (LTOP) SYSTEM

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description. Conditions, Required Actions, and Surveillances are renumbered in the ITS, as applicable.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. The Note to ISTS SR 3.4.12.6 is not included in the ITS consistent with current licensing basis. The purpose of the ISTS Note is to allow 12 hours after decreasing Reactor Coolant System (RCS) cold leg temperature to less than or equal to the LTOP enable temperature to perform the test. Per the ISTS Bases, this Note is necessary because the test cannot be performed until the unit is in a condition where the PORV lift setpoint can be reduced to the LTOP setting. At St. Lucie Plant Unit 1 and Unit 2, the PORVs are not required to be OPERABLE for opening in MODE 1, 2, or 3 to support a design basis accident or transient. Therefore, the CHANNEL FUNCTIONAL TEST is currently performed prior to decreasing RCS cold leg temperature to less than or equal to the LTOP enable temperature. Testing includes steps performed to minimize the potential for inadvertently opening a PORV and depressurizing the RCS during performance (e.g., closing the PORV block valve and deactivating the PORV from opening). As a result, the CHANNEL FUNCTIONAL TEST can be performed prior to placing the unit in a condition where LTOP is required rendering the ISTS Note unnecessary.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.12 Low Temperature Overpressure Protection (LTOP) System

BASES

BACKGROUND

The LTOP System controls 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) limits of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for demonstrating 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 requirements during the LTOP MODES.

The reactor vessel material is less tough at low temperatures than at normal operating temperatures. As the vessel neutron exposure accumulates, the material toughness decreases and becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure, therefore, is maintained low at low temperatures and is increased only as temperature is increased.

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only while shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the RCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3 requires administrative control of RCS pressure and temperature during heatup and cooldown to prevent exceeding the P/T limits.

This LCO provides RCS overpressure protection by having a minimum coolant input capability and having adequate pressure relief capacity. Limiting coolant input capability requires all but one high pressure safety injection (HPSI) pump and one charging pump incapable of injection into the RCS and isolating the safety injection tanks (SITs). The pressure relief capacity requires either two OPERABLE redundant power operated relief valves (PORVs) or the RCS depressurized and an RCS vent of sufficient size. One PORV or the RCS vent is the overpressure protection device that acts to terminate an increasing pressure event.

BASES

BACKGROUND (continued)

With minimum coolant input capability, the ability to provide core coolant addition is restricted. The LCO does not require the makeup control system deactivated or the safety injection (SI) actuation circuits blocked. Due to the lower pressures in the LTOP MODES and the expected core decay heat levels, the makeup system can provide adequate flow via the makeup control valve. If conditions require the use of more than one [HPI or] charging pump for makeup in the event of loss of inventory, then pumps can be made available through manual actions. S 1

The LTOP System for pressure relief consists of two PORVs with reduced lift settings or an RCS vent of sufficient size. Two relief valves are required for redundancy. One PORV has adequate relieving capability to prevent overpressurization for the required coolant input capability.

PORV Requirements

As designed for the LTOP System, each PORV is signaled to open if the RCS pressure approaches a limit determined by the LTOP actuation logic. The actuation logic monitors RCS pressure and determines when the LTOP overpressure setting is approached. If the indicated pressure meets or exceeds the calculated value, a PORV is signaled to open.

The LCO presents the PORV setpoints for LTOP. The setpoints are normally staggered so only one valve opens during a low temperature overpressure transient. Having the setpoints of both valves within the limits of the LCO ensures the P/T limits will not be exceeded in any analyzed event.

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 coolant, the system pressure decreases until a reset pressure is reached and the valve is signaled to close. The pressure continues to decrease below the reset pressure as the valve closes.

RCS Vent Requirements

Once the RCS is depressurized, a vent exposed to the containment atmosphere will maintain the RCS at containment ambient pressure in an RCS overpressure transient, if the relieving requirements of the transient do not exceed the capabilities of the vent. Thus, the vent path must be capable of relieving the flow resulting from the limiting LTOP mass or heat input transient and maintaining pressure below the P/T limits. The required vent capacity may be provided by one or more vent paths.

BASES

BACKGROUND (continued)

For an RCS vent to meet the specified flow capacity, it requires removing a pressurizer safety valve, removing a PORV's internals, and disabling its block valve in the open position, or similarly establishing a vent by opening an RCS vent valve. The vent path(s) must be above the level of reactor coolant, so as not to drain the RCS when open. 1

APPLICABLE SAFETY ANALYSES

LTOP

of 300°F

Safety analyses (Ref. 3) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits during shutdown. In MODES 1, 2, and 3, and in MODE 4 with any RCS cold leg temperature greater than the LTOP enable temperature specified in the PTLR, the pressurizer safety valves prevent RCS pressure from exceeding the Reference 1 limits. At the LTOP enable temperature specified in the PTLR and below, overpressure prevention falls to the OPERABLE PORVs [or to a depressurized RCS and a sufficient sized RCS vent]. Each of these means has a limited overpressure relief capability. 1 1 1 2

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as the reactor 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 its functional requirements can still be satisfied using the PORV method or the depressurized and vented RCS condition.

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.

Transients that are capable of overpressurizing the RCS are categorized as either mass or heat input transients, examples of which follow:

<u>Mass Input Type Transients</u>

a. Inadvertent safety injection or

b. Charging/letdown flow mismatch. 1

<u>Heat Input Type Transients</u>

a. Inadvertent actuation of pressurizer heaters, 1

b. Loss of shutdown cooling (SDC), or

BASES

APPLICABLE SAFETY ANALYSES (continued)

c. Reactor coolant pump (RCP) startup with temperature asymmetry within the RCS or between the RCS and steam generators. 1

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

a. Rendering all but one HPSI pump, and all but one charging pump incapable of injection and

b. Deactivating the SIT discharge isolation valves in their closed positions.

The Reference 3 analyses demonstrate that either one PORV or the RCS vent can maintain RCS pressure below limits when only one HPSI pump and one charging pump are actuated. Thus, the LCO allows only one HPSI pump and one charging pump capable of injecting into the RCS OPERABLE during the LTOP MODES. Since neither the PORV nor the RCS vent can handle the pressure transient produced from SIT accumulator injection, when RCS temperature is low, the LCO also requires the SITs isolation when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR. 1

The isolated SITs must have their discharge valves closed and the valve power supply breakers fixed in their open positions. The analyses show the effect of SIT discharge is over a narrower RCS temperature range ([175]°F and below) than that of the LCO (less than or equal to the LTOP enable temperature specified in the PTLR and below). 1

Fracture mechanics analyses established the temperature of LTOP Applicability at less than or equal to the LTOP enable temperature specified in the PTLR. 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 21 effective full power years of operation. 1

The consequences of a small break loss of coolant accident (LOCA) in LTOP MODE 4 conform to 10 CFR 50.46 and 10 CFR 50, Appendix K (Refs. 4 and 5), requirements by having a maximum of one HPSI pump and one charging pump capable of injecting into the RCS OPERABLE and SI actuation enabled for these pumps. 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

PORV Performance

The fracture mechanics analyses show that the vessel is protected when the PORVs are set to open at or below the limits specified in the ~~PTLR~~ LCO. 1
The setpoint is derived by modeling the performance of the LTOP System, assuming the limiting allowed LTOP transient of one HPSI pump and one charging pump injecting into the RCS. These analyses consider pressure overshoot and undershoot beyond the PORV opening and closing setpoints, resulting from signal processing and valve stroke times. The PORV setpoints at or below the derived limit ensure the Reference 1 limits will be met.

The PORV setpoints will be 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 vessel material toughness decreases due to embrittlement caused 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, "RCS Pressure and Temperature (P/T) Limits," discuss these examinations.

The PORVs are considered active components. Thus, the failure of one PORV represents the worst case, single active failure.

RCS Vent Performance

With the RCS depressurized, analyses show a vent size of [~~1.3~~ 1.75] square 2
inches is capable of mitigating the limiting allowed LTOP overpressure
transient. In that event, this ~~-~~size vent maintains RCS pressure less than 1
the maximum RCS pressure on the P/T limit curve.

The RCS vent size will also be re-evaluated for compliance each time the P/T limit curves are revised based on the results of the vessel material surveillance.

The RCS vent is passive and is not subject to active failure.

LTOP System satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

This LCO is required to ensure that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum coolant input and pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation and violation of the Reference 1 limits as a result of an operational transient.

To limit the coolant input capability, the LCO requires that a maximum of one HPSI pump and one charging pump be capable of injecting into the RCS, and the SITs isolated (when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3). 1

The LCO is modified by ~~two~~ three Notes. Note 1 allows [two charging pumps] to be made capable of injecting for ≤ 1 hour during pump swap operations. One hour provides sufficient time to safely complete the actual transfer and to complete the administrative controls and Surveillance Requirements associated with the swap. The intent is to minimize the actual time that more than [one] charging pump is physically capable of injection. Note 2 states that SIT isolation is only required when the SIT pressure is greater than or equal to the RCS pressure for the existing temperature, as allowed by the P/T limit curves provided in ~~the PTLR~~ LCO 3.4.3. This Note permits the SIT discharge valve surveillance performed only under these pressure and temperature conditions. 2 2 1

Note 3 states that all HPSI pumps shall be incapable of injecting into the RCS when any RCS cold leg temperature is ≤ 236°F except when no charging pumps are available for boration in MODES 5 and 6. This Note allows a flow path from the refueling water tank to the RCS via a single HPSI pump if the RCS pressure boundary does not exist, or the RCS pressure boundary integrity exists and no charging pumps are OPERABLE. In the latter case, all charging pumps shall be incapable of injecting into the RCS.

The elements of the LCO that provide overpressure mitigation through pressure relief are:

a. Two OPERABLE PORVs or 1

b. The depressurized RCS and an RCS vent.

A PORV is OPERABLE for LTOP when its block valve is open, its lift setpoint is set within the limits specified in the ~~PTLR~~ LCO and testing has proven its ability to open at that setpoint, and motive power is available to the two valves and their control circuits. 1

An RCS vent is OPERABLE when open with an area ≥ [1.3] 1.75 square inches. 2

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

BASES

APPLICABILITY

This LCO is applicable in MODE 4 when the temperature of any RCS cold leg is less than or equal to the LTOP enable temperature specified in the PTLR, in MODE 5, and in MODE 6 when the reactor vessel head is on. The pressurizer safety valves provide overpressure protection that meets the Reference 1 P/T limits above the LTOP enable temperature and below. When the reactor vessel head is off, overpressurization cannot occur.

≤ 300°F

1

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the OPERABILITY of the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and 3, and MODE 4 above the LTOP enable temperature specified in the PTLR.

when any RCS cold leg temperature is > 300°F

1

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure when little or no time allows operator action to mitigate the event.

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to inoperable PORVs used for LTOP. There is an increased risk associated with entering MODE 4 from MODE 5 with PORVs used for LTOP inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1 and B.1

or two or more charging pumps

1

With two or more HPSI pumps capable of injecting into the RCS, overpressurization is possible.

The immediate Completion Time to initiate actions to restore restricted coolant input capability to the RCS reflects the importance of maintaining overpressure protection of the RCS.

C.1, D.1, and D.2

An unisolated SIT requires isolation within 1 hour. This is only required when the SIT pressure is greater than or equal to the maximum RCS pressure for the existing cold leg temperature allowed in the PTLR.

LCO 3.4.3

1

BASES

ACTIONS (continued)

Raising RCS pressure above the SIT pressure or venting the SIT pressure below the RCS pressure, protects against an LTOP event.

If isolation is needed and cannot be accomplished within 1 hour, Required Action D.1 and Required Action D.2 provide two options, either of which must be performed within 12 hours. By increasing the RCS temperature to > [175]°F, a SIT pressure of [600] psig cannot exceed the LTOP limits if the tanks are fully injected. Depressurizing the SIT below the LTOP limit stated in the PTLR also protects against such an event. 1

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

E.1

In MODE 4 when any RCS cold leg temperature is ≤ 300 [285]°F, with one PORV inoperable, two PORVs must be restored to OPERABLE status within a Completion Time of 7 days. Two valves are required to meet the LCO requirement and to provide low temperature overpressure mitigation while withstanding a single failure of an active component. 2

The Completion Time is based on the facts that only one PORV is required to mitigate an overpressure transient and that the likelihood of an active failure of the remaining valve path during this time period is very low.

F.1

The consequences of operational events that will overpressure the RCS are more severe at lower temperature (Ref. 6). Thus, one required PORV inoperable in MODE 5 or in MODE 6 with the head on, the Completion Time to restore two valves to OPERABLE status is 24 hours.

The 24 hour Completion Time to restore two PORVs OPERABLE in MODE 5 or in MODE 6 when the vessel head is on is a reasonable amount of time to investigate and repair several types of PORV failures without exposure to a lengthy period with only one PORV OPERABLE to protect against overpressure events.

BASES

ACTIONS (continued)

G.1

If two required PORVs are inoperable, or if a Required Action and the associated Completion Time of Condition A, B, D, E, or F are not met, or if the LTOP System is inoperable for any reason other than Condition A through Condition F, the RCS must be depressurized and a vent established within 12 hours. The vent must be sized at least ~~[1.3]~~ 1.75 square inches to ensure the flow capacity is greater than that required for the worst case mass input transient reasonable during the applicable MODES. This action protects the RCPB from a low temperature overpressure event and a possible brittle failure of the reactor vessel. 2

The Completion Time of 12 hours to depressurize and vent the RCS is based on the time required to place the plant in this condition and the relatively low probability of an overpressure event during this time period due to increased operator awareness of administrative control requirements.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1, SR 3.4.12.2, and SR 3.4.12.3

To minimize the potential for a low temperature overpressure event by limiting the mass input capability, only one HPSI pump and all but ~~[~~one~~]~~ charging pump are verified capable of injecting into the RCS ~~OPERABLE~~ with the other pumps locked out with power removed and the SIT discharge incapable of injecting into the RCS. The ~~[~~HPI S~~]~~ pump~~[s]~~ and charging pump~~[~~s~~]~~ are rendered incapable of injecting into the RCS through removing the power from the pumps by racking the breakers out under administrative control. An alternate method of LTOP control may be employed using at least two independent means to prevent a pump start such that a single failure or single action will not result in an injection into the RCS. This may be accomplished through the pump control switch being placed in ~~[pull to lock]~~ stop and caution tag attached, and at least one valve in the discharge flow path being closed and caution tag attached,. 2 1 2 2

~~[The 12 hour interval considers operating practice to regularly assess potential degradation and to verify operation within the safety analysis.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---] 2

SR 3.4.12.4

1.75

SR 3.4.12.4 requires verifying that the required RCS vent is open ≥ [1.3] square inches is proven OPERABLE by verifying its open condition [either: 2

a. Once every 12 hours for a valve that is unlocked open (valves that are sealed or secured in the open position are considered "locked" in this context) or

b. Once every 31 days for other vent path(s) (e.g., a vent valve that is locked, sealed, or secured in position, a removed pressurizer safety valve, or open manway).

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---] 2

The passive vent path arrangement must only be open to be OPERABLE. This Surveillance need only be performed if the vent is being used to satisfy the requirements of this LCO. The Frequencies consider operating experience with mispositioning of unlocked and locked vent valves, respectively.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.12.5

The PORV block valve must be verified open to provide the flow path for each required PORV to perform its function when actuated. The valve can be remotely verified open in the main control room.

The block valve is a remotely controlled, motor operated valve. The power to the valve motor operator is not required to be removed, and the manual actuator is not required locked in the inactive position. Thus, the block valve can be closed in the event the PORV develops excessive leakage or does not close (sticks open) after relieving an overpressure event.

[The 72 hour Frequency considers operating experience with accidental movement of valves having remote control and position indication capabilities available where easily monitored. These considerations include the administrative controls over main control room access and equipment control. 2

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

SR 3.4.12.6

Performance of a CHANNEL FUNCTIONAL TEST is required to verify and, as necessary, adjust the PORV open setpoints. The CHANNEL FUNCTIONAL TEST will verify on a monthly basis that the PORV lift setpoints are within the LCO limit. A successful test of the required contact(s) of a channel relay may be performed by the verification of the

BASES

SURVEILLANCE REQUIREMENTS (continued)

change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. PORV actuation could depressurize the RCS and is not required. ~~[The 31 day Frequency considers experience with equipment reliability.~~ 2

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

~~A Note has been added indicating this SR is required to be performed [12] hours after decreasing RCS cold leg temperature to less than or equal to the LTOP enable temperature specified in the PTLR. The test cannot be performed until the RCS is in the LTOP MODES when the PORV lift setpoint can be reduced to the LTOP setting. The test must be performed within 12 hours after entering the LTOP MODES.~~ 3

SR 3.4.12.7

Performance of a CHANNEL CALIBRATION on each required PORV actuation channel is required to adjust the whole channel so that it responds and the valve opens within the required LTOP range and with accuracy to known input.

~~[The [18] month Frequency considers operating experience with equipment reliability and matches the typical refueling outage schedule.~~ 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]

2

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. FSAR, Section [15]. WCAP-17197-NP, "St. Lucie Unit 1 RCS Pressure and Temperature Limits and Low-Temperature Overpressure Protection Report for 54 Effective Full Power Years," Revision 1, January 2021.
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. Generic Letter 90-06.

1 2

1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.12 Low Temperature Overpressure Protection (LTOP) System

BASES

BACKGROUND

The LTOP System controls 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) limits of 10 CFR 50, Appendix G (Ref. 1). The reactor vessel is the limiting RCPB component for demonstrating 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 requirements during the LTOP MODES.

The reactor vessel material is less tough at low temperatures than at normal operating temperatures. As the vessel neutron exposure accumulates, the material toughness decreases and becomes less resistant to pressure stress at low temperatures (Ref. 2). RCS pressure, therefore, is maintained low at low temperatures and is increased only as temperature is increased.

The potential for vessel overpressurization is most acute when the RCS is water solid, occurring only while shutdown; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the RCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3 requires administrative control of RCS pressure and temperature during heatup and cooldown to prevent exceeding the P/T limits.

This LCO provides RCS overpressure protection by having a minimum coolant input capability and having adequate pressure relief capacity. Limiting coolant input capability requires all but one high pressure safety injection (HPSI) pump and one charging pump incapable of injection into the RCS and isolating the safety injection tanks (SITs). The pressure relief capacity requires [any combination of] ~~either~~ two OPERABLE redundant power operated relief valves (PORVs) [and shutdown cooling relief valves (SDCRVs),] or the RCS depressurized and an RCS vent of sufficient size. One [relief valve] ~~PORV~~ or the RCS vent is the overpressure protection device that acts to terminate an increasing pressure event. 1

BASES

BACKGROUND (continued)

With minimum coolant input capability, the ability to provide core coolant addition is restricted. The LCO does not require the makeup control system deactivated or the safety injection (SI) actuation circuits blocked. Due to the lower pressures in the LTOP MODES and the expected core decay heat levels, the makeup system can provide adequate flow via the makeup control valve. If conditions require the use of more than one [HPI or] charging pump for makeup in the event of loss of inventory, then pumps can be made available through manual actions.

S

relief valves including

The LTOP System for pressure relief consists of two PORVs with reduced lift settings or an RCS vent of sufficient size. Two relief valves are required for redundancy. One PORV has adequate relieving capability to prevent overpressurization for the required coolant input capability.

, two SDCRVs, one PORV with reduced settings and one SDCRV,

relief valve

PORV Requirements

As designed for the LTOP System, each PORV is signaled to open if the RCS pressure approaches a limit determined by the LTOP actuation logic. The actuation logic monitors RCS pressure and determines when the LTOP overpressure setting is approached. If the indicated pressure meets or exceeds the calculated value, a PORV is signaled to open.

1

The LCO presents the PORV setpoints for LTOP. The setpoints are normally staggered so only one valve opens during a low temperature overpressure transient. Having the setpoints of both valves within the limits of the LCO ensures the P/T limits will not be exceeded in any analyzed event.

required

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 coolant, the system pressure decreases until a reset pressure is reached and the valve is signaled to close. The pressure continues to decrease below the reset pressure as the valve closes.

SDCRV Requirements

The LCO presents the SDCRV setpoints for LTOP. The SDCRVs may be used to provide for LTOP protection when a SDC loop is aligned to the RCS.

Each SDCRV opens when the RCS pressure exceeds the relief valve setpoint, eliminating the potential for water volume changes and the resulting pressurization effects. The relief valve capacity is greater than the water volume that can be injected into the RCS following a spurious safety injection actuation signal (SIAS) that starts two HPSI pumps, three charging pumps, and isolates the letdown control valves.

RCS Vent Requirements

Once the RCS is depressurized, a vent exposed to the containment atmosphere will maintain the RCS at containment ambient pressure in an RCS overpressure transient, if the relieving requirements of the transient do not exceed the capabilities of the vent. Thus, the vent path must be capable of relieving the flow resulting from the limiting LTOP mass or heat input transient and maintaining pressure below the P/T limits. The required vent capacity may be provided by one or more vent paths.

BASES

BACKGROUND (continued)

For an RCS vent to meet the specified flow capacity, it requires removing a pressurizer safety valve, removing a PORV's internals, and disabling its block valve in the open position, or similarly establishing a vent by opening an RCS vent valve. The vent path(s) must be above the level of reactor coolant, so as not to drain the RCS when open. 1

APPLICABLE SAFETY ANALYSES

LTOP

Safety analyses (Ref. 3) demonstrate that the reactor vessel is adequately protected against exceeding the Reference 1 P/T limits during shutdown. In MODES 1, 2, and 3, and in MODE 4 with any RCS cold leg temperature greater than the LTOP enable temperature specified in the PTLR, the pressurizer safety valves prevent RCS pressure from exceeding the Reference 1 limits. At the LTOP enable temperature specified in the PTLR and below, overpressure prevention falls to the OPERABLE PORVs [or to a depressurized RCS and a sufficient sized RCS vent]. Each of these means has a limited overpressure relief capability. 1 1 1 2

> 240°F following entry from MODE 3 and when any RCS cold leg temperature is > 252°F following entry from MODE 5

At 240°F and below following entry from MODE 3, and 252°F and below following entry from MODE 5,

relief valves

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as the reactor 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 its functional requirements can still be satisfied using the PORV method or the depressurized and vented RCS condition. 1

relief valve

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.

Transients that are capable of overpressurizing the RCS are categorized as either mass or heat input transients, examples of which follow:

<u>Mass Input Type Transients</u>

a. Inadvertent safety injection or

b. Charging/letdown flow mismatch. 1

<u>Heat Input Type Transients</u>

a. Inadvertent actuation of pressurizer heaters,

b. Loss of shutdown cooling (SDC), or 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

~~c.~~ Reactor coolant pump (RCP) startup with temperature asymmetry within the RCS or between the RCS and steam generators. 1

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

a. Rendering all but one HPSI pump, and all but one charging pump incapable of injection and

b. Deactivating the SIT discharge isolation valves in their closed positions.

The Reference 3 analyses demonstrate that either one ~~PORV~~ relief valve or the RCS vent can maintain RCS pressure below limits when only one HPSI pump and one charging pump are actuated. Thus, the LCO allows only one HPSI pump and one charging pump capable of injecting into the RCS ~~OPERABLE~~ during the LTOP MODES. Since neither the relief valve ~~PORV~~ nor the RCS vent can handle the pressure transient produced from SIT ~~accumulator~~ injection, when RCS temperature is low, the LCO also requires the SITs isolation when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR. 1 1

The isolated SITs must have their discharge valves closed and the valve power supply breakers fixed in their open positions. The analyses show the effect of SIT discharge is over a narrower RCS temperature range ~~([175]°F and below)~~ than that of the LCO ~~(less than or equal to the LTOP enable temperature specified in the PTLR and below)~~. 1

Fracture mechanics analyses established the temperature of LTOP Applicability at less than or equal to the LTOP enable temperature ~~specified in the PTLR~~. 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 21 effective full power years of operation.~~ 1

The consequences of a small break loss of coolant accident (LOCA) in LTOP MODE 4 conform to 10 CFR 50.46 and 10 CFR 50, Appendix K (Refs. 4 and 5), requirements by having a maximum of one HPSI pump and one charging pump capable of injecting into the RCS ~~OPERABLE and SI actuation enabled for these pumps~~. 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

PORV Performance

LCO

The fracture mechanics analyses show that the vessel is protected when the PORVs are set to open at or below the limits specified in the ~~PTLR~~. The setpoint is derived by modeling the performance of the LTOP System, assuming the limiting allowed LTOP transient of one HPSI pump and one charging pump injecting into the RCS. These analyses consider pressure overshoot and undershoot beyond the PORV opening and closing setpoints, resulting from signal processing and valve stroke times. The PORV setpoints at or below the derived limit ensure the Reference 1 limits will be met. 1

The PORV setpoints will be 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 vessel material toughness decreases due to embrittlement caused 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, "RCS Pressure and Temperature (P/T) Limits," discuss these examinations.

The PORVs are considered active components. Thus, the failure of one PORV represents the worst case, single active failure.

SDCRV Performance

The SDCRVs are sized for a flow capacity of 2300 gpm at a lift set pressure of 350 psia. Each of two SDC relief valves is sufficient to provide LTOP during low temperature operation when the SDCRVs are aligned to the RCS.

The SDCRVs are passive components of the shutdown cooling system. 1

RCS Vent Performance

3.58

With the RCS depressurized, analyses show a vent size of [~~1.3~~] square inches is capable of mitigating the limiting allowed LTOP overpressure transient. In that event, this ~~-~~size vent maintains RCS pressure less than the maximum RCS pressure on the P/T limit curve. 2 1

The RCS vent size will also be re-evaluated for compliance each time the P/T limit curves are revised based on the results of the vessel material surveillance.

The RCS vent is passive and is not subject to active failure.

LTOP System satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

This LCO is required to ensure that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum coolant input and pressure relief capabilities are OPERABLE. Violation of this LCO could lead to the loss of low temperature overpressure mitigation and violation of the Reference 1 limits as a result of an operational transient.

To limit the coolant input capability, the LCO requires that a maximum of one HPSI pump and one charging pump be capable of injecting into the RCS, and the SITs isolated (when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3). 1

The LCO is modified by ~~two~~ three Notes. Note 1 allows [two charging pumps] to be made capable of injecting for ≤ 1 hour during pump swap operations. One hour provides sufficient time to safely complete the actual transfer and to complete the administrative controls and Surveillance Requirements associated with the swap. The intent is to minimize the actual time that more than [one] charging pump is physically capable of injection. Note 2 states that SIT isolation is only required when the SIT pressure is greater than or equal to the RCS pressure for the existing temperature, as allowed by the P/T limit curves provided in LCO 3.4.3 ~~the PTLR~~. This Note permits the SIT discharge valve surveillance performed only under these pressure and temperature conditions. 2 2 1

Note 3 allows the PORVs to be used when all RCS cold leg temperatures are ≥ 149°F during cooldown and when all RCS cold leg temperatures are ≥ 60°F during heatup. As a result, LCO 3.4.12.a and c pressure relief options are not allowed below 149°F during cooldown following a reactor shutdown. The SDCRVs or an RCS vent path of > 3.58 square inches are utilized for LTOP protection below 149°F. This restriction is necessary because the required relief capability of a PORV during a cooldown is not sufficient to overcome coolant input capability. During vessel heatup operations, the relief capability of the PORVs are sufficient. Use of PORVs below 60°F was not analyzed and therefore not acceptable for use below that value.

The elements of the LCO that provide overpressure mitigation through pressure relief are:

a. Two OPERABLE PORVs or two OPERABLE SDCRVs, or one OPERABLE PORV and one OPERABLE SDCRV, and 1

b. The depressurized RCS and an RCS vent.

A PORV is OPERABLE for LTOP when its block valve is open, its lift setpoint is set within the limits specified in the ~~PTLR~~ LCO and testing has proven its ability to open at that setpoint, and motive power is available to the ~~two~~ valve~~s~~ and their control circuits. 1

A SDCRV is OPERABLE for LTOP when its lift setpoint is set within the limits specified in the LCO and the SDC system is aligned to the RCS. 1

An RCS vent is OPERABLE when open with an area ≥ ~~[1.3]~~ 3.58 square inches. 2

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

 1

The LTOP enable temperature is dependent on RCS thermal transient conditions. LTOP analyses indicate that LTOP may be enabled at a lower RCS temperature during an RCS cooldown following a reactor shutdown than during an RCS heatup from cold conditions due to the lower reactor vessel fracture toughness when the reactor vessel is cold. Therefore, the LCO is applicable in MODE 4 when any RCS cold leg temperature is less or equal to the LTOP cooldown temperature of 240°F following entry into MODE 4 from MODE 3 and in MODE 4 when any RCS cold leg temperature is less or equal to the LTOP heatup temperature of 252°F following entry into MODE 4 from MODE 5.

BASES

APPLICABILITY

This LCO is applicable in MODE 4 when the temperature of any RCS cold leg is ~~less than or equal to the LTOP enable temperature specified in the PTLR~~ ≤ 240°F following entry from MODE 3 and when any RCS cold leg temperature is ≤ 252°F following entry from MODE 5., in MODE 5, and in MODE 6 when the reactor vessel head is on. The pressurizer safety valves provide overpressure protection that meets the Reference 1 P/T limits above the LTOP enable temperature and below. When the reactor vessel head is off, overpressurization cannot occur. 1

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the OPERABILITY of the pressurizer safety valves ~~that provide overpressure protection~~ during MODES 1, 2, and 3, and MODE 4 ~~above the LTOP enable temperature specified in the PTLR~~ when all RCS cold leg temperatures are > 230°F to ensure uninterrupted overpressure protection. 1

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure when little or no time allows operator action to mitigate the event.

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to inoperable PORVs used for LTOP. There is an increased risk associated with entering MODE 4 from MODE 5 with PORVs used for LTOP inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

<u>A.1 and B.1</u>

With two or more HPSI pumps or two or more charging pumps capable of injecting into the RCS, overpressurization is possible. 1

The immediate Completion Time to initiate actions to restore restricted coolant input capability to the RCS reflects the importance of maintaining overpressure protection of the RCS.

<u>C.1, D.1, and D.2</u>

An unisolated SIT requires isolation within 1 hour. This is only required when the SIT pressure is greater than or equal to the maximum RCS pressure for the existing cold leg temperature allowed in ~~the PTLR~~ LCO 3.4.3. 1

 1

BASES

ACTIONS (continued)

Raising RCS pressure above the SIT pressure or venting the SIT pressure below the RCS pressure, protects against an LTOP event.

If isolation is needed and cannot be accomplished within 1 hour, Required Action D.1 and Required Action D.2 provide two options, either of which must be performed within 12 hours. By increasing the RCS temperature to > [175]°F, a SIT pressure of [600] psig cannot exceed the LTOP limits if the tanks are fully injected. Depressurizing the SIT below the LTOP limit stated in the PTLR also protects against such an event. 1

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

E.1

or one required SDCRV inoperable,

required relief valves

required

In MODE 4 when any RCS cold leg temperature is ≤ [285]°F, with one PORV inoperable, two PORVs must be restored to OPERABLE status within a Completion Time of 7 days. Two valves are required to meet the LCO requirement and to provide low temperature overpressure mitigation while withstanding a single failure of an active component. 1 2

relief valve

The Completion Time is based on the facts that only one PORV is required to mitigate an overpressure transient and that the likelihood of an active failure of the remaining valve path during this time period is very low. 1

F.1

The consequences of operational events that will overpressure the RCS are more severe at lower temperature (Ref. 6). Thus, one required PORV inoperable in MODE 5 or in MODE 6 with the head on, the Completion Time to restore two valves to OPERABLE status is 24 hours. 1

The 24 hour Completion Time to restore two PORVs OPERABLE in MODE 5 or in MODE 6 when the vessel head is on is a reasonable amount of time to investigate and repair several types of PORV failures without exposure to a lengthy period with only one PORV OPERABLE to protect against overpressure events.

BASES

ACTIONS (continued)

F

~~G~~.1

or one required PORV and one required SDCRV are inoperable, or two required SDCRVs are inoperable,

or

If two required PORVs are inoperable, or if a Required Action and the associated Completion Time of Condition A, B, D, E, ~~or F~~ are not met, or if the LTOP System is inoperable for any reason other than Condition A through Condition ~~F~~, the RCS must be depressurized and a vent established within 12 hours. The vent must be sized at least ~~[1.3]~~ square inches to ensure the flow capacity is greater than that required for the worst case mass input transient reasonable during the applicable MODES. This action protects the RCPB from a low temperature overpressure event and a possible brittle failure of the reactor vessel. 1 2

E

3.58

The Completion Time of 12 hours to depressurize and vent the RCS is based on the time required to place the plant in this condition and the relatively low probability of an overpressure event during this time period due to increased operator awareness of administrative control requirements.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1, SR 3.4.12.2, and SR 3.4.12.3

To minimize the potential for a low temperature overpressure event by limiting the mass input capability, only one HPSI pump and all but ~~[~~one~~]~~ charging pump are verified ~~OPERABLE~~ with the other pumps locked out with power removed and the SIT discharge incapable of injecting into the RCS. The ~~[~~HPI~~]~~ pump~~[s]~~ and charging pump~~[~~s~~]~~ are rendered incapable of injecting into the RCS through removing the power from the pumps by racking the breakers out under administrative control. An alternate method of LTOP control may be employed using at least two independent means to prevent a pump start such that a single failure or single action will not result in an injection into the RCS. This may be accomplished through the pump control switch being placed in ~~[pull to lock]~~ and at least one valve in the discharge flow path being closed. 2 1 2 2

capable of injecting into the RCS

S

stop and control tag attached,

and control tag attached,

~~[The 12 hour interval considers operating practice to regularly assess potential degradation and to verify operation within the safety analysis.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

-------------------------------REVIEWER'S NOTE-------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---] 2

SR 3.4.12.4

3.58

SR 3.4.12.4 requires verifying that the required RCS vent is open ≥ [1.3] square inches is proven OPERABLE by verifying its open condition [either: 2

a. Once every 12 hours for a valve that is unlocked open (valves that are sealed or secured in the open position are considered "locked" in this context) or

b. Once every 31 days for other vent path(s) (e.g., a vent valve that is locked, sealed, or secured in position, a removed pressurizer safety valve, or open manway).

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-------------------------------REVIEWER'S NOTE-------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---] 2

The passive vent path arrangement must only be open to be OPERABLE. This Surveillance need only be performed if the vent is being used to satisfy the requirements of this LCO. The Frequencies consider operating experience with mispositioning of unlocked and locked vent valves, respectively.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.12.5

The PORV block valve must be verified open to provide the flow path for each required PORV to perform its function when actuated. The valve can be remotely verified open in the main control room.

The block valve is a remotely controlled, motor operated valve. The power to the valve motor operator is not required to be removed, and the manual actuator is not required locked in the inactive position. Thus, the block valve can be closed in the event the PORV develops excessive leakage or does not close (sticks open) after relieving an overpressure event.

~~[The 72 hour Frequency considers operating experience with accidental movement of valves having remote control and position indication capabilities available where easily monitored. These considerations include the administrative controls over main control room access and equipment control.~~ 2

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------REVIEWER'S NOTE-----------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~--]~~

SR 3.4.12.6

Performance of a CHANNEL FUNCTIONAL TEST is required to verify and, as necessary, adjust the PORV open setpoints. The CHANNEL FUNCTIONAL TEST will verify on a monthly basis that the PORV lift setpoints are within the LCO limit. A successful test of the required contact(s) of a channel relay may be performed by the verification of the

BASES

SURVEILLANCE REQUIREMENTS (continued)

change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. PORV actuation could depressurize the RCS and is not required. ~~[The 31 day Frequency considers experience with equipment reliability.~~ 2

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

~~A Note has been added indicating this SR is required to be performed [12] hours after decreasing RCS cold leg temperature to less than or equal to the LTOP enable temperature specified in the PTLR. The test cannot be performed until the RCS is in the LTOP MODES when the PORV lift setpoint can be reduced to the LTOP setting. The test must be performed within 12 hours after entering the LTOP MODES.~~ 3

SR 3.4.12.7

Performance of a CHANNEL CALIBRATION on each required PORV actuation channel is required to adjust the whole channel so that it responds and the valve opens within the required LTOP range and with accuracy to known input.

~~[The [18] month Frequency considers operating experience with equipment reliability and matches the typical refueling outage schedule.~~ 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~-----]~~

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. ~~FSAR, Section [15]~~. WCAP-16817-NP, "St. Lucie Unit 2 RCS Pressure and Temperature Limits and Low Temperature Overpressure Protection Report for 55 Effective Full Power Years," Revision 2, October 2007. 1 2
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. Generic Letter 90-06.

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.12, BASES, LOW TEMPERATURE OVERPRESSURE PROTECTION (LTOP) SYSTEM

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes have been made to be consistent with changes made to the Specification.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.12, LOW TEMPERATURE OVERPRESSURE PROTECTION (LTOP) SYSTEM

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 13

3.4.13, RCS Operational Leakage

Current Technical Specifications (CTS) Markup
and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

REACTOR COOLANT SYSTEM RCS Operational LEAKAGE

LIMITING CONDITION FOR OPERATION

LCO 3.4.13 3.4.6.2 Reactor Coolant System RCS operational leakage shall be limited to:

LCO 3.4.13.a a. No PRESSURE BOUNDARY LEAKAGE,

LCO 3.4.13.b b. 1 GPM UNIDENTIFIED LEAKAGE,

LCO 3.4.13.c c. 150 gallons per day primary-to-secondary leakage through any one steam generator (SG),

LCO 3.4.13.d d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and

e. Leakage as specified in Table 3.4.6-1 for each Reactor Coolant System Pressure Isolation Valve identified in Table 3.4.6-1. See ITS 3.4.14

Applicability **APPLICABILITY:** MODES 1, 2, 3 and 4.

ACTION:

Insert proposed ITS 3.4.13 ACTION A L01

ACTION C a. With any PRESSURE BOUNDARY LEAKAGE, or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY MODE 3 within 6 hours and in COLD SHUTDOWN MODE 5 within the following 30 36 hours.

ACTION B b. With any Reactor Coolant System RCS operational leakage greater than any one of the above not within limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE, and Reactor Coolant System Pressure Isolation Valve leakage, reduce the leakage rate to within limits within 4 hours

ACTION C or be in at least HOT STANDBY MODE 3 within 6 hours and in COLD SHUTDOWN MODE 5 within the following 30 36 hours.

See ITS 3.4.14

NOTE

Enter applicable ACTIONS for systems made inoperable by an inoperable pressure isolation valve.

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than the limit in 3.4.6.2.e above reactor operation may continue provided that at least two valves, including check valves, in each high pressure line having a non-functional valve are in and remain in the mode corresponding to the isolated condition. Motor operated valves shall be placed in the closed position, and power supplies deenergized. Otherwise, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.2 Reactor Coolant System operational leakages shall be demonstrated to be within each of the above limits by:

a. Monitoring the containment atmosphere gaseous and particulate radioactivity in accordance with the Surveillance Frequency Control Program. L02

REACTOR COOLANT SYSTEM

REACTOR COOLANT SYSTEM LEAKAGE

SURVEILLANCE REQUIREMENTS (Continued)

b. Monitoring the containment sump inventory and discharge in accordance with the Surveillance Frequency Control Program, L02

Verify RCS operational LEAKAGE is within limits by RCS

SR 3.4.13.1 c. *Performance of a Reactor Coolant System water inventory balance in accordance with the Surveillance Frequency Control Program except when operating in the shutdown cooling mode, L03

d. Monitoring the reactor head flange leakoff system in accordance with the Surveillance Frequency Control Program, and L02

e. Verifying each Reactor Coolant System Pressure Isolation Valve leakage (Table 3.4.6-1) to be within limits: See ITS 3.4.14

1. Prior to entering MODE 2 after refueling,

2. Prior to entering MODE 2, whenever the plant has been in COLD SHUTDOWN for 7 days or more if leakage testing has not been performed in the previous 9 months,

3. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.

4. The provision of Specification 4.0.4 is not applicable for entry into MODE 3 or 4.

f. Whenever integrity of a pressure isolation valve listed in Table 3.4.6-1 cannot be demonstrated the integrity of the remaining check valve in each high pressure line having a leaking valve shall be determined and recorded daily. In addition, the position of one other valve located in each high pressure line having a leaking valve shall be recorded daily; and

Verify

SR 3.4.13.2 g. Primary-to-secondary leakage shall be verified ≤150 gallons per day through any one steam generator in accordance with the Surveillance Frequency Control Program.** SG

SR 3.4.13.1 Note 1 * Not required to be performed until 12 hours after establishment of steady state operation.
SR 3.4.13.1 Note 2 Not applicable to primary-to-secondary leakage.

SR 3.4.13.2 Note ** Not required to be performed until 12 hours after establishment of steady state operation.

See ITS 3.4.14

TABLE 3.4 6-1

PRIMARY COOLANT SYSTEM PRESSURE ISOLATION VALVES

Check Valve No.
V3227
V3123
V3217
V3113
V3237
V3133
V3247
V3143
V3124
V3114
V3134
V3144

NOTES

(a) Maximum Allowable Leakage (each valve):

1. Leakage rates less than or equal to 1.0 gpm are acceptable.

2. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount the reduces the margin between previous measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

3. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

4. Leakage rates greater than 5.0 gpm are unacceptable.

(b) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.

(c) Minimum test differential pressure shall not be less than 150 psid.

REACTOR COOLANT SYSTEM

RCS OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

LCO 3.4.13 3.4.6.2 Reactor Coolant System RCS operational leakage shall be limited to:

LCO 3.4.13.a a. No PRESSURE BOUNDARY LEAKAGE,

LCO 3.4.13.b b. 1 gpm UNIDENTIFIED LEAKAGE,

LCO 3.4.13.c c. 150 gallons per day primary-to-secondary leakage through any one steam generator (SG),

LCO 3.4.13.d d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System, and

e. 1 gpm leakage (except as noted in Table 3.4-1) at a Reactor Coolant System pressure of 2235 ± 20 psig from any Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1. See ITS 3.4.14

Applicability **APPLICABILITY:** MODES 1, 2, 3, and 4.

ACTION: Insert proposed ITS 3.4.13 ACTION A L01

ACTION C a. With any PRESSURE BOUNDARY LEAKAGE or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY MODE 3 within 6 hours and in COLD SHUTDOWN MODE 5 within the following 30 36 hours.

ACTION B b. With any Reactor Coolant System RCS operational leakage greater than any one of the not within limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE, and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours

ACTION C or be in at least HOT STANDBY MODE 3 within the next 6 hours and in COLD SHUTDOWN MODE 5 within the following 30 36 hours.

NOTE
Enter applicable ACTIONS for systems made inoperable by an inoperable pressure isolation valve.

See ITS 3.4.14

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than the above limit, isolate the high pressure portion of the affected system from the low pressure portion within 4 hours by use of at least two closed manual or deactivated automatic valves, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

d. With RCS leakage alarmed and confirmed in a flow path with no flow indication, commence an RCS water inventory balance within 1 hour to determine the leak rate. L04

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System operational leakages shall be demonstrated to be within each of the above limits by:

a. Monitoring the containment atmosphere gaseous and particulate radioactivity monitor in accordance with the Surveillance Frequency Control Program. L02

b. Monitoring the containment sump inventory and discharge in accordance with the Surveillance Frequency Control Program. L02

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

Verify RCS operational LEAKAGE is within limits by

RCS

SR 3.4.13.1 c. *Performance of a Reactor Coolant System water inventory balance in accordance with the Surveillance Frequency Control Program.

d. Monitoring the reactor head flange leakoff system in accordance with the Surveillance Frequency Control Program. L02

SR 3.4.13.2 e. Verifying primary-to-secondary leakage is ≤ 150 gallons per day through any one steam generator in accordance with the Surveillance Frequency Control Program.** SG

4.4.6.2.2 Each Reactor Coolant System Pressure Isolation Valve check valve specified in Table 3.4-1 shall be demonstrated OPERABLE by verifying leakage to be within its limit: See ITS 3.4.14

a. In accordance with the Surveillance Frequency Control Program,

b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 7 days or more and if leakage testing has not been performed in the previous 9 months,

c. Prior to returning the valve to service following maintenance, repair or replacement work on the valve,

d. Following valve actuation due to automatic or manual action or flow through the valve:

1. Within 24 hours by verifying valve closure, and

2. Within 31 days by verifying leakage rate.

4.4.6.2.3 Each Reactor Coolant System Pressure Isolation Valve motor-operated valve specified in Table 3.4-1 shall be demonstrated OPERABLE by verifying leakage to be within its limit;

a. In accordance with the Surveillance Frequency Control Program, and

b. Prior to returning the valve to service following maintenance, repair, or replacement work on the valve.

The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

SR 3.4.13.1 Note 1 * Not required to be performed until 12 hours after establishment of steady state operation.
SR 3.4.13.1 Note 2 Not applicable to primary-to-secondary leakage.

SR 3.4.13.2 Note ** Not required to be performed until 12 hours after establishment of steady state operation.

See ITS 3.4.14

TABLE 3.4-1

REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES

Check Valve No.		Motor Operated Valve No.
V3217	V3525	V3480
V3227	V3524	V3481
V3237	V3527	V3652
V3247	V3526	V3651
V3259		
V3258		
V3260		
V3261		
V3215		
V3225		
V3235		
V3245		

NOTES

(a) Maximum Allowable Leakage (each valve):

1. Except as noted below leakage rates greater than 1.0 gpm are unacceptable.

2. For motor-operated valves (MOVs) only, leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount the reduces the margin between previous measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

3. For motor-operated valves (MOVs) only, leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

4. Leakage rates greater than 5.0 gpm are unacceptable.

(b) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.

(c) Minimum test differential pressure shall not be less than 200 psid.

DISCUSSION OF CHANGES
ITS 3.4.13, RCS OPERATIONAL LEAKAGE

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.4.6.2 Action a. states, in part, with any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY (i.e., MODE 3) within 6 hours and in COLD SHUTDOWN (i.e., MODE 5) within the following 30 hours. ITS 3.4.13 ACTION A states that if pressure boundary LEAKAGE exists, isolate the affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. Additionally, ITS 3.4.13 ACTION C states that with the Required Action and associated Completion Time not met, be in MODE 3 within 6 hours and MODE 5 within 36 hours. This changes the CTS by allowing 4 hours to isolate the leakage before requiring Actions to exit the applicable MODES, consistent with Technical Specification Task Force (TSTF) traveler TSTF-554-A, Revision 1, “Revise Reactor Coolant Leakage Requirements.”

TSTF traveler TSTF-554-A incorporated changes to the Standard Technical Specifications (STSs) under the consolidated line item improvement process (CLIIP). TSTF-554-A was approved for use by the NRC as documented in staff Safety Evaluation (SE) dated December 18, 2020 (ADAMS Accession No. ML20322A361, ML20322A024). PSL has reviewed the NRC staff SE and concluded that the justification presented in TSTF-554-A and the SE prepared by the NRC staff are applicable to PSL and justify this change.

TSTF-554-A revised the technical specifications related to reactor coolant system (RCS) operational leakage by adding Condition A that applies when pressure boundary LEAKAGE exists and Required Action A.1 that requires isolation of the affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve, within a Completion Time of 4 hours. If the 4-hour Completion Time cannot be met, the plant must initiate shutdown in accordance with ACTION C. The Required Action requires the flaw to be isolated from the reactor coolant pressure source to prevent further degradation of the flaw, which could result in additional leakage. If Required Action A.1 cannot be completed within the 4-hour Completion Time, ISTS 3.4.13 Condition C requires that the reactor be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences (i.e., be in MODE 3 within 6 hours and MODE 5 within 36 hours. ISTS 3.4.13 Condition A, including its associated Required Action A.1 and Completion Time, is acceptable because it continues to meet the requirements of 10 CFR 50.36(c)(2)(i), by providing remedial actions and shutting down the reactor if the remedial actions cannot be met.

This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 (Category 5 – Deletion of Surveillance Requirement) Unit 1 CTS 4.4.6.2.a and Unit 2 CTS 4.4.6.2.1.a require monitoring of the containment atmosphere gaseous and particulate radioactivity in accordance with the Surveillance Frequency Control Program. Unit 1 CTS 4.4.6.2.b and Unit 2 CTS 4.4.6.2.1.b require monitoring the containment sump inventory and discharge in accordance with the Surveillance Frequency Control Program. Unit 1 CTS 4.4.6.2.d and Unit 2 CTS 4.4.6.2.1.d require monitoring the reactor head flange leakoff system in accordance with the Surveillance Frequency Control Program. The ITS does not contain these Surveillance Requirements. This changes the CTS by deleting these Surveillance Requirements.

This change is acceptable because the deleted Surveillance Requirements are not necessary to verify that the LCO is being met. Appropriate Surveillance Requirements continue to be performed in a manner and at a Frequency necessary to give confidence that the LCO is being met. The indications in the deleted Surveillance Requirements are not necessarily indications of failure to meet the LCO on RCS operational leakage. These items do provide useful information and the containment atmosphere gaseous and particulate radioactivity monitors, and the containment sump monitors are required to be OPERABLE by ITS 3.4.15, "RCS Leakage Detection Instrumentation." However, under ITS SR 3.0.1, failure to meet the Surveillance results in failure to meet the LCO. As these indications do not necessarily indicate a failure to meet the LCO, it is not appropriate to retain these indications in this Specification. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

L03 **Unit 1 only:** *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.4.6.2.c requires performance of a Reactor Coolant System water inventory balance in accordance with the Surveillance Frequency Control Program “except when operating in the shutdown cooling mode” and is modified by a footnote that states not required to be performed until 12 hours after establishment of steady state operation. ITS SR 3.4.13.1 does not contain the exception that states “except when operating in the shutdown cooling mode.” This changes the CTS by deleting the exception for performance of the Surveillance when operating in the shutdown cooling mode.

The purpose of CTS 4.4.6.2.c is to verify RCS LEAKAGE within the LCO limits to ensure the integrity of the RCPB is maintained. Steady state operation is required to perform a proper water inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, and makeup and letdown. An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify that the values used to meet the LCO are consistent with the safety analysis. ITS SR 3.4.13.1 retains the Surveillance Requirement to verify RCS operation LEAKAGE is within limits by performance of RCS water inventory balance. This change is designated as less restrictive because a Surveillance required in the CTS will not be required in the ITS.

L04 **Unit 2 only:** *(Category 4 – Relaxation of Required Action)* CTS 3.4.6.2 Action d. states that with RCS leakage alarmed and confirmed in a flow path with no flow indication, commence an RCS water inventory balance within 1 hour to determine the leak rate. ITS 3.4.13 does not contain a requirement for an RCS water inventory balance in response to system alarms. This changes the CTS by deleting the explicit requirement for an RCS water inventory balance in response to system alarms.

The purpose of CTS 3.4.6.2 is to verify RCS LEAKAGE within the LCO limits and take appropriate actions in response to operational LEAKGE not within limits, to ensure the integrity of the RCPB is maintained. An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation.” ITS 3.4.15 provides ACTIONS that include performance of SR 3.4.13.1 (i.e., RCS water inventory balance). This change is acceptable because the deleted requirement is not necessary to verify that the values used to meet the LCO are consistent with the safety analysis. ITS SR 3.4.13.1 retains the Surveillance Requirement to verify RCS operation LEAKAGE is within limits by performance of RCS water inventory balance. This change is designated as less restrictive because an Action required in the CTS will not be required in the ITS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

3.4.6.2 LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

3.4.6.2.a a. No pressure boundary LEAKAGE,

3.4.6.2.b b. 1 gpm unidentified LEAKAGE,

3.4.6.2.d c. 10 gpm identified LEAKAGE, and

3.4.6.2.c d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG).

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L01	A. Pressure boundary LEAKAGE exists.	A.1 Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
3.4.6.2 Action b.	B. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	B.1 Reduce LEAKAGE to within limits.	4 hours

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.6.2 Action b.	C. Required Action and associated Completion Time not met. OR	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours
3.4.6.2 Action a.	Primary to secondary LEAKAGE not within limit.		

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.6.2.c	SR 3.4.13.1	-----------------------------NOTES----------------------------- 1. Not required to be performed until 12 hours after establishment of steady state operation. 2. Not applicable to primary to secondary LEAKAGE. --- Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.	~~[72 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
4.4.6.2.g SR 3.4.13.2	------------------------------NOTE------------------------------ Not required to be performed until 12 hours after establishment of steady state operation. -- Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.	[72 hours OR In accordance with the Surveillance Frequency Control Program]

2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

3.4.6.2 LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

3.4.6.2.a a. No pressure boundary LEAKAGE,

3.4.6.2.b b. 1 gpm unidentified LEAKAGE,

3.4.6.2.d c. 10 gpm identified LEAKAGE, and

3.4.6.2.c d. 150 gallons per day primary to secondary LEAKAGE through any one steam generator (SG).

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

	CONDITION	REQUIRED ACTION		COMPLETION TIME
DOC L01	A. Pressure boundary LEAKAGE exists.	A.1	Isolate affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve.	4 hours
3.4.6.2 Action b.	B. RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE.	B.1	Reduce LEAKAGE to within limits.	4 hours

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.6.2 Action b.	C. Required Action and associated Completion Time not met. OR	C.1 Be in MODE 3. AND	6 hours
3.4.6.2 Action a.	Primary to secondary LEAKAGE not within limit.	C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.6.2.1.c	SR 3.4.13.1	-----------------------------NOTES----------------------------- 1. Not required to be performed until 12 hours after establishment of steady state operation. 2. Not applicable to primary to secondary LEAKAGE. --- Verify RCS operational LEAKAGE is within limits by performance of RCS water inventory balance.	~~[72 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.6.2.1.e	SR 3.4.13.2	------------------------------NOTE------------------------------ Not required to be performed until 12 hours after establishment of steady state operation. --- Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.	[72 hours OR In accordance with the Surveillance Frequency Control Program]	2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.13, RCS OPERATIONAL LEAKAGE

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.13 RCS Operational LEAKAGE

BASES

BACKGROUND

Components that contain or transport the coolant to or from the reactor core make up the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.

During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant LEAKAGE, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational LEAKAGE LCO is to limit system operation in the presence of LEAKAGE from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of LEAKAGE.

10 CFR 50, Appendix A, GDC 30 (Ref. 1), requires means for detecting and, to the extent practical, identifying the source of reactor coolant LEAKAGE. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring reactor coolant LEAKAGE into the containment area is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur detrimental to the safety of the facility and the public.

A limited amount of leakage inside containment is expected from auxiliary systems that cannot be made 100% leaktight. Leakage from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS LEAKAGE detection.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analysis radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

BASES

APPLICABLE SAFETY ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes that primary to secondary LEAKAGE from ~~all~~ steam generators (SGs) is ~~[1~~ 0.25 gallon per minute~~]~~ or increases to ~~[1~~ 0.25 gallon per minute~~]~~ as a result of accident induced conditions. The LCO requirement to limit primary to secondary LEAKAGE through any one SG to less than or equal to 150 gallons per day is significantly less than the conditions assumed in the safety analysis. 2

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The FSAR (Ref. 3) analysis for SGTR assumes the contaminated secondary fluid is only briefly released via safety valves and the majority is steamed to the condenser. The ~~[1~~ 0.25 gpm~~]~~ primary to secondary LEAKAGE safety analysis assumption is relatively inconsequential. 2

The SLB is more limiting for site radiation releases. The safety analysis for the SLB accident assumes ~~the entire~~ ~~[1~~ 0.25 gpm~~]~~ primary to secondary LEAKAGE is through the affected generator as an initial condition. The dose consequences resulting from the SLB accident are well within the limits defined in 10 CFR 50 or the staff approved licensing basis (i.e., a small fraction of these limits). 2

RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

Pressure boundary LEAKAGE is prohibited as the leak itself could cause further RCPB deterioration, resulting in higher LEAKAGE.

BASES

LCO (continued)

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS makeup system. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE).

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leaktight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

d. Primary to Secondary LEAKAGE Through Any One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

ACTIONS

A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the system should be considered because the structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

B.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

C.1 and C.2

If primary to secondary LEAKAGE is not within limit, or if any of the Required Actions and associated Completion Times cannot be met, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. The reactor must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be performed with the reactor at steady state operating conditions (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, ~~[and RCP seal injection and return flows]~~). The Surveillance is modified by two Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. 2

Steady state operation is required to perform a proper water inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown~~, and RCP seal injection and return flows~~. 2

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

~~[The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

---------------------------------REVIEWER'S NOTE---------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---] 2

SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4.18 17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG. 1

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows. 1

[The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5). 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~ 2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
2. Regulatory Guide 1.45, May 1973.
3. U FSAR, Section ~~[15]~~ 15.4.4. 2
4. NEI 97-06, "Steam Generator Program Guidelines."
5. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.13 RCS Operational LEAKAGE

BASES

BACKGROUND

Components that contain or transport the coolant to or from the reactor core make up the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.

During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant LEAKAGE, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational LEAKAGE LCO is to limit system operation in the presence of LEAKAGE from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of LEAKAGE.

10 CFR 50, Appendix A, GDC 30 (Ref. 1), requires means for detecting and, to the extent practical, identifying the source of reactor coolant LEAKAGE. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring reactor coolant LEAKAGE into the containment area is necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur detrimental to the safety of the facility and the public.

A limited amount of leakage inside containment is expected from auxiliary systems that cannot be made 100% leaktight. Leakage from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS LEAKAGE detection.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analysis radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

BASES

APPLICABLE SAFETY ANALYSES

Except for primary to secondary LEAKAGE, the safety analyses do not address operational LEAKAGE. However, other operational LEAKAGE is related to the safety analyses for LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes that primary to secondary LEAKAGE from ~~all~~ steam generators (SGs) is 0.25 ~~[1~~ gallon per minute~~]~~ or increases to 0.25 ~~[1~~ gallon per minute~~]~~ as a result of accident induced conditions. The LCO requirement to limit primary to secondary LEAKAGE through any one SG to less than or equal to 150 gallons per day is significantly less than the conditions assumed in the safety analysis. 2

Primary to secondary LEAKAGE is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The FSAR (Ref. 3) analysis for SGTR assumes the contaminated secondary fluid is only briefly released via safety valves and the majority is steamed to the condenser. The 0.25 ~~[1~~ gpm~~]~~ primary to secondary LEAKAGE safety analysis assumption is relatively inconsequential. 2

The SLB is more limiting for site radiation releases. The safety analysis for the SLB accident assumes ~~the entire~~ 0.25 ~~[1~~ gpm~~]~~ primary to secondary LEAKAGE is through the affected generator as an initial condition. The dose consequences resulting from the SLB accident are well within the limits defined in 10 CFR 50 or the staff approved licensing basis (i.e., a small fraction of these limits). 2

RCS operational LEAKAGE satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

Pressure boundary LEAKAGE is prohibited as the leak itself could cause further RCPB deterioration, resulting in higher LEAKAGE.

BASES

LCO (continued)

b. Unidentified LEAKAGE

One gallon per minute (gpm) of unidentified LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) is necessary for prompt identification of potentially adverse conditions, assessment of the safety significance, and corrective action.

c. Identified LEAKAGE

Up to 10 gpm of identified LEAKAGE is considered allowable because LEAKAGE is from known sources that do not interfere with detection of unidentified LEAKAGE and is well within the capability of the RCS makeup system. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include controlled reactor coolant pump (RCP) seal leakoff (a normal function not considered LEAKAGE).

LCO 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," measures leakage through each individual PIV and can impact this LCO. Of the two PIVs in series in each isolated line, leakage measured through one PIV does not result in RCS LEAKAGE when the other is leaktight. If both valves leak and result in a loss of mass from the RCS, the loss must be included in the allowable identified LEAKAGE.

d. Primary to Secondary LEAKAGE Through Any One SG

The limit of 150 gallons per day per SG is based on the operational LEAKAGE performance criterion in NEI 97-06, Steam Generator Program Guidelines (Ref. 4). The Steam Generator Program operational LEAKAGE performance criterion in NEI 97-06 states, "The RCS operational primary to secondary leakage through any one SG shall be limited to 150 gallons per day." The limit is based on operating experience with SG tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the RCS is pressurized.

In MODES 5 and 6, LEAKAGE limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for LEAKAGE.

ACTIONS

A.1

If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the system should be considered because the structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

B.1

Unidentified LEAKAGE or identified LEAKAGE in excess of the LCO limits must be reduced to within limits within 4 hours. This Completion Time allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits before the reactor must be shut down. This action is necessary to prevent further deterioration of the RCPB.

C.1 and C.2

If primary to secondary LEAKAGE is not within limit, or if any of the Required Actions and associated Completion Times cannot be met, the reactor must be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences. The reactor must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This action reduces the LEAKAGE and also reduces the factors that tend to degrade the pressure boundary.

The allowed Completion Times are reasonable, based on operating experience, to reach the required conditions from full power conditions in an orderly manner and without challenging plant systems. In MODE 5, the pressure stresses acting on the RCPB are much lower, and further deterioration is much less likely.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1

Verifying RCS LEAKAGE to be within the LCO limits ensures the integrity of the RCPB is maintained. Pressure boundary LEAKAGE would at first appear as unidentified LEAKAGE and can only be positively identified by inspection. Unidentified LEAKAGE and identified LEAKAGE are determined by performance of an RCS water inventory balance.

The RCS water inventory balance must be performed with the reactor at steady state operating conditions (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, ~~[and RCP seal injection and return flows]~~). The Surveillance is modified by two Notes. Note 1 states that this SR is not required to be performed until 12 hours after establishing steady state operation. The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. 2

Steady state operation is required to perform a proper water inventory balance since calculations during maneuvering are not useful. For RCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown~~, and RCP seal injection and return flows~~. 2

An early warning of pressure boundary LEAKAGE or unidentified LEAKAGE is provided by the automatic systems that monitor the containment atmosphere radioactivity and the containment sump level. These leakage detection systems are specified in LCO 3.4.15, "RCS Leakage Detection Instrumentation."

Note 2 states that this SR is not applicable to primary to secondary LEAKAGE because LEAKAGE of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

~~[The 72 hour Frequency is a reasonable interval to trend LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------------------------------REVIEWER'S NOTE----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--] 2

SR 3.4.13.2

This SR verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this SR is not met, compliance with LCO 3.4 17 18, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG. 1

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows. 1

[The Surveillance Frequency of 72 hours is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5). 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
2. Regulatory Guide 1.45, May 1973.
3. U FSAR, Section [15] 15.4.4. 2
4. NEI 97-06, "Steam Generator Program Guidelines."
5. EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.13, BASES, RCS OPERATIONAL LEAKAGE

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.13, RCS OPERATIONAL LEAKAGE

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 14

3.4.14, RCS Pressure Isolation Valve (PIV) Leakage

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

~~REACTOR COOLANT SYSTEM~~ RCS PIV LEAKAGE

LIMITING CONDITION FOR OPERATION

See ITS 3.4.13

3.4.6.2 Reactor Coolant System operational leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

c. 150 gallons per day primary-to-secondary leakage through any one steam generator (SG),

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and

LCO 3.4.14
SR 3.4.14.1

e. Leakage as specified in ~~Table 3.4.6-1~~ for each Reactor Coolant System Pressure Isolation Valve ~~identified in Table 3.4.6-1~~.

APPLICABILITY: MODES 1, 2, 3 and 4. ← Add proposed Applicability – MODE 4 exception — L02

ACTION:

See ITS 3.4.13

a. With any PRESSURE BOUNDARY LEAKAGE, or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System operational leakage greater than any one of the above limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE, and Reactor Coolant System Pressure Isolation Valve leakage, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

LCO 3.4.14
ACTIONS Note 2

NOTE ← Add proposed LCO 3.4.14 ACTIONS Note 1 — A02

Enter applicable ~~ACTIONS~~ Conditions and Required Actions for systems made inoperable by an inoperable pressure isolation valve.

← Add proposed LCO 3.4.14 Required Action A.1 and A.2 Note — M01

ACTION A

~~c.~~ With any Reactor Coolant System Pressure Isolation Valve leakage greater than the limit in 3.4.6.2.e above reactor operation may continue provided that at least two valves, including check valves, in each high pressure line having a non-functional valve are in and remain in the mode corresponding to the isolated condition. Motor operated valves shall be placed in the closed position, and power supplies deenergized. Otherwise, reduce the leakage rate to within limits

Required Action A.2

within ~~4~~ 72 hours

ACTION B

or be in ~~at least HOT STANDBY~~ MODE 3 within 6 hours and ~~in COLD SHUTDOWN~~ MODE 5 within ~~the following 30~~ 36 hours. — L01

SURVEILLANCE REQUIREMENTS

See ITS 3.4.13

4.4.6.2 Reactor Coolant System operational leakages shall be demonstrated to be within each of the above limits by:

a. Monitoring the containment atmosphere gaseous and particulate radioactivity in accordance with the Surveillance Frequency Control Program.

REACTOR COOLANT SYSTEM

RCS PIV

~~REACTOR COOLANT SYSTEM~~ LEAKAGE

SURVEILLANCE REQUIREMENTS (Continued)

b. Monitoring the containment sump inventory and discharge in accordance with the Surveillance Frequency Control Program, — See ITS 3.4.13

c. *Performance of a Reactor Coolant System water inventory balance in accordance with the Surveillance Frequency Control Program except when operating in the shutdown cooling mode,

d. Monitoring the reactor head flange leakoff system in accordance with the Surveillance Frequency Control Program, and

SR 3.4.14.1 ~~e.~~ Verifying each Reactor Coolant System Pressure Isolation Valve leakage ~~(Table 3.4.6-1)~~ to be within limits: LA01

1. Prior to entering MODE 2 after refueling,

2. Prior to entering MODE 2, whenever the plant has been in COLD SHUTDOWN for 7 days or more if leakage testing has not been performed in the previous 9 months,

Add proposed SR 3.4.14.1 Frequency – in accordance with the Surveillance Frequency Control Program, and within 24 hours following valve actuation due to automatic or manual action or flow through the valve. M02

~~3. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.~~ L03

SR 3.4.14.1 Note 1 ~~4.~~ The provision of Specification 4.0.4 is not applicable for entry into MODE 3 or 4.

~~f. Whenever integrity of a pressure isolation valve listed in Table 3.4.6-1 cannot be demonstrated the integrity of the remaining check valve in each high pressure line having a leaking valve shall be determined and recorded daily. In addition, the position of one other valve located in each high pressure line having a leaking valve shall be recorded daily; and~~ L04

g. Primary-to-secondary leakage shall be verified ≤150 gallons per day through any one steam generator in accordance with the Surveillance Frequency Control Program.** — See ITS 3.4.13

* Not required to be performed until 12 hours after establishment of steady state operation. Not applicable to primary-to-secondary leakage.

** Not required to be performed until 12 hours after establishment of steady state operation.

~~TABLE 3.4.6-1~~

~~PRIMARY COOLANT SYSTEM PRESSURE ISOLATION VALVES~~

~~Check Valve No.~~

~~V3227~~
~~V3123~~
~~V3217~~
~~V3113~~
~~V3237~~
~~V3133~~
~~V3247~~
~~V3143~~
~~V3124~~
~~V3114~~
~~V3134~~
~~V3144~~

Add following valves to list:
V3480, 3481, 3652, 3651 SDC Return Isolation Valves
V3215, 3225, 3235, 3245 SIT Discharge Check Valves

M03

LA01

NOTES

SR 3.4.14.1 ~~(a)~~ Maximum Allowable Leakage (each valve):

1. Leakage rates less than or equal to 1.0 gpm are acceptable.

2. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount the reduces the margin between previous measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

3. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

4. Leakage rates greater than 5.0 gpm are unacceptable.

(b) ~~To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.~~ LA02

~~(c) Minimum test differential pressure shall not be less than 150 psid.~~ LA03

A01

~~DELETED~~

A01

~~DELETED~~

LCO 3.4.14 2nd Part Applicability

~~EMERGENCY CORE COOLING SYSTEMS~~

The Shutdown Cooling (SDC) System interlock function shall be OPERABLE in MODES 1, 2, 3, and MODE 4 except valves in the SDC flow path when in, or during the transition to or from, the SDC mode of operation.

A03

M04

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that the following valves are in the indicated positions with power to the valve operators removed:

Valve Number	Valve Function	Valve Position
1. V-3659	1. Mini-flow isolation	1. Open
2. V-3660	2. Mini-flow isolation	2. Open

See ITS 3.5.2

b. In accordance with the Surveillance Frequency Control Program by:

1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.*

2. Verifying ECCS train locations susceptible to gas accumulation are sufficiently filled with water.

. c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and

2. At least once daily of the areas affected within containment by the containment entry and during the final entry when CONTAINMENT INTEGRITY is established.

prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ 267 psia

A03

L05

d. In accordance with the Surveillance Frequency Control Program by:

Add proposed ACTION C

SR 3.4.14.2

SR 3.4.14.3

1. Verify~~ing proper operation of~~ the open permissive interlock ~~(OPI)~~ and the ~~valve open/~~high SDCS pressure alarm~~s for isolation valves V3651, V3652, V3480, V3481~~.

is OPERABLE

LA04

2. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion.

See ITS 3.5.2

* Not required to be met for system vent flow paths opened under administrative control.

REACTOR COOLANT SYSTEM

~~OPERATIONAL~~ RCS PIV LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System operational leakage shall be limited to: (See ITS 3.4.13)

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 gpm UNIDENTIFIED LEAKAGE,

c. 150 gallons per day primary-to-secondary leakage through any one steam generator (SG),

d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System, and

LCO 3.4.14 SR 3.4.14.1 e. 1 gpm leakage ~~(except as noted in Table 3.4-1)~~ at a Reactor Coolant System pressure of 2235 ± 20 psig from any Reactor Coolant System Pressure Isolation Valve ~~specified in Table 3.4-1~~. LA01

Applicability **APPLICABILITY**: MODES 1, 2, 3, and 4. ← Add proposed Applicability – MODE 4 exception L02

ACTION: (See ITS 3.4.13)

a. With any PRESSURE BOUNDARY LEAKAGE or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System operational leakage greater than any one of the limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE, and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

LCO 3.4.14 ACTIONS Note 2

NOTE ← Add proposed LCO 3.4.14 ACTIONS Note 1 A02

Enter applicable ~~ACTIONS~~ Conditions and Required Actions for systems made inoperable by an inoperable pressure isolation valve.

← Add proposed LCO 3.4.14 Required Action A.1 and A.2 Note M01

ACTION A ~~c.~~ With any Reactor Coolant System Pressure Isolation Valve leakage greater than the above limit, isolate the high pressure portion of the affected system from the low pressure portion within ~~4~~ 72 hours by use of at least two closed manual or deactivated automatic valves, L01

ACTION B or be in at least ~~HOT STANDBY~~ MODE 3 within ~~the next~~ 6 hours and ~~in COLD SHUTDOWN~~ MODE 5 within ~~the following 30~~ 36 hours.

d. With RCS leakage alarmed and confirmed in a flow path with no flow indication, commence an RCS water inventory balance within 1 hour to determine the leak rate.

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System operational leakages shall be demonstrated to be within each of the above limits by: (See ITS 3.4.13)

a. Monitoring the containment atmosphere gaseous and particulate radioactivity monitor in accordance with the Surveillance Frequency Control Program.

b. Monitoring the containment sump inventory and discharge in accordance with the Surveillance Frequency Control Program.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

c. *Performance of a Reactor Coolant System water inventory balance in accordance with the Surveillance Frequency Control Program. See ITS 3.4.13

d. Monitoring the reactor head flange leakoff system in accordance with the Surveillance Frequency Control Program.

e. Verifying primary-to-secondary leakage is ≤ 150 gallons per day through any one steam generator in accordance with the Surveillance Frequency Control Program.**

SR 3.4.14.1 ~~4.4.6.2.2~~ Each Reactor Coolant System Pressure Isolation Valve check valve ~~specified in Table 3.4-1~~ shall be demonstrated OPERABLE by verifying leakage to be within its limit: LA01

a. In accordance with the Surveillance Frequency Control Program,

b. Prior to entering MODE 2 whenever the plant has been in COLD SHUTDOWN for 7 days or more and if leakage testing has not been performed in the previous 9 months,

~~c. Prior to returning the valve to service following maintenance, repair or replacement work on the valve,~~ L03

d. Following valve actuation due to automatic or manual action or flow through the valve:

1. Within 24 hours by verifying valve closure, and

2. Within 31 days by verifying leakage rate.

SR 3.4.14.1 ~~4.4.6.2.3~~ Each Reactor Coolant System Pressure Isolation Valve motor-operated valve ~~specified in Table 3.4-1~~ shall be demonstrated OPERABLE by verifying leakage to be within its limit; LA01

a. In accordance with the Surveillance Frequency Control Program, and

~~b. Prior to returning the valve to service following maintenance, repair, or replacement work on the valve.~~ L03

SR 3.4.14.1 Note 1 The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 or 4.

* Not required to be performed until 12 hours after establishment of steady state operation. Not applicable to primary-to-secondary leakage. See ITS 3.4.13

** Not required to be performed until 12 hours after establishment of steady state operation.

TABLE 3.4-1

REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES

Check Valve No.		Motor Operated Valve No.
V3217	V3525	V3480
V3227	V3524	V3481
V3237	V3527	V3652
V3247	V3526	V3651
V3259		
V3258		
V3260		
V3261		
V3215		
V3225		
V3235		
V3245		

LA02

NOTES

SR 3.4.14.1 (a) Maximum Allowable Leakage (each valve):

1. Except as noted below leakage rates greater than 1.0 gpm are unacceptable.

2. For motor-operated valves (MOVs) only, leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount the reduces the margin between previous measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

3. For motor-operated valves (MOVs) only, leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater.

4. Leakage rates greater than 5.0 gpm are unacceptable.

(b) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria. LA02

(c) Minimum test differential pressure shall not be less than 200 psid. LA03

~~DELETED~~

A01

~~DELETED~~

A01

~~DELETED~~

LCO 3.4.14
2nd Part
Applicability

~~EMERGENCY CORE COOLING SYSTEMS~~

The Shutdown Cooling (SDC) System interlock function shall be OPERABLE in MODES 1, 2, 3, and MODE 4 except valves in the SDC flow path when in, or during the transition to or from, the SDC mode of operation.

A03

M04

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. In accordance with the Surveillance Frequency Control Program by verifying that the following valves are in the indicated positions with power to the valve operators removed:

Valve Number	**Valve Function**	**Valve Position**
a. V3733 V3734	a. SIT Vent Valves	a. Locked Closed
b. V3735 V3736	b. SIT Vent Valves	b. Locked Closed
c. V3737 V3738 V3739 V3740	c. SIT Vent Valves	c. Locked Closed

See ITS 3.5.2

b. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.*

c. In accordance with the Surveillance Frequency Control Program by verifying ECCS locations susceptible to gas accumulation are sufficiently filled with water.

. d. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and

2. At least once daily of the areas affected within containment by the containment entry and during the final entry when CONTAINMENT INTEGRITY is established.

e. In accordance with the Surveillance Frequency Control Program by:

L05

Add proposed ACTION C

SR 3.4.14.3

1. Verifying automatic isolation and interlock action of the shutdown cooling system from Reactor Coolant System when RCS pressure (actual or simulated) is greater than or equal to 515 psia, and that the interlocks prevent opening the shutdown cooling system isolation valves when RCS pressure (actual or simulated) is greater than or equal to 276 psia.

SR 3.4.14.2

* Not required to be met for system vent flow paths opened under administrative control.

See ITS 3.5.2

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.4.6.2 Action c specifies the compensatory actions to take when the leakage by any RCS PIV(s) is greater than the specified limit. ITS 3.4.14 ACTIONS A and B also state the appropriate compensatory actions under the same condition, however, ITS 3.4.14 ACTIONS Note 1 has been added. ITS 3.4.14 ACTIONS Note 1 allows separate entry condition for each RCS PIV flow path. This changes the CTS by explicitly stating that the Action is to be taken separately for each inoperable RCS PIV flow path.

The purpose of the Note is to provide explicit instructions for proper application of the ACTION for Technical Specification compliance. In conjunction with proposed Specification 1.3, "Completion Times," this Note provides direction consistent with the intent of the existing Action for inoperable PIVs. This change is designated as administrative because it does not result in technical changes to the CTS.

A03 Unit 1 CTS 4.5.2.d.1 requires verification that proper operation of the open permissive interlock (OPI) and the valve open/high Shutdown Cooling (SDC) System pressure alarms for isolation valves V3651, V3652, V3480, V3481. ITS SR 3.4.14.2 and SR 3.4.14.3 provide similar requirements. ITS SR 3.4.12.2 requires verification that the SDC System interlock prevents the valves from being opened with a simulated or actual RCS pressure signal > 267 psia. ITS SR 3.4.12.3 requires verification that the SDC System interlock function high pressure alarm is OPERABLE. This changes the Unit 1 CTS by clarifying how to verify proper operation of the OPI.

Unit 2 CTS 4.5.2.e.1 requires verifying automatic isolation and interlock action of the shutdown cooling system from Reactor Coolant System when RCS pressure (actual or simulated) is greater than or equal to 515 psia, and that the interlocks prevent opening the shutdown cooling system isolation valves when RCS pressure (actual or simulated) is greater than or equal to 276 psia. ITS SR 3.4.14.2 and SR 3.4.14.3 provide similar requirements.

In addition, a new LCO has been added which requires the SDC System interlock function to be OPERABLE. This changes the CTS by including the SDC System interlock Surveillance Requirement with the RCS PIV leakage limits and adding a new LCO and ACTION for the interlock function.

The purpose of CTS Surveillance is to ensure the SDC System interlock function is available to prevent overpressurization of the low pressure SDC System piping. The OPERABILITY of the low pressure safety injection(LPSI)/SDC system is affected by the position of the SDC return isolation valves, not when the interlock is inoperable. Therefore, the transfer of this requirement to the RCS PIV Specification is appropriate. A discussion of the change to the Applicability of the SDC System interlock (including high pressure alarm for Unit 1) is discussed in DOC M04. A discussion of a change to the Required Actions when the SDC System interlock (including high pressure alarm for Unit 1) is inoperable is discussed in DOC L05. This change is acceptable since the SDC System interlock function is retained in the Technical Specifications. This change is designated as administrative because it does not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.4.6.2 Action c. specify the compensatory actions to take when the leakage through any RCS PIV(s) is greater than the specified limit. The compensatory action is to isolate the high pressure portion of the affected system from the low pressure portion of the affected system by use of a combination of at least two closed valves. The CTS does not include any leakage restrictions concerning the valves that may be used to satisfy the isolation requirement of this action. ITS 3.4.14 ACTION A is consistent with the requirement in CTS 3.4.6.2 Action c., however, a Note has been added to the Required Actions (ITS 3.4.14 Required Actions A.1 and A.2 Note) which specifies that each valve used to satisfy ITS 3.4.14 Required Actions A.1 and A.2 must have been verified to meet SR 3.4.14.1, the RCS PIV maximum leakage limit Surveillance Requirement, and either be in the RCS pressure boundary or the high pressure portion of the system. This changes the CTS by providing a Note which explicitly states that the valves used to satisfy Required Action must satisfy the same leakage requirements of the RCS PIVs and provides an option for them to be in the RCS pressure boundary.

The purpose of CTS 3.4.6.2 Action c. is to isolate the flow path in order to minimize the leakage from the high pressure portion of the RCS to the low pressure piping. The ITS 3.4.14 Required Actions A.1 and A.2 Note requires the valves used to provide isolation between the high pressure and low pressure portions of the affected system to have been verified to meet the RCS PIV maximum leakage limits within the required Surveillance Frequency. The addition of the Note represents an additional restriction on unit operation necessary to help ensure the valves used to isolate the high pressure portion from the low pressure portion of the affected system are capable of preventing the overpressurization of the low pressure portion of the system. The ITS 3.4.14 Required Actions A.1 and A.2 Note also provides the option for the valves to be in the RCS pressure boundary, which is considered an acceptable alternative to the high pressure portion of the system. This change is designated as more restrictive because it adds a new requirement to the CTS.

M02 **Unit 1 only:** CTS 4.4.6.2.e provides a verification that the RCS PIV leakage is within limits but provides no Frequency other than “prior to entering MODE 2 after refueling” and “prior to entering MODE 2, whenever the plant has been in COLD SHUTDOWN for 7 days or more if leakage testing has not been performed in the previous 9 months." ITS SR 3.4.14.1 requires performance on a periodic Frequency or in accordance with the Surveillance Frequency Control Program and within 24 hours following valve actuation due to automatic or manual action or flow through the valve. This changes the CTS by adding a periodic Frequency in accordance with the Surveillance Frequency Control Program and adding the Frequency of within 24 hours following valve actuation due to automatic or manual action or flow through the valve. PSL controls periodic Frequencies for Surveillances in accordance with the Surveillance Frequency Control Program per CTS 6.8.4.o. Therefore, SR 3.4.14.1 will be performed at a Frequency in accordance with the Surveillance Frequency Control Program with an initial Frequency of 18 months consistent with the ISTS SR 3.4.14.1.

The purpose of CTS 4.4.6.2.e is to perform leakage testing on each RCS PIV to verify that leakage is below the specified limit and to identify each leaking valve. The Frequency in accordance with the Surveillance Frequency Control Program is consistent with 10 CFR 50.55a(g) and the INSERVICE TESTING PROGRAM and is based on the need to perform the Surveillance under conditions that apply during a plant outage. In addition, testing must be performed once after the valve has been opened by flow or exercised to ensure tight reseating. Testing must be performed within 24 hours after the valve has been reseated. Twenty-four hours is a reasonable and practical time limit for performing this test after opening or reseating a valve.

This change is designated as more restrictive because it adds new requirements to the CTS.

M03 **Unit 1 only:** CTS Table 3.4.6-1 provides a list of RCS PIVs. ITS 3.4.14 does not contain a list of the RCS PIVs or their associated valve numbers. The list of RCS PIVs in CTS Table 3.4.6-1 are proposed to be relocated to the ITS Bases (See Discussion of Change LA01). The proposed list of RCS PIVs relocated to the ITS Bases includes the shutdown cooling (SDC) return isolation valves and safety injection tank (SIT) discharge check valves consistent with the current licensing basis. In response to NRC Generic Letter 87-06, "Periodic Verification of Leak Tight Integrity of Pressure Isolation Valves," FPL provides testing exception for these additional PIVs (NRC ADAMS Accession No. ML20214W254). The SDC return isolation valves are tested to verify ≤ 1 gpm using indication of differential pressure in isolated downstream piping not to exceed 200 psid. If a leakage rate of > 1 gpm is indicated by > 200 psid, a volumetric leakage test is conducted and verified to be ≤ 50% of the margin between the rate determined by the previous measured leakage rate and 5 gpm. The SIT discharge check valves isolate the SIT from the safety injection header when safety injection header pressure is greater than SIT pressure. SIT pressures and levels are monitored and alarmed. This instrumentation and alarm scheme may indicate possible check valve leakage if it were to occur. As a result, a Note is included in ITS SR 3.4.14.1 (proposed Note 2) to waive performance of the PIV leakage test for the SIT discharge check valves. This change aligns the CTS list of RCS PIVs with the current licensing basis and is designated as more restrictive because it adds additional components to the CTS RCS PIV list.

M04 Unit 1 CTS 4.5.2.d.1 requires, in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia, verification of the proper operation of the open permissive interlock (OPI) and the valve open/high Shutdown Cooling (SDC) System pressure alarms for isolation valves V3651, V3652, V3480, V3481. Unit 2 CTS 4.5.2.e.1 requires, in MODES 1, 2, and 3 with pressurizer pressure ≥ 1750 psia, verifying automatic isolation and interlock action of the shutdown cooling system from Reactor Coolant System when RCS pressure (actual or simulated) is greater than or equal to 515 psia, and that the interlocks prevent opening the shutdown cooling system isolation valves when RCS pressure (actual or simulated) is greater than or equal to 276 psia. ITS SR 3.4.14.2 and SR 3.4.14.3 provide similar requirements. However, ITS requires the SDC System interlock function and associated Surveillances to be applicable in MODES 1, 2, and 3, and MODE 4 except valves in the SDC flow path when in, or during the transition to or from, the SDC mode of operation. This changes the CTS by expanding the applicability of the SDC System interlock function to include conditions with pressurizer pressure < 1750 psia.

The purpose of the SDC System interlock function and associated Surveillances is to preclude the SDC return isolation valves from being opened when RCS pressure is above the SDC System design pressure of 350 psig. The SDC System interlock function, along with the PIV leakage requirements support the dominant accident sequence in the intersystem LOCA category of the failure of the low pressure portion of the SDC System outside of containment. Therefore, this change expands the applicability of the interlock function to include MODES where RCS pressure could be greater than SDC System design pressure. This change is consistent with the ISTS Applicability for RCS PIVs and is designated as more restrictive because it expands the CTS applicability for this interlock function.

<u>RELOCATED SPECIFICATIONS</u>

None

<u>REMOVED DETAIL CHANGES</u>

LA01 *(Type 1 - Removing Details of System Design and System Description, Including Design Limits)* Unit 1 CTS 3.4.6.2.e, 4.4.6.2.e require each RCS PIV leakage be within the limits for the RCS PIVs listed in Table 3.4.6-1. Unit 2 CTS 3.4.6.2.e, 4.4.6.2.2 and 4.6.2.2.3 require each RCS PIV leakage to be within the limits for the RCS PIVs listed in Table 3.4-1. ITS 3.4.14 does not contain a list of the RCS PIVs or their associated valve numbers. This changes the CTS by relocating the list of RCS PIVs and their associated valve numbers to the Bases.

The removal of these details, which are related to system design, from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.4.14 requires the RCS PIVs to be OPERABLE, and ITS SR 3.4.14.1 requires periodic Surveillances to determine RCS PIV leakage. It is not necessary for the list of RCS PIVs to be in the Technical Specifications in order to ensure that the RCS PIVs are OPERABLE.

Other lists of components, such as containment isolation valves and equipment response time, have been relocated from the Technical Specification to licensee-controlled documents while retaining the requirements on these components in Technical Specifications. Also, this change is acceptable because these types of description details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system description is being removed from the Technical Specifications.

LA02 *(Type 3 - Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* Unit 1 CTS Table 3.4.6-1 and Unit 2 CTS Table 3.4-1 are modified by Note (b). Note (b) explains an alternative method of testing the PIVs to satisfy the ALARA requirements. ITS 3.4.14 does not retain this Note. This changes the CTS by relocating the information in the Note to the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specification is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.4.14 still retains the requirements that RCS PIV leakage must be within limit and provides the appropriate Surveillance that includes the leakage limit. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LA03 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* Unit 1 CTS Table 3.4.6-1 and Unit 2 CTS Table 3.4-1 are modified by Note (c). Note (c) specifies the minimum test differential pressure for the RCS PIVs to not be below (150 psid on Unit 1, 200 psid on Unit 2). ITS 3.4.14 does not specify this limit. This changes the CTS by relocating the RCS PIV minimum test differential pressure to the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS 3.4.14 retains the requirement that the RCS PIV leakage must be within limit and provides the appropriate Surveillance that includes the leakage limit. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LA04 **Unit 1 only:** *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 4.5.2.d.1 requires, in part, verification that the valve open/high Shutdown Cooling (SDC) System pressure alarms for isolation valves V3651, V3652, V3480, V3481. ITS SR 3.4.12.3 requires verification that the SDC System interlock function high pressure alarm is OPERABLE. This changes the CTS by relocating detail related to the specific valve numbers associated with the RCS high pressure alarm that is actuated when the SDC return isolation valves are open.

The removal of these details, which are related to detail system design and description, from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS LCO 3.4.14 requires the SDC System interlock function of be OPERABLE and ITS SR 3.4.14.3 requires periodic verification that the SDC System interlock function high pressure alarm is OPERABLE. It is not necessary to state the valve numbers associated with the alarm function in the Technical Specifications in order to ensure that the SDC System interlock function high pressure alarm is OPERABLE. This change is acceptable because these type of description details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system description is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 - Relaxation of Completion Time)* CTS 3.4.6.2 Action c. requires, in part, that if the RCS PIV leakage is not within limits, the high pressure to low pressure boundary must be isolated by at least two valves as specified in CTS 3.4.6.2 Action c. Specifically, Unit 1 CTS 3.4.6.2 Action c. states, in part, that with the integrity of any pressure isolation valve specified in Table 3.4.6-1 not demonstrated, power operation may continue provided at least two valves in each high pressure line that has a non-functional valve are in and remain in, the mode corresponding to the isolated condition. Unit 2 CTS 3.4.6.2 Action c. states, in part, that with the integrity of any pressure isolation valve specified in Table 3.4-1 not demonstrated, power operation may continue provided that the high pressure portion of the affected system is isolated from the low pressure portion by use of at least two closed manual or deactivated automatic valves. The two CTS Actions ultimately result in requiring the two valves to be in the isolated condition within 4 hours. ITS 3.4.14 ACTION A contains similar requirements but allows 4 hours to isolate the first valve (Required Action A.1) and 72 hours to isolate the second valve (Required Action A.2). This changes the CTS by extending the time requirement to close the second valve from 4 hours to 72 hours.

The purpose of CTS 3.4.6.2 Action c is to allow time to reduce leakage before isolating the pathway. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the low probability of a DBA occurring during the allowed Completion Time. This includes the fact that the high pressure to low pressure boundary is isolated by at least one isolation device. The time to close the first valve remains the same and the time to close the second valve has been changed from 4 hours to 72 hours. The 4 hour Completion Time to close the first valve ensures leakage in excess of the allowable limit is reduced. The 4 hour time allows time for these actions and restricts the time of operation with leaking valves. The 72 hours Completion Time to close the second valve considers the time required to complete the Required Action and the low probability of the first valve failing during this period. This change is designated as less restrictive because additional time is allowed to perform a required action than was allowed in the CTS.

L02 *(Category 2 - Relaxation of Applicability)* CTS 3.4.6.e is applicable in MODES 1, 2, 3, and 4. ITS 3.4.14 is applicable in MODES 1, 2, 3, and MODE 4, except valves in the shutdown cooling (SDC) flow path when in, or during the transition to or from, the SD mode of operation. This changes the CTS by exempting the SDC flow path PIVs from the leakage requirements when in or during the transition to or from the SDC mode of operation.

The purpose of CTS 3.4.6.2.e is to ensure the RCS PIVs are within leakage limits. This change is acceptable because the LCO requirements continue to ensure that the components are maintained consistent with the safety analyses and licensing basis. It is not necessary for the SDC PIVs to meet the leakage limits when in or during transition to or from the SDC mode of operation. These check valves cannot open until the SDC system is placed in service, which is not until RCS pressure is less than the SDC permissive. Thus, overpressurization of the SDC piping is not a concern. This change is designated as less restrictive because less stringent LCO requirements are being applied in the ITS than are being applied in the CTS.

L03 *(Category 5 - Deletion of Surveillance Requirement)* Unit 1 CTS 4.4.6.2.e.3 and Unit 2 CTS 4.4.6.2.2.c and 4.4.6.2.3.c require testing of RCS PIVs following maintenance, repair, or replacement work on the valve. ITS 3.4.14 does not include this requirement. This changes the CTS by eliminating a post-maintenance Surveillance Requirement.

The purpose of the Surveillance requirements is to ensure the RCS PIV leakage is within limits prior to returning the valve to service. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify that the equipment used to meet the LCO can perform its required functions. Thus, appropriate equipment continues to be tested in a manner and at a frequency necessary to give confidence that the equipment can perform its assumed safety function. Whenever, the OPERABILITY of a system or component has been affected by repair, maintenance, modification, or replacement of a component, post maintenance testing is required to demonstrate the OPERABILITY of a system or component. This is described in the Bases for ITS SR 3.0.1 and required under SR 3.0.1. In addition, the requirements of 10 CFR 50, Appendix B, Section XI (Test Control), provide adequate controls for test programs to ensure that testing incorporates applicable acceptance criteria. Compliance with 10 CFR 50, Appendix B is required under the unit operating license. As a result, post-maintenance testing will continue to be performed and an explicit requirement in the Technical Specifications is not necessary. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

L04 **Unit 1 only:** *(Category 5 - Deletion of Surveillance Requirement)* CTS 4.4.6.2.f provides additional compensatory measures to take, above those required by CTS 3.6.4.2 Action c., when leakage through an RCS PIV is not within limit. The CTS requires a daily leakage test of the remaining OPERABLE RCS PIV in the flow path or a combined leakage test of the two valves used to comply with CTS 3.6.4.2 Action c. In addition, the position of the second, non-RCS PIV valve is required to be recorded on a daily basis. ITS 3.4.14 does not include these additional compensatory measures. This changes the CTS by deleting the additional Surveillance compensatory measures taken when leakage through an RCS PIV is not within limit.

The purpose of CTS 4.4.6.2.f is to help ensure that the leakage through the valves used to isolate the penetration with an inoperable RCS PIV is minimized so that an overpressurization event of the downstream piping cannot occur. The change is acceptable since the requirements to ensure the leakage through the two closed valves is within the RCS PIV leakage limit and to ensure closure of the valves are maintained in the ITS. The RCS PIV leakage is ensured prior to using each of the valves as an isolation boundary, as required by the ITS 3.4.14 Required Action A.1 and A.2 Note. Once leakage is checked, it is not expected to change since the valve cannot be manipulated (ITS 3.4.14 ACTION A requires the valves to be isolated, thus they must remain isolated to comply with the ACTION). Manipulation of manual valves that have been closed and automatic valves that have been deactivated to comply with Technical Specification Actions is a controlled evolution and the valves are not expected to be inadvertently moved from the isolated condition. Furthermore, these valves will be verified to be in the correct position when first isolated to comply with ITS 3.4.14 ACTIONS A and B. This change is designated as less restrictive because a Surveillance compensatory measure required by the CTS will not be required in the ITS.

L05 (*Category 4 – Relaxation of Required Action*) Unit 1 CTS 4.5.2.d.1 requires verification that proper operation of the open permissive interlock (OPI) and the valve open/high SDC System pressure alarms for isolation valves V3651, V3652, V3480, V3481. Unit 2 CTS 4.5.2.e.1 requires verifying automatic isolation and interlock action of the shutdown cooling system from Reactor Coolant System when RCS pressure (actual or simulated) is greater than or equal to 515 psia, and that the interlocks prevent opening the shutdown cooling system isolation valves when RCS pressure (actual or simulated) is greater than or equal to 276 psia. When the interlock is inoperable (i.e., the Surveillance not met), LCO 3.0.3 entry is required since this inoperability affects both LPSI trains. ITS 3.4.14 ACTION C requires the isolation of the penetration by use of one closed manual or deactivated automatic valve within 4 hours. This changes the CTS by allowing the penetration to be isolated and to continue operation of the unit for an unlimited amount of time without entry into LCO 3.0.3.

At PSL, the LPSI and SDC systems share the same components. The purpose of ITS 3.4.14 ACTION C is to isolate the penetration to ensure the LPSI/SDC System is not overpressurized by the RCS. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded condition in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the action of isolating the penetration by use of at least one closed manual or deactivated automatic valve accomplishes the function of ensuring the valves are not inadvertently opened when RCS pressure is above the SDC System design pressure. The 4-hour Completion Time is reasonable based on the consideration that the associated valves are closed when the SDC System is not aligned for the SDC function and the low probability of a failure that could inadvertently open the isolation valves. This change allows the unit to continue to operate and avoids an unnecessary plant transient as a result of entry into LCO 3.0.3. Closing and deactivating an automatic valve or closing a manual valve will ensure the function of the interlock is met. Therefore, the actions provide sufficient remedial measures to preclude overpressurization of the LPSI/SDC System by the RCS thereby allowing continued safe operation pursuant the requirements of 10 CFR 50.36(c)(2). This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

3.4.6.2.e LCO 3.4.14 Leakage from each RCS PIV shall be within limits.

DOC A03 AND

The Shutdown Cooling (SDC) System interlock function shall be OPERABLE. 1

3.4.6.2 Applicability, DOC M04 DOC L02

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the ~~shutdown cooling (~~SDC~~)~~ flow path when in, or during the transition to or from, the SDC mode of operation. 1

ACTIONS

--NOTES--

DOC A02 1. Separate Condition entry is allowed for each flow path.

3.4.6.2 Action c. Note 2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.6.2 Action c., DOC M01 A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	--------------------NOTE-------------------- Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.14.1 and be on the RCS pressure boundary ~~[~~or the high pressure portion of the system~~]~~. 2 -- A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve. AND	 4 hours

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
3.4.6.2 Action c.		A.2	[Isolate the high pressure portion of the affected system from the low pressure portion by use of a second closed manual, deactivated automatic, or check valve. [or] Restore RCS PIV to within limits.	72 hours]	2 2
3.4.6.2 Action c.	B. Required Action and associated Completion Time for Condition A not met.	B.1 AND B.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours	
DOC L05	C. [Shutdown Cooling (SDC) System autoclosure interlock function inoperable.	C.1	Isolate the affected penetration by use of one closed manual or deactivated automatic valve.	4 hours]	2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.14.1	-----------------------------NOTES---------------------------- 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on the RCS PIVs located in the SDC flow path when in the shutdown cooling mode of operation. [safety injection tank discharge check valves.] 3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided. -- Verify leakage from each RCS PIV is equivalent to ≤ 0.5 [5.0] gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure ≥ [2215] [2225] psia and ≤ [2255] [2275] psia; and when current measured rate is > 1 gpm, the current measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and 5.0 gpm by 50%.	In accordance with the INSERVICE TESTING PROGRAM, and [[18] months OR In accordance with the Surveillance Frequency Control Program] AND Prior to entering MODE 2 determine the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months AND

4.4.6.2.e
4.4.6.2.e.4
4.4.6.2.e
Table 3.4.6-1 Note (a)
DOC M02
4.4.6.2.e.2

4 7 5 6 3 2 3 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
DOC M02		Within 24 hours following valve actuation due to automatic or manual action or flow through the valve	
4.5.2.d.1	SR 3.4.14.2 ----------NOTE---------- [Not required to be met when the SDC System autoclosure interlock is disabled in accordance with SR 3.4.12.7. ------------------------------ Verify SDC System autoclosure interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ [425] psig. (> 267 psia)	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	8 3 2 3 2
4.5.2.d.1	SR 3.4.14.3 ----------NOTE---------- [Not required to be met when the SDC System autoclosure interlock is disabled in accordance with SR 3.4.12.7. ------------------------------ Verify SDC System autoclosure interlock causes the valves to close automatically with a simulated or actual RCS pressure signal ≥ [600] psig. (function high pressure alarm is OPERABLE.)	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	8 3 2 3 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

3.4.6.2.e LCO 3.4.14 Leakage from each RCS PIV shall be within limits.

DOC A03 AND

The Shutdown Cooling (SDC) System interlock function shall be OPERABLE. 1

3.4.6.2 Applicability, DOC M04 DOC L02

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except valves in the ~~shutdown cooling (~~SDC~~)~~ flow path when in, or during the transition to or from, the SDC mode of operation. 1

ACTIONS

---NOTES---

DOC A02 1. Separate Condition entry is allowed for each flow path.

3.4.6.2 Action c. Note 2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit. (3.4.6.2 Action c., DOC M01)	--------------------NOTE------------------ Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.14.1 and be on the RCS pressure boundary ~~[~~or the high pressure portion of the system~~]~~. (2) ---	
	A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve.	4 hours
	AND	

cACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
3.4.6.2 Action c.		A.2	[Isolate the high pressure portion of the affected system from the low pressure portion by use of a second closed manual, deactivated automatic, or check valve. [or] Restore RCS PIV to within limits.	72 hours]	2 2
3.4.6.2 Action c.	B. Required Action and associated Completion Time for Condition A not met.	B.1 AND B.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours	
DOC L05	C. [Shutdown Cooling (SDC) System autoclosure interlock function inoperable.	C.1	Isolate the affected penetration by use of one closed manual or deactivated automatic valve.	4 hours]	2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.4.6.2.2 4.4.6.2.3 Note	SR 3.4.14.1 -----------------------------NOTES----------------------------- 1. Not required to be performed in MODES 3 and 4. 2. Not required to be performed on the RCS PIVs located in the SDC flow path when in the shutdown cooling mode of operation. 3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided. ---		4 5 4 5
4.4.6.2.2 Table 3.4-1, Note (a) 4.4.6.2.2.a	Verify leakage from each RCS PIV is equivalent to ≤ 0.5 [5.0] gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure ≥ [2215] [2225] psia and ≤ [2255] [2275] psia; and when current measured rate is > 1 gpm, the current measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and 5.0 gpm by 50%.	In accordance with the INSERVICE TESTING PROGRAM, and [[18] months OR In accordance with the Surveillance Frequency Control Program] AND	6 3 2 3 2
4.4.6.2.2.b		Prior to entering MODE 2 determine the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months AND	

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.6.2.2.d			Within 24 hours following valve actuation due to automatic or manual action or flow through the valve	
4.5.2.e.1	SR 3.4.14.2	------------NOTE------------ [Not required to be met when the SDC System autoclosure interlock is disabled in accordance with SR 3.4.12.7. ------------------------------- Verify SDC System autoclosure interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ [425] psig. 276 psia	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	8 3 2 3 2
4.5.2.e.1	SR 3.4.14.3	------------NOTE------------ [Not required to be met when the SDC System autoclosure interlock is disabled in accordance with SR 3.4.12.7. ------------------------------- Verify SDC System autoclosure interlock causes the valves to close automatically with a simulated or actual RCS pressure signal ≥ [600] psig. 515 psia	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	8 3 2 3 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.14, RCS PRESSURE ISOLATION VALVE (PIV) LEAKAGE

1. The second part of the LCO has been added to ensure consistency between the LCO, ACTIONS, and Surveillance Requirements. The ISTS LCO, Actions, and Surveillances do not match up since there is no explicit statement in the LCO requiring the Shutdown Cooling (SDC) System interlock function to be OPERABLE. In the ISTS, if the SDC System interlock function is inoperable, the LCO is not affected since RCS PIV leakage is not directly affected by an inoperable interlock function. Therefore, the inclusion of the second portion of the LCO ensures consistency between the LCO, ACTIONS, and Surveillance Requirements. In addition, due to the addition of the term "SDC" into the LCO statement, the use of the term " Shutdown Cooling (SDC)" in the Applicability has been changed to "SDC."

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

4. Note 2 to ISTS SR 3.4.14.1 has been deleted since it is not necessary. The ISTS 3.4.14 Applicability does not require leakage to be met for SDC valves in the flow path when in MODE 4 and when in, or during the transition to or from, the SDC Mode of operation.

5. Note 3 to ISTS SR 3.4.14.1 has been deleted since it is not required by the current licensing basis.

6. Verification of RCS PIV leakage is required by the INSERVICE TESTING PROGRAM, which fulfills the requirements of 10 CFR 50.55a(g). Therefore, it is duplicative to require ISTS SR 3.4.14.1 to be performed in accordance with the INSERVICE TESTING PROGRAM. Since compliance with 10 CFR 50.55a is required by the operating licenses of PSL Unit 1 and Unit 2, this Frequency is not included in ITS SR 3.4.14.1.

7. **Unit 1 only:** A Note is added to ISTS 3.4.14.1 (Note 2 to ITS SR 3.4.14.1). This Note waives performance of the PIV leakage test for the safety injection tank (SIT) discharge check valves. The SIT discharge check valves are added to the list of RCS PIVs consistent with the current licensing basis. In response to NRC Generic Letter 87-06, "Periodic Verification of Leak Tight Integrity of Pressure Isolation Valves," an exception to PIV testing was provided for the SIT discharge check valves (NRC ADAMS Accession No. ML20214W254). The SIT discharge check valves isolate the SIT from the safety injection header when safety injection header pressure is greater than SIT pressure. SIT pressures and levels are monitored and alarmed. This instrumentation and alarm scheme may indicate possible check valve leakage if it were to occur. As a result, periodic performance of the leakage testing is not required for the SIT discharge check valves consistent with current licensing basis.

8. The Note to ISTS SRs 3.4.14.2 and 3.4.14.3 is deleted and not included in the ITS because ISTS SR 3.4.12.7 is not related to SRs 3.4.14.2 and 3.4.14.3. The Note to

the SRs is also included in NUREG-1431, “Standard Technical Specifications, Westinghouse Plants,” and refers to an SR that requires the associated residual heat removal (RHR) suction isolation valve to be locked open with operator power removed for each required RHR suction relief valve. There is no equivalent SR in NUREG-1432 or the PSL Unit 1 and Unit 2 current Technical Specifications. Therefore, the Note is not included in the PSL Unit 1 and Unit 2 ITS.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

BASES

BACKGROUND

10 CFR 50.2, 10 CFR 50.55a(c), and GDC 55 of 10 CFR 50, Appendix A (Refs. 1, 2, and 3), define RCS PIVs as any two normally closed valves in series within the RCS pressure boundary that separate the high pressure RCS from an attached low pressure system. During their lives, these valves can produce varying amounts of reactor coolant leakage through either normal operational wear or mechanical deterioration. The RCS PIV LCO allows RCS high pressure operation when leakage through these valves exists in amounts that do not compromise safety.

The PIV leakage limit applies to each individual valve. Leakage through both PIVs in series in a line must be included as part of the identified LEAKAGE, governed by LCO 3.4.13, "RCS Operational LEAKAGE." This is true during operation only when the loss of RCS mass through two valves in series is determined by a water inventory balance (SR 3.4.13.1). A known component of the identified LEAKAGE before operation begins is the least of the two individual leakage rates determined for leaking series PIVs during the required surveillance testing; leakage measured through one PIV in a line is not RCS operational LEAKAGE if the other is leaktight.

Although this specification provides a limit on allowable PIV leakage rate, its main purpose is to prevent overpressure failure of the low pressure portions of connecting systems. The leakage limit is an indication that the PIVs between the RCS and the connecting systems are degraded or degrading. PIV leakage could lead to overpressure of the low pressure piping or components. Failure consequences could be a loss of coolant accident (LOCA) outside of containment, an unanalyzed condition that could degrade the ability for low pressure injection.

The basis for this LCO is the 1975 NRC "Reactor Safety Study" (Ref. 4) that identified potential intersystem LOCAs as a significant contributor to the risk of core melt. A subsequent study (Ref. 5) evaluated various PIV configurations to determine the probability of intersystem LOCAs.

PIVs are provided to isolate the RCS from the following typically connected systems:

BASES

BACKGROUND (continued)

a. Shutdown Cooling (SDC) System,

b. Safety Injection System, and

c. Chemical and Volume Control System.

Table B 3.4.14-1

The PIVs are listed in ~~FSAR section (Ref. 6)~~. 1

Violation of this LCO could result in continued degradation of a PIV, which could lead to overpressurization of a low pressure system and the loss of the integrity of a fission product barrier. Insert 1 1

APPLICABLE SAFETY ANALYSES

Reference 4 identified potential intersystem LOCAs as a significant contributor to the risk of core melt. The dominant accident sequence in the intersystem LOCA category is the failure of the low pressure portion of the SDC System outside of containment. The accident is the result of a postulated failure of the PIVs, which are part of the reactor coolant pressure boundary (RCPB), and the subsequent pressurization of the SDC System downstream of the PIVs from the RCS. Because the low pressure portion of the SDC System is ~~typically~~ designed for ~~[600]~~ 350 psig, overpressurization failure of the SDC low pressure line would result in a LOCA outside containment and subsequent risk of core melt. 2

Reference 5 evaluated various PIV configurations, leakage testing of the valves, and operational changes to determine the effect on the probability of intersystem LOCAs. This study concluded that periodic leakage testing of the PIVs can substantially reduce the probability of an intersystem LOCA.

RCS PIV leakage satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS PIV leakage is identified LEAKAGE into closed systems connected to the RCS. Isolation valve leakage is usually on the order of drops per minute. Leakage that increases significantly suggests that something is operationally wrong and corrective action must be taken.

The LCO PIV leakage limit is ~~0.5 gpm per nominal inch of valve size, with a maximum limit of 5 gpm. The previous criterion of 1 gpm for all valve sizes imposed an unjustified penalty on the larger valves without providing information on potential valve degradation and resulted in higher personnel radiation exposures. A study concluded a leakage rate limit based on valve size was superior to a single allowable value.~~ 1

< 5.0 gpm. However, when the current measured rate is > 1.0 gpm, the current measured rate shall not exceed the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate (5.0 gpm) by 50%. 1

1

INSERT 1

Two motor operated valves are included in series in the suction piping of the two SDC trains to isolate the high pressure RCS from the low pressure piping of the SDC System when the RCS pressure is above the design pressure of the SDC System piping and components. Ensuring the SDC interlock that prevents the valves from being opened is OPERABLE ensures that RCS pressure will not pressurize the SDC System beyond its design pressure of 350 psig.

BASES

LCO (continued)

Ensuring the SDC System interlock function is OPERABLE, including the open permissive interlock that prevents the valves from being opened and the high pressure alarm on RCS high pressure when the valves are open, ensures that RCS pressure will not pressurize the SDC System beyond its design pressure.

6

Reference ~~7~~ permits leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation (the maximum pressure differential) in those types of valves in which the higher service pressure will tend to diminish the overall leakage channel opening. In such cases, the observed rate may be adjusted to the maximum pressure differential by assuming leakage is directly proportional to the pressure differential to the one half power. 1

APPLICABILITY

In MODES 1, 2, 3, and 4, this LCO applies because the PIV leakage potential is greatest when the RCS is pressurized. In MODE 4, valves in the SDC flow path are not required to meet the requirements of this LCO when in, or during the transition to or from, the SDC mode of operation.

In MODES 5 and 6, leakage limits are not provided because the lower reactor coolant pressure results in a reduced potential for leakage and for a LOCA outside the containment.

ACTIONS

The Actions are modified by two Notes. Note 1 is added to provide clarification that each flow path allows separate entry into a Condition. This is allowed based on the functional independence of the flow path. Note 2 requires an evaluation of affected systems if a PIV is inoperable. The leakage may have affected system operability or isolation of a leaking flow path with an alternate valve may have degraded the ability of the interconnected system to perform its safety function.

A.1 and A.2

The flow path must be isolated by two valves. Required Actions A.1 and A.2 are modified by a Note stating that the valves used for isolation must meet the same leakage requirements as the PIVs and must be in the RCPB ~~[~~or the high pressure portion of the system~~]~~. 2

Required Action A.1 requires that the isolation with one valve must be performed within 4 hours. Four hours provides time to reduce leakage in excess of the allowable limit and to isolate if leakage cannot be reduced. The 4 hours allows the actions and restricts the operation with leaking isolation valves.

BASES

ACTIONS (continued)

[Required Action A.2 specifies that the double isolation barrier of two valves be restored by closing some other valve qualified for isolation or restoring one leaking PIV. The 72 hour Completion Time after exceeding the limit considers the time required to complete the action and the low probability of a second valve failing during this time period. 2

or

The 72 hour Completion Time after exceeding the limit allows for the restoration of the leaking PIV to OPERABLE status. This timeframe considers the time required to complete this Action and the low probability of a second valve failing during this period.] 2

-----------------------------------REVIEWER'S NOTE-----------------------------------
Two options are provided for Required Action A.2. The second option (72 hour restoration) is appropriate if isolation of a second valve would place the unit in an unanalyzed condition. 1

B.1 and B.2

If leakage cannot be reduced [,the system isolated,] or other Required Actions accomplished, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This Action reduces the leakage and also reduces the potential for a LOCA outside the containment. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. 3

any Required Action of Condition A cannot be met within the required Completion Time

C.1

The inoperability of the SDC autoclosure interlock renders the SDC suction isolation valves incapable of: isolating in response to a high pressure condition and preventing inadvertent opening of the valves at RCS pressures in excess of the SDC systems design pressure. If the SDC autoclosure interlock is inoperable, operation may continue as long as the affected SDC suction penetration is closed by at least one closed manual or deactivated automatic valve within 4 hours. This Action accomplishes the purpose of the autoclosure function. 1

or incapable of alerting the operator of increasing RCS pressure with the SDC return isolation valves open

The RCS PIV leakage limit is < 5.0 gpm. However, RCS PIV leakage is also limited when the current measured rate is > 1.0 gpm, such that the current measured rate shall not exceed the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and 5.0 gpm by 50%. The minimum differential test pressure across each valve shall be ≥ 150 psid.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.14.1

Performance of leakage testing on each RCS PIV or isolation valve used to satisfy Required Action A.1 or A.2 is required to verify that leakage is below the specified limit and to identify each leaking valve. ~~The leakage limit of 0.5 gpm per inch of nominal valve diameter up to 5 gpm maximum applies to each valve.~~ Leakage testing requires a stable pressure condition. 1

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Testing is to be performed every 9 months, but may be extended if the plant does not go into MODE 5 for at least 7 days. ~~[The [18] month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 8) and the INSERVICE TESTING PROGRAM and is within frequency allowed by the American Society of Mechanical Engineers (ASME) Code (Ref. 7), and is based on the need to perform the Surveillance under conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

In addition, testing must be performed once after the valve has been opened by flow or exercised to ensure tight reseating. ~~PIVs disturbed in the performance of this Surveillance should also be tested unless documentation shows that an infinite testing loop cannot practically be avoided.~~ Testing must be performed within 24 hours after the valve has been reseated. Within 24 hours is a reasonable and practical time limit for performing this test after opening or reseating a valve. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by two Notes. Note 1 states that the Surveillance is not required to be performed in MODES 3 and 4.

3

The leakage limit is to be met at the RCS pressure associated with MODES 1 and 2. This permits leakage testing at high differential pressures with stable conditions not possible in the MODES with lower pressures.

Entry into MODES 3 and 4 is allowed to establish the necessary differential pressures and stable conditions to allow for performance of this Surveillance. ~~The Note that allows this provision is complimentary to the Frequency of prior to entry into MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months. In addition, this Surveillance is not required to be performed on the SDC System when the SDC System is aligned to the RCS in the shutdown cooling mode of operation. PIVs contained in the SDC shutdown cooling flow path must be leakage rate tested after SDC is secured and stable unit conditions and the necessary differential pressures are established.~~ 3

Insert 2 1

SR 3.4.14.2 and SR 3.4.14.3

function, which includes the open permissive interlock and the high pressure alarm, is

Verifying that the SDC ~~autoclosure~~ interlock~~s~~ ~~are~~ OPERABLE ensures that RCS pressure will not pressurize the SDC system beyond ~~125% of~~ its design pressure of ~~[600]~~ 350 psig. The interlock setpoint that prevents the valves from being opened is set so the actual RCS pressure must be ~~< [425] psig~~ ≤ 267 psia to open the valves. This setpoint ensures the SDC design pressure will not be exceeded and the SDC relief valves will not lift. 1

Verifying the SDC interlock function high pressure alarm is OPERABLE ensures that when RCS pressure exceeds the high pressure setpoint and one or more SDC return isolation valves (i.e., V3651, V3652, V3480, V3481) are open, an alarm will annunciate in the control room to alert the operator.

~~[The 18 month Frequency is based on the need to perform these Surveillances under conditions that apply during a plant outage. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment.~~

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 2

~~-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]~~

1

INSERT 2

Note 2 modifies this SR to waive performance of the PIV leakage test for the safety injection tank (SIT) discharge check valves. In response to NRC Generic Letter 87-06, an exception to PIV leakage testing was provided for the SIT discharge check valves (Ref. 7). SIT pressures and levels are monitored and alarmed. The SIT pressure and level instrumentation and alarm scheme may be used to indicate possible check valve leakage if it were to occur. As a result, periodic performance of the leakage testing for the SIT discharge check valves is not required.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~The SRs are modified by Notes allowing the SDC autoclosure function to be disabled when using the SDC System suction relief valves for cold overpressure protection in accordance with SR 3.4.12.7.~~ 1

REFERENCES

1. 10 CFR 50.2.
2. 10 CFR 50.55a(c).
3. 10 CFR 50, Appendix A, Section V, GDC 55.
4. WASH-1400 (NUREG-75/014), Appendix V, October 1975.
5. NUREG-0677, May 1980.

~~6. [Document containing list of PIVs.]~~ 2

~~7~~ 6. ASME Code for Operation and Maintenance of Nuclear Power Plants.

7. Letter from C. Woody (FPL) to Document Control Desk (NRC), "Generic Letter 87-06, "Periodic Verification of Leaktight Integrity of Pressure Isolation Valves," dated June 10, 1987 (NRC ADAMS Accession No. ML20214W254).

~~8. 10 CFR 50.55a(g).~~

Insert 3

1

1

INSERT 3

Table B 3.4.14-1 (Page 1 of 1)
Reactor Coolant System Pressure Isolation Valves

CHECK VALVE NUMBER	MOTOR OPERATED VALVE NUMBER
V3217	V3480
V3227	V3481
V3237	V3652
V3247	V3651
V3113	
V3123	
V3133	
V3143	
V3114	
V3124	
V3134	
V3144	
V3215	
V3225	
V3235	
V3245	

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

BASES

BACKGROUND

10 CFR 50.2, 10 CFR 50.55a(c), and GDC 55 of 10 CFR 50, Appendix A (Refs. 1, 2, and 3), define RCS PIVs as any two normally closed valves in series within the RCS pressure boundary that separate the high pressure RCS from an attached low pressure system. During their lives, these valves can produce varying amounts of reactor coolant leakage through either normal operational wear or mechanical deterioration. The RCS PIV LCO allows RCS high pressure operation when leakage through these valves exists in amounts that do not compromise safety.

The PIV leakage limit applies to each individual valve. Leakage through both PIVs in series in a line must be included as part of the identified LEAKAGE, governed by LCO 3.4.13, "RCS Operational LEAKAGE." This is true during operation only when the loss of RCS mass through two valves in series is determined by a water inventory balance (SR 3.4.13.1). A known component of the identified LEAKAGE before operation begins is the least of the two individual leakage rates determined for leaking series PIVs during the required surveillance testing; leakage measured through one PIV in a line is not RCS operational LEAKAGE if the other is leaktight.

Although this specification provides a limit on allowable PIV leakage rate, its main purpose is to prevent overpressure failure of the low pressure portions of connecting systems. The leakage limit is an indication that the PIVs between the RCS and the connecting systems are degraded or degrading. PIV leakage could lead to overpressure of the low pressure piping or components. Failure consequences could be a loss of coolant accident (LOCA) outside of containment, an unanalyzed condition that could degrade the ability for low pressure injection.

The basis for this LCO is the 1975 NRC "Reactor Safety Study" (Ref. 4) that identified potential intersystem LOCAs as a significant contributor to the risk of core melt. A subsequent study (Ref. 5) evaluated various PIV configurations to determine the probability of intersystem LOCAs.

PIVs are provided to isolate the RCS from the following typically connected systems:

BASES

BACKGROUND (continued)

a. Shutdown Cooling (SDC) System,

b. Safety Injection System, and

c. Chemical and Volume Control System.

Table B 3.4.14-1

The PIVs are listed in ~~FSAR section (Ref. 6)~~. 1

Violation of this LCO could result in continued degradation of a PIV, which could lead to overpressurization of a low pressure system and the loss of the integrity of a fission product barrier. Insert 1 1

APPLICABLE SAFETY ANALYSES

Reference 4 identified potential intersystem LOCAs as a significant contributor to the risk of core melt. The dominant accident sequence in the intersystem LOCA category is the failure of the low pressure portion of the SDC System outside of containment. The accident is the result of a postulated failure of the PIVs, which are part of the reactor coolant pressure boundary (RCPB), and the subsequent pressurization of the SDC System downstream of the PIVs from the RCS. Because the low pressure portion of the SDC System is ~~typically~~ designed for ~~[600]~~ 350 psig, overpressurization failure of the SDC low pressure line would result in a LOCA outside containment and subsequent risk of core melt. 2

Reference 5 evaluated various PIV configurations, leakage testing of the valves, and operational changes to determine the effect on the probability of intersystem LOCAs. This study concluded that periodic leakage testing of the PIVs can substantially reduce the probability of an intersystem LOCA.

RCS PIV leakage satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

RCS PIV leakage is identified LEAKAGE into closed systems connected to the RCS. Isolation valve leakage is usually on the order of drops per minute. Leakage that increases significantly suggests that something is operationally wrong and corrective action must be taken.

The LCO PIV leakage limit is ~~0.5 gpm per nominal inch of valve size, with a maximum limit of 5 gpm. The previous criterion of 1 gpm for all valve sizes imposed an unjustified penalty on the larger valves without providing information on potential valve degradation and resulted in higher personnel radiation exposures. A study concluded a leakage rate limit based on valve size was superior to a single allowable value.~~ 1

< 5.0 gpm. However, when the current measured rate is > 1.0 gpm, the current measured rate shall not exceed the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate (5.0 gpm) by 50%. 1

1

INSERT 1

Two motor operated valves are included in series in the suction piping of the two SDC trains to isolate the high pressure RCS from the low pressure piping of the SDC System when the RCS pressure is above the design pressure of the SDC System piping and components. Ensuring the SDC interlock that prevents the valves from being opened is OPERABLE ensures that RCS pressure will not pressurize the SDC System beyond its design pressure of 350 psig.

1

BASES

Ensuring the SDC System interlock function is OPERABLE ensures that RCS pressure will not pressurize the SDC System beyond its design pressure by providing an open permissive interlock. The SDC System interlock function also automatically closes the SDC suction line isolation valves on high pressurizer pressure with a setpoint high enough to preclude premature isolation of the SDC System.

LCO (continued)

1

Reference ~~7~~ 6 permits leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation (the maximum pressure differential) in those types of valves in which the higher service pressure will tend to diminish the overall leakage channel opening. In such cases, the observed rate may be adjusted to the maximum pressure differential by assuming leakage is directly proportional to the pressure differential to the one half power.

APPLICABILITY

In MODES 1, 2, 3, and 4, this LCO applies because the PIV leakage potential is greatest when the RCS is pressurized. In MODE 4, valves in the SDC flow path are not required to meet the requirements of this LCO when in, or during the transition to or from, the SDC mode of operation.

In MODES 5 and 6, leakage limits are not provided because the lower reactor coolant pressure results in a reduced potential for leakage and for a LOCA outside the containment.

ACTIONS

The Actions are modified by two Notes. Note 1 is added to provide clarification that each flow path allows separate entry into a Condition. This is allowed based on the functional independence of the flow path. Note 2 requires an evaluation of affected systems if a PIV is inoperable. The leakage may have affected system operability or isolation of a leaking flow path with an alternate valve may have degraded the ability of the interconnected system to perform its safety function.

A.1 and A.2

The flow path must be isolated by two valves. Required Actions A.1 and A.2 are modified by a Note stating that the valves used for isolation must meet the same leakage requirements as the PIVs and must be in the RCPB ~~[~~or the high pressure portion of the system~~]~~. 2

Required Action A.1 requires that the isolation with one valve must be performed within 4 hours. Four hours provides time to reduce leakage in excess of the allowable limit and to isolate if leakage cannot be reduced. The 4 hours allows the actions and restricts the operation with leaking isolation valves.

BASES

ACTIONS (continued)

[Required Action A.2 specifies that the double isolation barrier of two valves be restored by closing some other valve qualified for isolation or restoring one leaking PIV. The 72 hour Completion Time after exceeding the limit considers the time required to complete the action and the low probability of a second valve failing during this time period. 2

or

The 72 hour Completion Time after exceeding the limit allows for the restoration of the leaking PIV to OPERABLE status. This timeframe considers the time required to complete this Action and the low probability of a second valve failing during this period.] 2

-----REVIEWER'S NOTE-----
Two options are provided for Required Action A.2. The second option (72 hour restoration) is appropriate if isolation of a second valve would place the unit in an unanalyzed condition. 1

B.1 and B.2

If leakage cannot be reduced [the system isolated] or other Required Actions accomplished [any Required Action of Condition A cannot be met within the required Completion Time], the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and to MODE 5 within 36 hours. This Action reduces the leakage and also reduces the potential for a LOCA outside the containment. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. 3

C.1

The inoperability of the SDC autoclosure interlock renders the SDC suction isolation valves incapable of: isolating in response to a high pressure condition and preventing inadvertent opening of the valves at RCS pressures in excess of the SDC systems design pressure. If the SDC autoclosure interlock is inoperable, operation may continue as long as the affected SDC suction penetration is closed by at least one closed manual or deactivated automatic valve within 4 hours. This Action accomplishes the purpose of the autoclosure function. 1

The RCS PIV leakage limit is < 5.0 gpm. However, RCS PIV leakage is also limited when the current measured rate is > 1.0 gpm, such that the current measured rate shall not exceed the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and 5.0 gpm by 50%. The minimum differential test pressure across each valve shall be ≥ 200 psid.

1

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.14.1

Performance of leakage testing on each RCS PIV or isolation valve used to satisfy Required Action A.1 or A.2 is required to verify that leakage is below the specified limit and to identify each leaking valve. ~~The leakage limit of 0.5 gpm per inch of nominal valve diameter up to 5 gpm maximum applies to each valve.~~ Leakage testing requires a stable pressure condition. 1

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Testing is to be performed every 9 months, but may be extended if the plant does not go into MODE 5 for at least 7 days. ~~[The [18] month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 8) and the INSERVICE TESTING PROGRAM and is within frequency allowed by the American Society of Mechanical Engineers (ASME) Code (Ref. 7), and is based on the need to perform the Surveillance under conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------REVIEWER'S NOTE-----------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~---]~~

In addition, testing must be performed once after the valve has been opened by flow or exercised to ensure tight reseating. ~~PIVs disturbed in the performance of this Surveillance should also be tested unless documentation shows that an infinite testing loop cannot practically be avoided.~~ Testing must be performed within 24 hours after the valve has been reseated. Within 24 hours is a reasonable and practical time limit for performing this test after opening or reseating a valve. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that states the Surveillance is not required to be performed in MODES 3 and 4.

The leakage limit is to be met at the RCS pressure associated with MODES 1 and 2. This permits leakage testing at high differential pressures with stable conditions not possible in the MODES with lower pressures. 3

Entry into MODES 3 and 4 is allowed to establish the necessary differential pressures and stable conditions to allow for performance of this Surveillance. ~~The Note that allows this provision is complimentary to the Frequency of prior to entry into MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months. In addition, this Surveillance is not required to be performed on the SDC System when the SDC System is aligned to the RCS in the shutdown cooling mode of operation. PIVs contained in the SDC shutdown cooling flow path must be leakage rate tested after SDC is secured and stable unit conditions and the necessary differential pressures are established.~~ 3

SR 3.4.14.2 and SR 3.4.14.3

Verifying ~~that~~ the SDC ~~autoclosure~~ [automatic closure of the suction isolation valves] interlock~~s are~~ ~~OPERABLE~~ ensures that RCS pressure will not pressurize the SDC ~~system beyond 125% of its design pressure of [600] psig~~ [System while precluding premature isolation of the system]. The interlock setpoint that prevents the valves from being opened is set so the actual RCS pressure must be < ~~[425] psig~~ [276 psia] to open the valves. This setpoint ensures the SDC ~~design pressure~~ [System design pressure of 350 psig] will not be exceeded and the SDC [System suction] relief valves will not lift. ~~[The 18 month Frequency is based on the need to perform these Surveillances under conditions that apply during a plant outage. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment.~~ 1

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 2

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

The SRs are modified by Notes allowing the SDC autoclosure function to be disabled when using the SDC System suction relief valves for cold overpressure protection in accordance with SR 3.4.12.7. 1

REFERENCES

1. 10 CFR 50.2.
2. 10 CFR 50.55a(c).
3. 10 CFR 50, Appendix A, Section V, GDC 55.
4. WASH-1400 (NUREG-75/014), Appendix V, October 1975.
5. NUREG-0677, May 1980.

6. [Document containing list of PIVs.] 2

6

7. ASME Code for Operation and Maintenance of Nuclear Power Plants.

8. 10 CFR 50.55a(g). 1

Insert 2

1

INSERT 2

Table B 3.4.14-1 (Page 1 of 1)
Reactor Coolant System Pressure Isolation Valves

CHECK VALVE NUMBER	MOTOR OPERATED VALVE NUMBER
V3217	V3480
V3227	V3481
V3237	V3652
V3247	V3651
V3259	
V3258	
V3260	
V3261	
V3215	
V3225	
V3235	
V3245	
V3525	
V3524	
V3527	
V3526	

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.14 BASES, RCS PRESSURE ISOLATION VALVE (PIV) LEAKAGE

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. Changes are made to be consistent with changes made to the Specification.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.14, RCS PRESSURE ISOLATION VALVE (PIV) LEAKAGE

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 15

3.4.15, RCS Leakage Detection Instrumentation

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

LCO 3.4.15 3.4.6.1 The following RCS leakage detection systems [instrumentation shall] will be OPERABLE:

LCO 3.4.15.a a. The [One] reactor cavity sump inlet flow monitoring system; and

LCO 3.4.15.b b. One containment atmosphere radioactivity monitor (gaseous or particulate).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

Condition A a. With the reactor cavity sump inlet flow monitoring system inoperable with an operable containment particulate radioactivity monitor, perform a RCS water [SR 3.4.13.1] inventory balance at least once per 24* hours (Required Action A.1) and restore the sump inlet flow monitoring system to OPERABLE status within 30 days (Required Action A.2); otherwise, be in at least HOT STANDBY [MODE 3] within the next 6 hours and in COLD SHUTDOWN [MODE 5] within the following 30 [36] hours. (ACTION D) A02

Condition C b. With the reactor cavity sump inlet flow monitoring system inoperable [AND containment atmosphere particulate radioactivity monitor inoperable] with only the containment gaseous radioactivity monitor operable, perform an RCS water [SR 3.4.13.1] inventory balance at least once per 24* hours (Required Action A.1) and analyze grab samples of the containment atmosphere at least once per 12 hours (Required Action C.1), and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or (Required Action C.2) restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of action a.; (Condition C Note) otherwise, be in at least HOT STANDBY [MODE 3] within the next 6 hours and in COLD SHUTDOWN [MODE 5] within the following 30 [36] hours. (ACTION D) A02 A03

Condition B c. With the required radioactivity monitor inoperable, analyze grab samples of the containment atmosphere (Required Action B.1.1) or perform a RCS water inventory balance [SR 3.4.13.1] at least once per 24* hours (Required Action B.1.2), and restore the required radioactivity monitor to OPERABLE status within 30 days (Required Action B.2); otherwise, be in at least HOT STANDBY [MODE 3] within the next 6 hours and in COLD SHUTDOWN [MODE 5] within the following 30 [36] hours. (ACTION D) A02

ACTION E d. With all required monitors inoperable, enter LCO 3.0.3 immediately.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The RCS leakage detection instruments shall be demonstrated OPERABLE by:

SR 3.4.15.1, SR 3.4.15.2, SR 3.4.15.4 a. Performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor in accordance with Surveillance Requirement 4.3.3.1 [the Surveillance Frequency Control Program]. A02

SR 3.4.15.3 b. Performance of the CHANNEL CALIBRATION of the reactor cavity sump inlet flow monitoring system in accordance with the Surveillance Frequency Control Program.

Required Action A.1 Note, B.1.2 Note, * Not required to be performed until 12 hours after establishment of steady state operation.

~~DELETED~~

INSTRUMENTATION REACTOR COOLANT SYSTEMS (RCS)

3/4.3.3 MONITORING INSTRUMENTATION RCS Leakage Detection

RADIATION MONITORING

A04

LIMITING CONDITION FOR OPERATION

LCO 3.4.15.b 3.3.3.1 The One containment radiation monitoring instrumentation channels (gaseous or particulate) shown in Table 3.3-6 shall be OPERABLE with their alarm/trip setpoints within the specified limits.

Applicability **APPLICABILITY:** As shown in Table 3.3-6. MODES 1, 2, 3, and 4

ACTION:

See ITS 3.3.6 ITS 3.3.7 ITS 3.3.8 ITS 3.3.9

a. With a radiation monitoring channel alarm/trip setpoint exceeding the value shown in Table 3.3-6, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable.

A04

ACTIONS b With one or more required radiation monitoring channels inoperable, take the ACTION shown in Table 3.3-6. Specification 3.4.15

c. The provisions of Specification 3.0.3 are not applicable. A05

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1 SR 3.4.15.2 SR 3.4.15.4 4.3.3.1 Each required containment radiation monitoring instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations in accordance with the Surveillance Frequency Control Program. A04

4.3.3.2 In accordance with the Surveillance Frequency Control Program, each Control Room Isolation radiation monitoring instrumentation channel shall be demonstrated OPERABLE by verifying that the response time of the channel is within limits.

See ITS 3.3.7

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION	
1. AREA MONITORS						
a. Fuel Storage Pool Area	1	*	≤ 15 mR/hr	$10^{-1} – 10^{4}$ mR/hr	13	See ITS 3.3.8
b. Containment (CIS)	3	****	≤ 90 mR/hr	$1 – 10^{5}$ mR/hr	16	See ITS 3.3.6
c. Containment Area – Hi Range	1	1, 2, 3, & 4	≤ 10 R/hr	$1 – 10^{7}$ R/hr	15	See ITS 3.3.9
d. Control Room Isolation	1 per intake	ALL MODES	≤ 320 cpm	$10 - 10^{7}$ cpm	17	See ITS 3.3.7
2. PROCESS MONITORS (LCO 3.4.15)						
a. Containment						
i. Gaseous Activity RCS Leakage Detection	1 (or – A06)	1, 2, 3 & 4	Not Applicable	$10 – 10^{6}$ cpm (LA01)	14	
ii. Particulate Activity RCS Leakage Detection	1	1, 2, 3 & 4	Not Applicable	$10 – 10^{6}$ cpm	14	

* With fuel in the storage pool or building. See ITS 3.3.8

**** During movement of recently irradiated fuel assemblies within containment. See ITS 3.3.6

TABLE 3.3-6 (Continued)

TABLE NOTATION

ACTION 12 - DELETED

ACTION 13 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

See ITS 3.3.8

ACTIONS

ACTION 14 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.4.6.1. 3.4.15

A06

ACTION 15 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, either restore the inoperable Channel(s) to OPERABLE status within 72 hours, or:

1) Initiate the preplanned alternate method of monitoring the appropriate parameter(s),and

2) Prepare and submit a Special Report to the Commission pursuant to Specification6.9.2 within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

See ITS 3.3.9

ACTION 16 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirements, comply with the ACTION requirements of Specification 3.9.9.

See ITS 3.3.6

ACTION 17 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, within 1 hour initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation. LCO 3.0.4.a is not applicable when entering HOT SHUTDOWN.

See ITS 3.3.7

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

LCO 3.4.15 — 3.4.6.1 The following RCS leakage detection systems will [instrumentation shall] be OPERABLE:

LCO 3.4.15.a — a. The [One] reactor cavity sump inlet flow monitoring system; and

LCO 3.4.15.b — b. One containment atmosphere radioactivity monitor (gaseous or particulate).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

Condition A — a. With the reactor cavity sump inlet flow monitoring system inoperable with an operable containment particulate radioactivity monitor,
Required Action A.1 — perform a RCS water inventory balance [SR 3.4.13.1] (A02) at least once per 24* hours
Required Action A.2 — and restore the sump inlet flow monitoring system to OPERABLE status within 30 days;
ACTION D — otherwise, be in at least HOT STANDBY [MODE 3] within the next 6 hours and in COLD SHUTDOWN [MODE 5] within the following 30 [36] hours.

Condition C — b. With the reactor cavity sump inlet flow monitoring system inoperable [AND containment atmosphere particulate radioactivity monitor inoperable] with only the containment gaseous radioactivity monitor operable,
Required Action A.1 — perform an RCS water inventory balance [SR 3.4.13.1] (A02) at least once per 24* hours
Required Action C.1 — and analyze grab samples of the containment atmosphere at least once per 12 hours,
Required Action C.2 — and either restore the sump inlet flow monitoring system to OPERABLE status within 7 days or
Condition C Note — restore the containment particulate radioactivity monitor to OPERABLE status within 7 days and enter action a. above with the time in this action applied against the allowed outage time of action a.; (A03)
ACTION D — otherwise, be in at least HOT STANDBY [MODE 3] within the next 6 hours and in COLD SHUTDOWN [MODE 5] within the following 30 [36] hours.

Condition B — c. With the required radioactivity monitor inoperable,
Required Action B.1.1 — analyze grab samples of the containment atmosphere
Required Action B.1.2 — or perform a RCS water inventory balance [SR 3.4.13.1] (A02) at least once per 24* hours,
Required Action B.2 — and restore the required radioactivity monitor to OPERABLE status within 30 days;
ACTION D — otherwise, be in at least HOT STANDBY [MODE 3] within the next 6 hours and in COLD SHUTDOWN [MODE 5] within the following 30 [36] hours.

ACTION E — d. With all required monitors inoperable, enter LCO 3.0.3 immediately.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The RCS leakage detection instruments shall be demonstrated OPERABLE by:

SR 3.4.15.1, SR 3.4.15.2, SR 3.4.15.4 — a. Performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor in accordance with surveillance 4.3.3.1. [the Surveillance Frequency Control Program.] (A02)

SR 3.4.15.3 — b. Performance of the CHANNEL CALIBRATION of the reactor cavity sump inlet flow monitoring system in accordance with the Surveillance Frequency Control Program.

Required Action A.1 Note, B.1.2 Note, — * Not required to be performed until 12 hours after establishment of steady state operation.

INSTRUMENTATION

REACTOR COOLANT SYSTEMS (RCS)

RCS Leakage Detection

3/4.3.3 MONITORING INSTRUMENTATION

A04

RADIATION MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

(gaseous or particulate)

One containment

LCO 3.4.15.b 3.3.3.1 The radiation monitoring instrumentation channels shown in Table 3.3-6 shall be OPERABLE with their alarm/trip setpoints within the specified limits.

Applicability **APPLICABILITY**: As shown in Table 3.3-6. ← MODES 1, 2, 3, and 4

See ITS 3.3.6
ITS 3.3.7
ITS 3.3.8
ITS 3.3.9

ACTION:

a. With a radiation monitoring channel alarm/trip setpoint exceeding the value shown in Table 3.3-6, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable.

A04

required

ACTIONS b. With one or more radiation monitoring channels inoperable, take the ACTION shown in Table 3.3-6. ← Specification 3.4.15

c. The provisions of Specification 3.0.3 are not applicable. A05

SURVEILLANCE REQUIREMENTS

required containment

SR 3.4.15.1
SR 3.4.15.2
SR 3.4.15.4

4.3.3.1 Each radiation monitoring instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations in accordance with the Surveillance Frequency Control Program. A04

4.3.3.2 In accordance with the Surveillance Frequency Control Program, each Control Room Isolation radiation monitoring instrumentation channel shall be demonstrated OPERABLE by verifying that the response time of the channel is within limits.

See ITS 3.3.7

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION	
1. AREA MONITORS						
a. Fuel Storage Pool Area						
i. Criticality and Ventilation System Isolation Monitor	4	*	≤ 20 mR/hr	$10^{-1} – 10^{4}$ mR/hr	22	See ITS 3.3.8
b. Containment Isolation	3	****	≤ 90 mR/hr	$1 – 10^{7}$ mR/hr	25	See ITS 3.3.6
c. Containment Area – Hi Range	1	1, 2, 3 & 4	Not Applicable	$1 - 10^{7}$ R/hr	27	See ITS 3.3.9
d. Control Room Isolation	1 per intake	ALL MODES	≤ 320 cpm	$10^{-7} – 10^{-2}$ μCi/cc	26	See ITS 3.3.7
2. PROCESS MONITORS						
LCO 3.4.15 a. Containment						
i. Gaseous Activity RCS Leakage Detection	1 (A06: or)	1, 2, 3 & 4	Not Applicable	$10^{-7} – 10^{-2}$ μCi/cc (LA01)	23	
ii. Particulate Activity RCS Leakage Detection	1	1, 2, 3 & 4	Not Applicable	$10 – 10^{7}$ cpm	23	

* With fuel in the storage pool or building. (See ITS 3.3.8)

**** During movement of recently irradiated fuel assemblies within containment. (See ITS 3.3.6)

~~TABLE 3.3-6 (Continued)~~

~~ACTION STATEMENTS~~

ACTION 22 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, perform area surveys of the monitored area with portable monitoring instrumentation at least once per 24 hours.

See ITS 3.3.8

ACTIONS

~~ACTION 23~~ - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification ~~3.4.6.1~~ 3.4.15.

A06

ACTION 24 - DELETED

ACTION 25 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.9.9.

See ITS 3.3.6

ACTION 26 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirements, within 1 hour initiate and maintain operation of the control room emergency ventilation system in the recirculation mode of operation. LCO 3.0.4.a is not applicable when entering HOT SHUTDOWN.

See ITS 3.3.7

ACTION 27 - With the number of OPERABLE Channels less than required by the Minimum Channels OPERABLE requirement, either restore the inoperable Channel(s) to OPERABLE status within 72 hours, or:

1) Initiate the preplanned alternate method of monitoring the appropriate parameter(s), and

2) Prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 14 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

See ITS 3.3.9

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.4.6.1 Actions a, b, and c, state, in part, perform a RCS water inventory balance at least once per 24 hours. Unit 1 CTS 4.4.6.2.c and Unit 2 CTS 4.4.6.2.1c (i.e., RCS Operational Leakage) require demonstration that the RCS operational LEAKAGE is within limits by performance of a Reactor Coolant System water inventory balance. ITS 3.4.15 states “Perform SR 3.4.13.1 once per 24 hours.” ITS SR 3.4.13.1 requires verification that the RCS operational LEAKAGE is within limits by performance of an RCS water inventory balance.” This changes the CTS by explicitly requiring that the RCS water balance Surveillance be performed.

CTS 4.4.6.1.a requires performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor in accordance with Surveillance Requirement 4.3.3.1. The CTS 4.3.3.1 Surveillance Frequency for the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST of each radiation monitoring instrumentation channel is in accordance with the Surveillance Frequency Control Program. Therefore, the Surveillance Frequency for CTS 4.4.6.1.a is changed to “in accordance with the Surveillance Frequency Control Program” consistent with the referenced CTS 4.3.3.1 Surveillance Requirement. ITS SR 3.4.15.1, SR 3.4.15,2, and SR 3.4.15.4 Frequencies are annotated “in accordance with the Surveillance Frequency Control Program” consistent with CTS 4.4.3.1.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A03 CTS 3.4.6.1 Action b states, in part, with the reactor cavity sump inlet flow monitoring system inoperable with only the containment gaseous radioactivity monitor operable, perform an RCS water inventory balance at least once per 24 hours and analyze grab samples of the containment atmosphere at least once per 12 hours, and either restore the containment particulate radioactivity monitor to OPERABLE status within 7 days, and enter action a. above with the time in this action applied against the allowed outage time of action a.

ITS 3.4.15 ACTION C does not include the requirement “perform an RCS water inventory balance at least once per 24 hours” since with the reactor cavity sump inlet flow monitoring system inoperable, ACTION A is also entered (LCO 3.0.2), and Required Action A.1 performs the RCS water inventory balance using SR 3.4.13.1.

ITS 3.4.15 ACTION C does not include the requirement to "restore the containment particulate radioactivity monitor to OPERABLE status within 7 days." ITS Required Action C.2 restores the reactor cavity sump inlet flow monitor to OPERABLE status within 7 days. The Condition C note implies that the containment particulate radioactivity monitor is inoperable, and though not a Required Action, it remains an option to restore the containment particulate radioactivity monitor to OPERABLE status. Required Action C.2 allows 7 days to restore the reactor cavity sump inlet flow monitor to OPERABLE status before entering Condition D; therefore, the Completion Time of 7 days is also allowed to restore the containment particulate radioactivity monitor to OPERABLE status.

ITS 3.4.15 ACTION C does not include an action similar to the CTS Action b., which requires entry into Action a. and applying the time in Action b. to the allowed outage time of Action a. This is not necessary since with the reactor cavity sump inlet flow monitoring system inoperable, ACTION A is also entered (LCO 3.0.2), therefore, the allowed outage time is also accrued for ACTION A.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A04 CTS 3.3.3.1 specifies requirements for radiation monitoring instrumentation and list the requirements for each instrument in CTS Table 3.3-6, including the containment gaseous and particulate activity RCS leakage detection instrumentation. ITS 3.4.15 provides, in part, requirements for the containment gaseous and particulate activity RCS leakage detection instrumentation consistent with the requirements of CTS 3.4.6.1 and provides the requirements in the LCO, Applicability, ACTIONS, and Surveillance Requirements. This changes the CTS by presenting the gaseous and particulate activity RCS leakage detection instrument requirements without use of an instrument table. This change is acceptable as it results solely from the change in the format and presentation of the CTS necessary to conform to the ISTS. As the proposed change is the result of changes in the format and presentation of the CTS requirements, it is designated administrative.

A05 CTS 3.3.3.1 Action c states that the provisions of Specification 3.0.3 are not applicable. ITS 3.4.15 does not include an allowance waving the provisions of LCO 3.0.3. This changes the CTS by eliminating an instrumentation action requirement that conflicts with an action in Specification 3.4.6.1.

The purpose of CTS 3.3.3.1 Action c is to preclude action be taken per Specification 3.0.3 (ITS LCO 3.0.3) to shutdown the unit in the event there are no actions to perform or the actions cannot be performed within the required time when radiation monitoring instrumentation is inoperable. However, a portion of the radiation monitoring instrumentation is also utilized for RCS leakage detection. CTS 3.3.3.1 Action c states that the provisions of Specification 3.0.3 are not applicable. Yet, CTS Table 3.3-6 Action 14 (Unit 1) and Action 23 (Unit 2) require complying with Specification 3.4.6.1. CTS 3.4.6.1 Action d requires entry into Specification 3.0.3 when all required leakage detection monitors, including the containment gaseous and particulate activity RCS leakage detection instrumentation, are inoperable. Therefore, the requirements of CTS 3.3.3.1 and

CTS 3.4.6.1 appear to conflict with regard to CTS 3.0.3 compliance. This change eliminates conflicting statements regarding LCO 3.0.3 compliance by removing the Specification 3.0.3 waiver for the containment gaseous and particulate activity RCS leakage detection instrumentation and preserves the intent of the CTS requirement to apply Specification 3.0.3 when all required leakage detection monitors, including the containment gaseous and particulate activity RCS leakage detection instruments, are inoperable. This change is designated as administrative and is acceptable because it does not result in a technical change to the CTS.

A06 CTS 3.3.3.1 Table 3.3-6 requires a minimum of one channel to be OPERABLE for the containment gaseous activity RCS leakage detection monitor (Instrument 2.a.i) and the containment particulate activity RCS leakage detection monitor (Instrument 2.a.ii). The associated CTS Table 3.3-6 Action requires action to be taken pursuant to Specification 3.4.6.1. CTS 3.4.6.1.b requires either one gaseous channel or one particulate channel of the containment atmosphere radioactivity monitor to be OPERABLE and provides actions when one “required” containment atmosphere radioactivity monitor is inoperable. Consistent with CTS 3.4.6.1, ITS LCO 3.4.15.b also requires one channel of the containment atmosphere radioactivity monitor (gaseous or particulate) to be OPERABLE and ACTIONS when one “required” channel is inoperable. This changes the CTS presentation by eliminating potential confusion of the existing requirements by clarifying the intent that one channel of either the gaseous or particulate activity RCS leakage detection instrument must be OPERABLE. This change is acceptable as it represents a change in the format and presentation of the CTS to more accurately reflect the intent of the existing requirements as specified in CTS 3.4.6.1. As the proposed change is the result of changes in the format and presentation of the CTS requirements, it is designated administrative.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 (*Type 1 - Removing Details of System Design and System Description, Including Design Limits*) CTS 3.3.3.1 Table 3.3-6 for radiation monitoring instrumentation has a column specifying the Measurement Range and a specific measurement range for the containment gaseous and particulate activity RCS leakage detection instrumentation. ITS 3.4.15 does not retain the measurement range of the containment gaseous and particulate activity RCS leakage detection instrumentation. This changes the CTS by moving the instrument measurement range to the Bases.

The removal of these details, which are related to system design, from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement for the number of required channels and the appropriate Condition to enter if a required channel becomes inoperable. This change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

None

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Leakage Detection Instrumentation

3.4.6.1 LCO 3.4.15 ~~[Two of]~~ the following RCS leakage detection instrumentation shall be OPERABLE: 2

a. One ~~containment~~ reactor cavity sump inlet flow monitor, and 1

b. One containment atmosphere radioactivity monitor (gaseous or particulate)~~, and~~

~~[c. One containment air cooler condensate flow rate monitor.]~~ 2

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
Action a. A. ~~Containment~~ Reactor cavity sump inlet flow monitor inoperable.	A.1	---------------NOTE-------------- Not required until 12 hours after establishment of steady state operation. ------------------------------------- Perform SR 3.4.13.1.	Once per 24 hours (1)
	AND		
	A.2	Restore ~~containment~~ reactor cavity sump inlet flow monitor to OPERABLE status.	30 days (1)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action c. B. Required containment atmosphere radioactivity monitor inoperable.	B.1.1 Analyze grab samples of the containment atmosphere. OR B.1.2 ---------------NOTE-------------- Not required until 12 hours after establishment of steady state operation. ------------------------------------- Perform SR 3.4.13.1. AND B.2.~~1~~ Restore required containment atmosphere radioactivity monitor to OPERABLE status. ~~OR~~ ~~[B.2.2 Verify containment air cooler condensate flow rate monitor is OPERABLE.~~	Once per 24 hours Once per 24 hours 30 days (1) ~~30 days]~~ (2)
~~C. [Containment air cooler condensate flow rate monitor inoperable.~~	~~C.1 Perform SR 3.4.15.1.~~ ~~OR~~ ~~C.2 ---------------NOTE-------------- Not required until 12 hours after establishment of steady state operation. -------------------------------------~~ ~~Perform SR 3.4.13.1.~~	~~Once per 8 hours~~ ~~Once per 24 hours]~~ (2)

ACTIONS (continued)

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action b.	---------------NOTE-------------- Only applicable when the containment atmosphere gaseous radiation monitor is the only OPERABLE monitor. --- D. C. Containment Reactor cavity sump inlet flow monitor inoperable. AND [Containment air cooler condensate flow rate monitor inoperable.]	D C.1 Analyze grab samples of the containment atmosphere. AND D C.2.1 Restore containment reactor cavity sump inlet flow monitor to OPERABLE status. OR [D.2.2 Restore containment air cooler condensate flow rate monitor to OPERABLE status.]	Once per 12 hours 7 days 7 days	1, 1, 1, 2
	E. [Required containment atmosphere radioactivity monitor inoperable. AND [Containment air cooler condensate flow rate monitor inoperable.]	E.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status. OR E.2 Restore containment air cooler condensate flow rate monitor to OPERABLE status.	30 days 30 days]	2, 2
Action a., b., c.	F D. Required Action and associated Completion Time not met.	F D.1 Be in MODE 3. AND F D.2 Be in MODE 5.	6 hours 36 hours	1, 1
Action d.	G E. All required monitors inoperable.	G E.1 Enter LCO 3.0.3.	Immediately	1

ACTIONS (continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.6.1	SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	[[12] hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.6.1	SR 3.4.15.2	Perform CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitor.	[92 days OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.6.2	SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump monitor. reactor cavity inlet flow	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY	
4.4.6.1 SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2 2
SR 3.4.15.5	[Perform CHANNEL CALIBRATION of the required containment air cooler condensate flow rate monitor.	[[18] months OR In accordance with the Surveillance Frequency Control Program]]	2 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.15 RCS Leakage Detection Instrumentation

3.4.6.1 LCO 3.4.15 [Two of] the following RCS leakage detection instrumentation shall be OPERABLE: 2

a. One containment reactor cavity sump inlet flow monitor, and 1

b. One containment atmosphere radioactivity monitor (gaseous or particulate), and

[c. One containment air cooler condensate flow rate monitor.] 2

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a. A. Containment Reactor cavity sump inlet flow monitor inoperable.	A.1 ---------------NOTE-------------- Not required until 12 hours after establishment of steady state operation. -------------------------------------	1
	Perform SR 3.4.13.1.	Once per 24 hours
	AND	
	A.2 Restore containment reactor cavity sump inlet flow monitor to OPERABLE status.	30 days 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action c. B. Required containment atmosphere radioactivity monitor inoperable.	B.1.1 Analyze grab samples of the containment atmosphere. OR B.1.2 ---------------NOTE-------------- Not required until 12 hours after establishment of steady state operation. ------------------------------------- Perform SR 3.4.13.1. AND B.2.~~1~~ Restore required containment atmosphere radioactivity monitor to OPERABLE status. ~~OR~~ ~~[B.2.2 Verify containment air cooler condensate flow rate monitor is OPERABLE.~~	Once per 24 hours Once per 24 hours 30 days (1) ~~30 days]~~ (2)
~~C. [Containment air cooler condensate flow rate monitor inoperable.~~	~~C.1 Perform SR 3.4.15.1.~~ ~~OR~~ ~~C.2 ---------------NOTE--------------~~ ~~Not required until 12 hours after establishment of steady state operation.~~ ~~-------------------------------------~~ ~~Perform SR 3.4.13.1.~~	~~Once per 8 hours~~ ~~Once per 24 hours]~~ (2)

ACTIONS (continued)

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action b.	---------------NOTE-------------- Only applicable when the containment atmosphere gaseous radiation monitor is the only OPERABLE monitor. -------------------------------------- D. C. Containment Reactor cavity sump inlet flow monitor inoperable. AND [Containment air cooler condensate flow rate monitor inoperable.]	D. C.1 Analyze grab samples of the containment atmosphere. AND D. C.2.1 Restore containment reactor cavity sump inlet flow monitor to OPERABLE status. OR [D.2.2 Restore containment air cooler condensate flow rate monitor to OPERABLE status.]	Once per 12 hours 7 days 7 days	1 1 1 2
	E. [Required containment atmosphere radioactivity monitor inoperable. AND [Containment air cooler condensate flow rate monitor inoperable.]	E.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status. OR E.2 Restore containment air cooler condensate flow rate monitor to OPERABLE status.	30 days 30 days]	2 2
Action a., b., c.	F. D. Required Action and associated Completion Time not met.	F. D.1 Be in MODE 3. AND F. D.2 Be in MODE 5.	6 hours 36 hours	1 1
Action d.	G. E. All required monitors inoperable.	G. E.1 Enter LCO 3.0.3.	Immediately	1

ACTIONS (continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.6.1	SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	[[12] hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.6.1	SR 3.4.15.2	Perform CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitor.	[92 days OR In accordance with the Surveillance Frequency Control Program]	2 2
4.4.6.2	SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump monitor. reactor cavity inlet flow	[[18] months OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.6.1	SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	~~[[18] months~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2
	~~SR 3.4.15.5~~	~~[Perform CHANNEL CALIBRATION of the required containment air cooler condensate flow rate monitor.~~	~~[[18] months~~ ~~OR~~ ~~In accordance with the Surveillance Frequency Control Program]]~~	2 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.15, RCS LEAKAGE DETECTION INSTRUMENTATION

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Leakage Detection Instrumentation

BASES

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45, Revision 0, (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all unidentified LEAKAGE. ~~[In addition to meeting the OPERABILITY requirements, the monitors are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.]~~ 2

reactor cavity

The ~~containment~~ sump used to collect unidentified LEAKAGE [is~~] [(or) and the containment air cooler condensate flow rate monitor] [are]~~ instrumented to alarm for increases above in the normal flow rates. 1 2

The reactor coolant contains radioactivity that, when released to the containment, may be detected by radiation monitoring instrumentation. Radioactivity detection systems are included for monitoring both particulate and gaseous activities, because of their sensitivities and rapid responses to RCS LEAKAGE. 1

The measurement range of the containment particulate and gaseous radioactivity monitoring instruments is 10 to 10^6 cpm.

~~Other indications may be used to detect an increase in unidentified LEAKAGE; however, they are not required to be OPERABLE by this LCO. An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. Dew point temperature measurements can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential RCS LEAKAGE.~~ 1

~~Since the humidity level is influenced by several factors, a quantitative evaluation of an indicated leakage rate by this means may be questionable and should be compared to observed increases in liquid flow into or from the containment sump [and condensate flow from air coolers]. Humidity level monitoring is considered most useful as an indirect alarm or indication to alert the operator to a potential problem. Humidity monitors are not required by this LCO.~~ 1

BASES

BACKGROUND (continued)

Air temperature and pressure monitoring methods may also be used to infer unidentified LEAKAGE to the containment. Containment temperature and pressure fluctuate slightly during plant operation, but a rise above the normally indicated range of values may indicate RCS LEAKAGE into the containment. The relevance of temperature and pressure measurements is affected by containment free volume and, for temperature, detector location. Alarm signals from these instruments can be valuable in recognizing rapid and sizable leakage to the containment. Temperature and pressure monitors are not required by this LCO.

The above-mentioned LEAKAGE detection methods or systems differ in sensitivity and response time. ~~[Some of these systems could serve as early alarm systems signaling the operators that closer examination of other detection systems is necessary to determine the extent of any corrective action that may be required.]~~ (2)

APPLICABLE SAFETY ANALYSES

The need to evaluate the severity of an alarm or an indication is important to the operators, and the ability to compare and verify with indications from other systems is necessary.

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area are necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE provides quantitative information to the operators, allowing them to take corrective action should leakage occur detrimental to the safety of the facility and the public.

RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide confidence that small amounts of unidentified LEAKAGE are detected in time to allow actions to place the plant in a safe condition when RCS LEAKAGE indicates possible RCPB degradation.

The LCO requires ~~[three]~~ two instruments to be OPERABLE. (2)

The ~~containment~~ reactor cavity sump is used to collect unidentified LEAKAGE. ~~[The containment sump consists of the normal sump and the emergency sump.~~ The LCO requirements apply to the total amount of unidentified LEAKAGE collected in ~~[~~the~~][both]~~ sump~~[s]~~.~~]~~ The monitor on the ~~containment~~ reactor cavity sump detects ~~[level or~~ flow rate ~~or the operating frequency of a pump]~~ and is instrumented to detect when there is ~~[leakage of] [~~an (1) (2) (1) (2)

BASES

LCO (continued)

increase above the normal value by] 1 gpm. The identification of [an increase in] unidentified LEAKAGE will be delayed by the time required for the unidentified LEAKAGE to travel to the containment reactor cavity sump and it may take longer than one hour to detect a 1 gpm increase in unidentified LEAKAGE, depending on the origin and magnitude of the LEAKAGE. This sensitivity is acceptable for ~~containment~~ reactor cavity sump inlet flow monitor OPERABILITY. 1 1

The reactor coolant contains radioactivity that, when released to the containment, can be detected by the gaseous or particulate containment atmosphere radioactivity monitor. Only one of the two detectors is required to be OPERABLE. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS LEAKAGE, but have recognized limitations. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. If there are few fuel element cladding defects and low levels of activation products, it may not be possible for the gaseous or particulate containment atmosphere radioactivity monitors to detect a 1 gpm increase within 1 hour during normal operation. However, the gaseous or particulate containment atmosphere radioactivity monitor is OPERABLE when it is capable of detecting a 1 gpm increase in unidentified LEAKAGE within 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors (Reference 3).

~~[An increase in humidity of the containment atmosphere could indicate the release of water vapor to the containment. Condensate flow from air coolers is instrumented to detect when there is an increase above the normal value by 1 gpm. The time required to detect a 1 gpm increase above the normal value varies based on environmental and system conditions and may take longer than 1 hour. This sensitivity is acceptable for containment air cooler condensate flow rate monitor OPERABILITY.]~~ 2

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the ~~containment~~ reactor cavity sump inlet flow monitor, in combination with a particulate or gaseous radioactivity monitor ~~[and a containment air cooler condensate flow rate monitor]~~, provides an acceptable minimum. 1 2

APPLICABILITY

Because of elevated RCS temperature and pressure in MODES 1, 2, 3, and 4, RCS leakage detection instrumentation is required to be OPERABLE.

BASES

APPLICABILITY (continued)

In MODE 5 or 6, the temperature is ≤ 200°F and pressure is maintained low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, 3, and 4, the likelihood of leakage and crack propagation is much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

ACTIONS

A.1 and A.2

reactor cavity inlet flow

If the containment sump monitor is inoperable, no other form of sampling can provide the equivalent information. 1

However, the containment atmosphere radioactivity monitor will provide indications of changes in leakage. Together with the containment atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must be performed at an increased frequency of 24 hours to provide information that is adequate to detect leakage. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and [RCP seal injection and return flows]). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. 2

Restoration of the sump monitor to OPERABLE status is required to regain the function in a Completion Time of 30 days after the monitor's failure. This time is acceptable considering the frequency and adequacy of the RCS water inventory balance required by Required Action A.1.

B.1.1, B.1.2, B.2.1, and B.2.2 1

With both gaseous and particulate containment atmosphere radioactivity monitoring instrumentation channels inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed, or water inventory balances, in accordance with SR 3.4.13.1, must be performed to provide alternate periodic information. With a sample obtained and analyzed or an inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of at least one of the radioactivity monitors.

[Alternatively, continued operation is allowed if the air cooler condensate flow rate monitoring system is OPERABLE, provided grab samples are taken or water inventory balance performed every 24 hours.] 2

BASES

ACTIONS (continued)

The 24 hour interval provides periodic information that is adequate to detect leakage. A Node is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown~~, and [RCP seal injection and return flows]~~). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day Completion Time recognizes at least one other form of leakage detection is available. 2

~~[C.1 and C.2~~

~~If the containment air cooler condensate flow rate monitor is inoperable, alternative action is again required. Either SR 3.4.15.1 must be performed, or water inventory balances, in accordance with SR 3.4.13.1, must be performed to provide alternate periodic information. Provided a CHANNEL CHECK is performed every 8 hours or an inventory balance is performed every 24 hours, reactor operation may continue while awaiting restoration of the containment air cooler condensate flow rate monitor to OPERABLE status.~~ 2

~~The 24 hour interval provides periodic information that is adequate to detect RCS LEAKAGE. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and [RCP seal injection and return flows]). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.]~~ 2

C.1 and C.2
~~D.1, D.2.1, and D.2.2~~ 1

reactor cavity | inlet flow

With the ~~containment~~ sump monitor~~, [and the containment air cooler condensate flow rate monitor]~~ inoperable, the only means of detecting LEAKAGE is the required containment atmosphere radiation monitor. A Note clarifies that this Condition is only applicable when the only OPERABLE monitor is the required containment atmosphere gaseous radiation monitor. The containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within one hour when RCS activity is low. In addition, this configuration does not provide the required diverse means of leakage detection. Indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken and analyzed every 12 hours to provide 2

BASES

ACTIONS (continued)

alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage. The Required Action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. The 7 day Completion Time ensures that the plant will not be operated in a degraded configuration for a lengthy time period. The Note assumes the containment particulate radioactivity monitor is inoperable. If the containment particulate radioactivity monitor is restored to OPERABLE status within the 7 day Completion Time to restore the reactor cavity sump inlet flow monitor to OPERABLE status, the Condition may be exited. 1

~~E.1 and E.2~~

~~If the required containment atmosphere radioactivity monitor [and the containment air cooler condensate flow rate monitor] are inoperable, the only means of detecting leakage is the containment sump monitor. This Condition does not provide the required diverse means of leakage detection. The Required Action is to restore either of the inoperable monitors to OPERABLE status within 30 days to regain the intended leakage detection diversity. The 30 day Completion Times ensure that the plant will not be operated in a reduced configuration for a lengthy time period.~~ 1

~~F~~D.1 and ~~F~~D.2 1

If any Required Action of Condition A, B, or ~~[~~C~~], [D] or [E]~~ cannot be met within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. 1

~~G~~E.1 1

If all required monitors are inoperable, no automatic means of monitoring leakage are available and immediate plant shutdown in accordance with LCO 3.0.3 is required.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitors. The check gives reasonable confidence the channel is operating properly. ~~[The Frequency of [12] hours is based on instrument reliability and is reasonable for detecting off normal conditions.~~ 2

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------REVIEWER'S NOTE-----------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 2
~~--]~~

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitors. The test ensures that the monitor can perform its function in the desired manner. The test verifies the alarm setpoint and relative accuracy of the instrument string. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other

BASES

SURVEILLANCE REQUIREMENTS (continued)

Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. [The Frequency of 92 days considers instrument reliability, and operating experience has shown it proper for detecting degradation. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.]
----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

and

SR 3.4.15.3, SR 3.4.15.4, and [SR 3.4.15.5] 1

These SRs require the performance of a CHANNEL CALIBRATION for each of the RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. [The Frequency of [18] months is a typical refueling cycle and considers channel reliability. Operating experience has shown this Frequency is acceptable. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

BASES

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.

2. Regulatory Guide 1.45, Revision 0, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

3. U FSAR, Section ~~[ ]~~ 5.2.4. 1 2

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.15 RCS Leakage Detection Instrumentation

BASES

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of RCS LEAKAGE. Regulatory Guide 1.45, Revision 0, (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all unidentified LEAKAGE. [In addition to meeting the OPERABILITY requirements, the monitors are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.] 2

reactor cavity

The containment sump used to collect unidentified LEAKAGE [is] [(or) and the containment air cooler condensate flow rate monitor] [are] instrumented to alarm for increases above in the normal flow rates. 1 2

The reactor coolant contains radioactivity that, when released to the containment, may be detected by radiation monitoring instrumentation. Radioactivity detection systems are included for monitoring both particulate and gaseous activities, because of their sensitivities and rapid responses to RCS LEAKAGE. 1

The measurement range of the containment particulate radioactivity monitoring instrument is 10 to 10^7 cpm. The measurement range of the containment gaseous radioactivity monitoring instrument is 10^{-7} to 10^{-2} μCi/cc.

Other indications may be used to detect an increase in unidentified LEAKAGE; however, they are not required to be OPERABLE by this LCO. An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. Dew point temperature measurements can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential RCS LEAKAGE. 1

Since the humidity level is influenced by several factors, a quantitative evaluation of an indicated leakage rate by this means may be questionable and should be compared to observed increases in liquid flow into or from the containment sump [and condensate flow from air coolers]. Humidity level monitoring is considered most useful as an indirect alarm or indication to alert the operator to a potential problem. Humidity monitors are not required by this LCO. 1

BASES

BACKGROUND (continued)

Air temperature and pressure monitoring methods may also be used to infer unidentified LEAKAGE to the containment. Containment temperature and pressure fluctuate slightly during plant operation, but a rise above the normally indicated range of values may indicate RCS LEAKAGE into the containment. The relevance of temperature and pressure measurements is affected by containment free volume and, for temperature, detector location. Alarm signals from these instruments can be valuable in recognizing rapid and sizable leakage to the containment. Temperature and pressure monitors are not required by this LCO.

The above-mentioned LEAKAGE detection methods or systems differ in sensitivity and response time. ~~[Some of these systems could serve as early alarm systems signaling the operators that closer examination of other detection systems is necessary to determine the extent of any corrective action that may be required.]~~ 2

APPLICABLE SAFETY ANALYSES

The need to evaluate the severity of an alarm or an indication is important to the operators, and the ability to compare and verify with indications from other systems is necessary.

The safety significance of RCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS LEAKAGE into the containment area are necessary. Quickly separating the identified LEAKAGE from the unidentified LEAKAGE provides quantitative information to the operators, allowing them to take corrective action should leakage occur detrimental to the safety of the facility and the public.

RCS leakage detection instrumentation satisfies Criterion 1 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide confidence that small amounts of unidentified LEAKAGE are detected in time to allow actions to place the plant in a safe condition when RCS LEAKAGE indicates possible RCPB degradation.

The LCO requires ~~[three]~~ two instruments to be OPERABLE. 2

The ~~containment~~ reactor cavity sump is used to collect unidentified LEAKAGE. ~~[The containment sump consists of the normal sump and the emergency sump.~~ The LCO requirements apply to the total amount of unidentified LEAKAGE collected in ~~[~~the~~][both]~~ sump~~[s]~~.~~]~~ The monitor on the ~~containment~~ reactor cavity sump detects ~~[level or~~ flow rate ~~or the operating frequency of a pump]~~ and is instrumented to detect when there is ~~[leakage of]~~ ~~[~~an 1 2 1 2

BASES

LCO (continued)

increase above the normal value by] 1 gpm. The identification of [an increase in] unidentified LEAKAGE will be delayed by the time required for the unidentified LEAKAGE to travel to the containment reactor cavity sump and it may take longer than one hour to detect a 1 gpm increase in unidentified LEAKAGE, depending on the origin and magnitude of the LEAKAGE. This sensitivity is acceptable for ~~containment~~ reactor cavity sump inlet flow monitor OPERABILITY. 1 1

The reactor coolant contains radioactivity that, when released to the containment, can be detected by the gaseous or particulate containment atmosphere radioactivity monitor. Only one of the two detectors is required to be OPERABLE. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS LEAKAGE, but have recognized limitations. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. If there are few fuel element cladding defects and low levels of activation products, it may not be possible for the gaseous or particulate containment atmosphere radioactivity monitors to detect a 1 gpm increase within 1 hour during normal operation. However, the gaseous or particulate containment atmosphere radioactivity monitor is OPERABLE when it is capable of detecting a 1 gpm increase in unidentified LEAKAGE within 1 hour given an RCS activity equivalent to that assumed in the design calculations for the monitors (Reference 3).

~~[An increase in humidity of the containment atmosphere could indicate the release of water vapor to the containment. Condensate flow from air coolers is instrumented to detect when there is an increase above the normal value by 1 gpm. The time required to detect a 1 gpm increase above the normal value varies based on environmental and system conditions and may take longer than 1 hour. This sensitivity is acceptable for containment air cooler condensate flow rate monitor OPERABILITY.]~~ 2

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the ~~containment~~ reactor cavity sump inlet flow monitor, in combination with a particulate or gaseous radioactivity monitor ~~[and a containment air cooler condensate flow rate monitor]~~, provides an acceptable minimum. 1 2

APPLICABILITY

Because of elevated RCS temperature and pressure in MODES 1, 2, 3, and 4, RCS leakage detection instrumentation is required to be OPERABLE.

BASES

APPLICABILITY (continued)

In MODE 5 or 6, the temperature is ≤ 200°F and pressure is maintained low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, 3, and 4, the likelihood of leakage and crack propagation is much smaller. Therefore, the requirements of this LCO are not applicable in MODES 5 and 6.

ACTIONS

A.1 and A.2

reactor cavity inlet flow

If the ~~containment~~ sump monitor is inoperable, no other form of sampling can provide the equivalent information. 1

However, the containment atmosphere radioactivity monitor will provide indications of changes in leakage. Together with the containment atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance, SR 3.4.13.1, must be performed at an increased frequency of 24 hours to provide information that is adequate to detect leakage. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown~~, and [RCP seal injection and return flows]~~). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. 2

Restoration of the sump monitor to OPERABLE status is required to regain the function in a Completion Time of 30 days after the monitor's failure. This time is acceptable considering the frequency and adequacy of the RCS water inventory balance required by Required Action A.1.

B.1.1, B.1.2, ~~B.2.1,~~ and B.2~~.2~~ 1

With both gaseous and particulate containment atmosphere radioactivity monitoring instrumentation channels inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed, or water inventory balances, in accordance with SR 3.4.13.1, must be performed to provide alternate periodic information. With a sample obtained and analyzed or an inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of at least one of the radioactivity monitors.

~~[Alternatively, continued operation is allowed if the air cooler condensate flow rate monitoring system is OPERABLE, provided grab samples are taken or water inventory balance performed every 24 hours.]~~ 2

BASES

ACTIONS (continued)

The 24 hour interval provides periodic information that is adequate to detect leakage. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and [RCP seal injection and return flows]). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day Completion Time recognizes at least one other form of leakage detection is available. 2

[C.1 and C.2

If the containment air cooler condensate flow rate monitor is inoperable, alternative action is again required. Either SR 3.4.15.1 must be performed, or water inventory balances, in accordance with SR 3.4.13.1, must be performed to provide alternate periodic information. Provided a CHANNEL CHECK is performed every 8 hours or an inventory balance is performed every 24 hours, reactor operation may continue while awaiting restoration of the containment air cooler condensate flow rate monitor to OPERABLE status. 2

The 24 hour interval provides periodic information that is adequate to detect RCS LEAKAGE. A Note is added allowing that SR 3.4.13.1 is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and [RCP seal injection and return flows]). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.] 2

C.1 and C.2

D.1, D.2.1, and D.2.2 1

reactor cavity inlet flow

With the containment sump monitor, [and the containment air cooler condensate flow rate monitor] inoperable, the only means of detecting LEAKAGE is the required containment atmosphere radiation monitor. A Note clarifies that this Condition is only applicable when the only OPERABLE monitor is the required containment atmosphere gaseous radiation monitor. The containment atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within one hour when RCS activity is low. In addition, this configuration does not provide the required diverse means of leakage detection. Indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken and analyzed every 12 hours to provide 2

BASES

ACTIONS (continued)

alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage. The Required Action provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. The 7 day Completion Time ensures that the plant will not be operated in a degraded configuration for a lengthy time period. The Note assumes the containment particulate radioactivity monitor is inoperable. If the containment particulate radioactivity monitor is restored to OPERABLE status within the 7 day Completion Time to restore the reactor cavity sump inlet flow monitor to OPERABLE status, the Condition may be exited. 1

E.1 and E.2

If the required containment atmosphere radioactivity monitor [and the containment air cooler condensate flow rate monitor] are inoperable, the only means of detecting leakage is the containment sump monitor. This Condition does not provide the required diverse means of leakage detection. The Required Action is to restore either of the inoperable monitors to OPERABLE status within 30 days to regain the intended leakage detection diversity. The 30 day Completion Times ensure that the plant will not be operated in a reduced configuration for a lengthy time period. 1

D F.1 and D F.2 1

If any Required Action of Condition A, B, or [C], [D] or [E] cannot be met within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. 1

E G.1 1

If all required monitors are inoperable, no automatic means of monitoring leakage are available and immediate plant shutdown in accordance with LCO 3.0.3 is required.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity monitors. The check gives reasonable confidence the channel is operating properly. [The Frequency of [12] hours is based on instrument reliability and is reasonable for detecting off normal conditions. (2)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. (2)
--]

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a CHANNEL FUNCTIONAL TEST of the required containment atmosphere radioactivity monitors. The test ensures that the monitor can perform its function in the desired manner. The test verifies the alarm setpoint and relative accuracy of the instrument string. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other

BASES

SURVEILLANCE REQUIREMENTS (continued)

Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. [The Frequency of 92 days considers instrument reliability, and operating experience has shown it proper for detecting degradation. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.]

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

and

SR 3.4.15.3, SR 3.4.15.4, and [SR 3.4.15.5] 1

These SRs require the performance of a CHANNEL CALIBRATION for each of the RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. [The Frequency of [18] months is a typical refueling cycle and considers channel reliability. Operating experience has shown this Frequency is acceptable. 2

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 2
--]

BASES

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.

2. Regulatory Guide 1.45, Revision 0, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

3. U FSAR, Section ~~[ ]~~ 5.2.5. 1 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.15, BASES, RCS LEAKAGE DETECTION INSTRUMENTATION

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.15, RCS LEAKAGE DETECTION INSTRUMENTATION

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 16

3.4.16, RCS Specific Activity

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 within limits.

LCO 3.4.16 ~~3.4.8~~ ~~The~~ specific activity ~~of the primary coolant~~ shall be ~~limited to:~~

SR 3.4.16.2 ~~a.~~ ≤ 1.0 µCi/gram DOSE EQUIVALENT I-131, and

SR 3.4.16.1 ~~b.~~ ≤ 518.9 µCi/gram DOSE EQUIVALENT XE-133.

Applicability **APPLICABILITY**: MODES 1, 2, 3, and 4.

ACTION:

Condition A
Required Action A.1 ~~a.~~ ~~With the specific activity of the primary coolant >1.0 µCi/gram~~ DOSE EQUIVALENT I-131 [not within limits], verify DOSE EQUIVALENT I-131 is ≤ 60.0 µCi/gram once per four hours.

Required Action A.2 ~~b.~~ With the specific activity of the primary coolant > 1.0 µCi/gram DOSE EQUIVALENT I-131, but ≤ 60.0 µCi/gram DOSE EQUIVALENT I-131, operation may continue for up to 48 hours ~~while efforts are made to~~ restore DOSE EQUIVALENT I-131 to within ~~the 1.0 µCi/gram~~ limit. LCO 3.0.4.c is applicable.

Required Action A.1 and A.2 Note

Condition C
Required Action C.1 and C.2 ~~c.~~ With the specific activity of the primary coolant > 1.0 µCi/gram DOSE EQUIVALENT I-131 for greater than 48 hours during one continuous time interval, or > 60.0 µCi/gram DOSE EQUIVALENT I-131, be in ~~HOT STANDBY~~ [MODE 3] within 6 hours and ~~COLD SHUTDOWN~~ [MODE 5] within ~~the following~~ ~~30~~ [36] hours.

Required Action B.1 ~~d.~~ With the specific activity of the primary coolant > 518.9 µCi/gram DOSE EQUIVALENT XE-133, operation may continue for up to 48 hours ~~while efforts are made to~~ restore DOSE EQUIVALENT XE-133 to within ~~the 518.9 µCi/gram DOSE EQUIVALENT XE-133~~ limit. LCO 3.0.4.c is applicable.

Required Action B.1 Note

Condition C
Required Action C.1 and C.2 ~~e.~~ With the specific activity of the primary coolant > 518.9 µCi/gram DOSE EQUIVALENT XE-133 for greater than 48 hours during one continuous time interval, be in ~~HOT STANDBY~~ [MODE 3] within 6 hours and ~~COLD SHUTDOWN~~ [MODE 5] within ~~the following~~ ~~30~~ [36] hours.

SURVEILLANCE REQUIREMENTS

Verify reactor coolant DOSE EQUIVALENT XE-133; Verify reactor coolant DOSE EQUIVALENT I-131

SR 3.4.16.1
SR 3.4.16.2 ~~4.4.8~~ ~~The~~ specific activity ~~of the primary coolant shall be determined to be~~ within ~~the~~ limits ~~by performing sampling and analysis as described in Table 4.4-4~~.

A01

REACTOR COOLANT SYSTEM

~~DELETED~~

TABLE 4.4-4

PRIMARY COOLANT SPECIFIC ACTIVITY SAMPLE AND ANALYSIS

	TYPE OF MEASUREMENT AND ANALYSIS	MINIMUM FREQUENCY	MODES IN WHICH SAMPLE AND ANALYSIS REQUIRED
SR 3.4.16.1	1. DOSE EQUIVALENT XE-133 Determination	SFCP	1, 2, 3 and 4
SR 3.4.16.2	2. Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	SFCP	1
Required Action A.1 (LA01)	3. Isotopic Analysis for Iodine Including I-131, I-132, I-133, I-134, and I-135	a) Once per 4 hours, whenever the DOSE EQUIVALENT I-131 exceeds 1.0 µCi/gram, and	1#, 2#, 3#, and 4# (A02)
SR 3.4.16.2 Frequency		b) One sample between 2 and 6 hours following (after) a THERMAL POWER change exceeding (≥) 15 percent of the RATED THERMAL POWER within a one hour period. (A03)	1, 2, 3

Until the specific activity of the primary coolant system is restored within its limits. (A02)

~~DELETED~~

REACTOR COOLANT SYSTEM

3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

LCO 3.4.16 3.4.8 The [RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133] specific activity of the primary coolant shall be [within limits.] limited to:

SR 3.4.16.2 a. Less than or equal to 1.0 microcurie/gram DOSE EQUIVALENT I-131, and

SR 3.4.16.1 b. Less than or equal to 518.9 microcuries/gram DOSE EQUIVALENT XE-133.

Applicability **APPLICABILITY**: MODES 1, 2, 3, and 4

ACTION:

Condition A, Required Action A.1 — a. With the specific activity of the primary coolant > 1.0 µCi/gram DOSE EQUIVALENT I-131, [not within limits] verify DOSE EQUIVALENT I-131 is ≤ 60.0 µCi/gram once per four hours.

Required Action A.2 — b. With the specific activity of the primary coolant > 1.0 µCi/gram DOSE EQUIVALENT I-131, but ≤ 60.0 µCi/gram DOSE EQUIVALENT I-131, operation may continue for up to 48 hours while efforts are made to restore DOSE EQUIVALENT I-131 to within the 1.0 µCi/gram limit.

Required Action A.1 and A.2 Note — LCO 3.0.4.c is applicable.

Condition C — c. With the specific activity of the primary coolant > 1.0 µCi/gram DOSE EQUIVALENT I-131 for greater than 48 hours during one continuous time interval, or > 60.0 µCi/gram DOSE EQUIVALENT I-131,

Required Action C.1 and C.2 — be in HOT STANDBY [MODE 3] within 6 hours and COLD SHUTDOWN [MODE 5] within the following 30 [36] hours.

Required Action B.1 — d. With the specific activity of the primary coolant > 518.9 µCi/gram DOSE EQUIVALENT XE-133, operation may continue for up to 48 hours while efforts are made to restore DOSE EQUIVALENT XE-133 to within the 518.9 µCi/gram DOSE EQUIVALENT XE-133 limit.

Required Action B.1 Note — LCO 3.0.4.c is applicable.

Condition C — e. With the specific activity of the primary coolant > 518.9 µCi/gram DOSE EQUIVALENT XE-133 for greater than 48 hours during one continuous time interval,

Required Action C.1 and C.2 — be in HOT STANDBY [MODE 3] within 6 hours and COLD SHUTDOWN [MODE 5] within the following 30 [36] hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1
SR 3.4.16.2 4.4.8 The [Verify reactor coolant DOSE EQUIVALENT XE-133; Verify reactor coolant DOSE EQUIVALENT I-131] specific activity of the primary coolant shall be determined to be within the limits by performing sampling and analysis as described in Table 4.4-4.

REACTOR COOLANT SYSTEM

DELETED

TABLE 4.4-4

PRIMARY COOLANT SPECIFIC ACTIVITY SAMPLE

AND ANALYSIS

	TYPE OF MEASUREMENT AND ANALYSIS	MINIMUM FREQUENCY	MODES IN WHICH SAMPLE AND ANALYSIS REQUIRED
SR 3.4.16.1	1. DOSE EQUIVALENT XE-133 Determination	SFCP	1, 2, 3, and 4
SR 3.4.16.2	2. Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	SFCP	1
LA01			
Required Action A.1	3. Isotopic Analysis for Iodine Including I-131, I-132, I-133, I-134, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1 micro-Ci/gram, DOSE EQUIVALENT I-131, and	1#, 2#, 3#, and 4# A02
SR 3.4.16.2 Frequency		b) One sample between 2 and 6 hours following after a THERMAL POWER change exceeding ≥ 15% of the RATED THERMAL POWER within a 1-hour period. A03	1, 2, 3

Until the specific activity of the primary coolant system is restored within its limits. A02

A01

~~DELETED~~

DISCUSSION OF CHANGES
ITS 3.4.16, RCS SPECIFIC ACTIVITY

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.4.8 (MODES 1, 2, 3, and 4), ACTION a, requires Table 4.4-4, Sampling Test 3.a, Isotopic Analysis for Iodine, to be performed every 4 hours until the specific activity of the primary coolant is restored to within its limits. This is also restated in CTS Table 4.4-4, Footnote #. ITS 3.4.16 Required Action A.1 essentially requires the same analysis; however, the explicit statement to perform the isotopic analysis for iodine "until restored to within limits" is not included. This changes the CTS by deleting the explicit statement to perform the isotopic analysis for iodine until the limits are met.

The purpose of the statement "until the specific activity of the primary coolant is restored to within its limits," in CTS 3.4.8 (MODES 1, 2, 3, and 4) ACTION a., Table 4.4-4 Item 3.a, and footnote #, is to ensure the Surveillance is performed until the limit is met. In ITS, stating that the analysis is required until the specific activity is within limits is unnecessary. ITS LCO 3.0.2 requires the Required Actions of the entered Condition(s) to be performed upon discovery of failure to meet the LCO, until the LCO is met. If the LCO is met or is no longer applicable prior to the expiration of the specified Completion Time(s), completion of the Required Action(s) is not required unless otherwise stated. This change is acceptable since ITS LCO 3.0.2 will require the Required Action to be performed until the LCO is met. This change is designated as administrative because it does not result in technical changes to the CTS.

A03 CTS Table 4.4-4 Item 3.b Frequency requires, that one sample between 2 and 6 hours following a THERMAL POWER change exceeding (i.e., >) 15% of the RATED THERMAL POWER within a one hour period. ITS SR 3.4.16.2 Frequency requires, one sample between 2 and 6 hours after a THERMAL POWER change of greater than or equal to (i.e., ≥) 15% RTP within 1 hour. This changes the CTS by requiring one sample to be taken between 2 and 6 hours after a THERMAL POWER change of greater than or equal to (i.e., ≥) 15% RTP within 1 hour.

The purpose of CTS Table 4.4-4 Item 3.b Frequency is to ensure one sample is taken between 2 and 6 hours following a THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period. This change is acceptable because ITS SR 3.4.16.2 requires essentially the same Frequency with a sample between 2 and 6 hours after a THERMAL POWER change of greater than or equal to 15% RTP within 1 hour. This change is designated as administrative because it does not result in technical changes to CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS Table 4.4-4, Item 2 requires an isotopic analysis to determine whether DOSE EQUIVALENT I-131 concentration is within limit. CTS Table 4.4-4, Item 3 requires an isotopic analysis for iodine including I-131, I-132, I-133, I-134 and I-135. ITS SR 3.4.16.2 requires the verification that reactor coolant DOSE EQUIVALENT I-131 specific activity is within limit. ITS 3.4.16 Required Action A.1 requires the verification that DOSE EQUIVALENT I-131 is within the acceptable region. This changes the CTS by moving the detail that an isotopic analysis must be performed to satisfy the requirements of the Surveillances to the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. ITS SR 3.4.16.2 and ITS 3.4.16 Required Action A.1 still retain the requirements to verify reactor coolant DOSE EQUIVALENT I-131 is within limit. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

None

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

3.4.8 LCO 3.4.16 RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits.

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.8.a 3.4.8.b	A. DOSE EQUIVALENT I-131 not within limit.	--------------------NOTE------------------- LCO 3.0.4.c is applicable. ---	
3.4.8.a		A.1 Verify DOSE EQUIVALENT I-131 ≤ [60] μCi/gm. AND	Once per 4 hours
3.4.8.b		A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
3.4.8.d 3.4.8.d Note	B. DOSE EQUIVALENT XE-133 not within limit.	--------------------NOTE------------------- LCO 3.0.4.c is applicable. ---	
3.4.8.d		B.1 Restore DOSE EQUIVALENT XE-133 to within limit.	48 hours

2

ACTIONS (continued)

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.8.c 3.4.8.d 3.4.8.c	C. Required Action and associated Completion Time of Condition A or B not met. OR DOSE EQUIVALENT I-131 > [60] μCi/gm.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours	2

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
4.4.8 Table 4.4-4 Item 1.	SR 3.4.16.1	-----NOTE----- Only required to be performed in MODE 1. --------------		3
3.4.8.b Table 4.4-4 Item 1.		Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ [280] 518.9 μCi/gm.	[7 days OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
4.4.8 Table 4.4-4 Item 2.	SR 3.4.16.2	-------------------------------NOTE------------------------------ Only required to be performed in MODE 1. --		
3.4.8.a		Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ [1.0] μCi/gm.	[14 days OR	2
Table 4.4-4 Item 1. and 2.			In accordance with the Surveillance Frequency Control Program]	2
			AND	
Table 4.4-4 Item 3.b			Between 2 and 6 hours after THERMAL POWER change of ≥ 15% RTP within a 1 hour period	

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

3.4.8 LCO 3.4.16 RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits.

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CTS	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.4.8.a 3.4.8.b	A. DOSE EQUIVALENT I-131 not within limit.	--------------------NOTE-------------------- LCO 3.0.4.c is applicable. ---	
3.4.8.a		A.1 Verify DOSE EQUIVALENT I-131 ≤ [60] μCi/gm.	Once per 4 hours
		AND	
3.4.8.b		A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
3.4.8.d 3.4.8.d Note	B. DOSE EQUIVALENT XE-133 not within limit.	--------------------NOTE-------------------- LCO 3.0.4.c is applicable. ---	
3.4.8.d		B.1 Restore DOSE EQUIVALENT XE-133 to within limit.	48 hours

2

1

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.4.8.c 3.4.8.d 3.4.8.c	C. Required Action and associated Completion Time of Condition A or B not met. OR DOSE EQUIVALENT I-131 > [60] µCi/gm.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours	2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.4.8 Table 4.4-4 Item 1.	SR 3.4.16.1	----------NOTE---------- Only required to be performed in MODE 1. ----------------------------		3
3.4.8.b		Verify reactor coolant DOSE EQUIVALENT XE-133 specific activity ≤ [280] 518.9 µCi/gm.	[7 days OR	2
Table 4.4-4 Item 1.			In accordance with the Surveillance Frequency Control Program]	2

SURVEILLANCE REQUIREMENTS (continued)

CTS		SURVEILLANCE	FREQUENCY	
4.4.8 Table 4.4-4 Item 2.	SR 3.4.16.2	------------------------------NOTE------------------------------ Only required to be performed in MODE 1. --		
3.4.8.a		Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ [1.0] μCi/gm.	~~[14 days~~ ~~OR~~	2
Table 4.4-4 Item 1. and 2.			In accordance with the Surveillance Frequency Control Program]	2
			AND	
Table 4.4-4 Item 3.b			Between 2 and 6 hours after THERMAL POWER change of ≥ 15% RTP within a 1 hour period	

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.16, RCS SPECIFIC ACTIVITY

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. ISTS SR 3.4.16 Note is deleted. PSL retains the current licensing basis that samples DOSE EQUIVALENT XE-133 in the applicable Modes.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.16 RCS Specific Activity

BASES

BACKGROUND

The maximum dose that an individual at the exclusion area boundary can receive for 2 hours following an accident, or at the low population zone outer boundary for the radiological release duration, is specified in [10 CFR 100.11][10 CFR 50.67] (Ref. 1). Doses to control room operators must be limited per GDC 19. The limits on specific activity ensure that the offsite and control room doses are appropriately limited during analyzed transients and accidents. 2

The RCS specific activity LCO limits the allowable concentration level of radionuclides in the reactor coolant. The LCO limits are established to minimize the dose consequences in the event of a steam line break (SLB) or steam generator tube rupture (SGTR) accident.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133. The allowable levels are intended to ensure that offsite and control room doses meet the appropriate acceptance criteria in the Standard Review Plan (SR) (Ref. 2).

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensure that the resulting offsite and control room doses meet the appropriate SRP acceptance criteria following a SLB or SGTR accident. The safety analyses (Refs. 3 and 4) assume the specific activity of the reactor coolant is at the LCO limits, and an existing reactor coolant steam generator (SG) tube leakage rate of [1 gpm] (0.25 gpm per SG; 0.5 gpm total) exists. The safety analyses assume the specific activity of the secondary coolant is at its limit of [0.1] μCi/gm DOSE EQUIVALENT I-131 from LCO 3.7.19, "Secondary Specific Activity." 2 2

The analyses for the SLB and SGTR accidents establish the acceptance limits for RCS specific activity. Reference to these analyses is used to assess changes to the unit that could affect RCS specific activity, as they relate to the acceptance limits.

The safety analyses consider two cases of reactor coolant iodine specific activity. One case assumes specific activity at [1.0] μCi/gm DOSE EQUIVALENT I-131 with a concurrent large iodine spike that increases the rate of release of iodine from the fuel rods containing cladding defects to the primary coolant immediately after a SLB (by a factor of 500), or SGTR (by a factor of 335), respectively. The second case assumes the initial reactor coolant iodine activity at [60.0] μCi/gm DOSE EQUIVALENT 2 2

BASES

APPLICABLE SAFETY ANALYSES (continued)

Fuel damage is assumed for the SLB event and the activity released exceeds that released by the two iodine spike cases; therefore, the two iodine spike cases are not analyzed for the SLB event.

I-131 due to an iodine spike caused by a reactor or an RCS transient prior to the accident. In both cases, the noble gas specific activity is assumed to be ~~[280]~~ 518.9 μCi/gm DOSE EQUIVALENT XE-133. 1 2

The SGTR analysis assumes a rise in pressure in the ruptured SG causes radioactively contaminated steam to discharge to the atmosphere through the atmospheric dump valves or the main steam safety valves. The atmospheric discharge stops when the turbine bypass to the condenser removes the excess energy to rapidly reduce the RCS pressure and close the valves. The unaffected SG removes core decay heat by venting steam until the cooldown ends and the Shutdown Cooling (SDC) System is placed in service.

The SLB radiological analysis assumes that offsite power is lost at the same time as the pipe break occurs outside containment. The affected SG blows down completely and steam is vented directly to the atmosphere. The unaffected SG removes core decay heat by venting steam to the atmosphere until the cooldown ends and the SDC System is placed in service.

Operation with iodine specific activity levels greater than the LCO limit is permissible, if the activity levels do not exceed ~~[~~60.0~~]~~ μCi/gm for more than 48 hours. 2

The limits on RCS specific activity are also used for establishing standardization in radiation shielding and plant personnel radiation protection practices.

RCS specific activity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The iodine specific activity in the reactor coolant is limited to ~~[~~1.0~~]~~ μCi/gm DOSE EQUIVALENT I-131, and the noble gas specific activity in the reactor coolant is limited to ~~[280]~~ 518.9 μCi/gm DOSE EQUIVALENT XE-133. The limits on specific activity ensure that offsite and control room doses will meet the appropriate SRP acceptance criteria (Ref. 2). 2 2

The SLB and SGTR accident analyses (Refs. 3 and 4) show that the calculated doses are within acceptable limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of a SLB or SGTR, lead to doses that exceed the SRP acceptance criteria (Ref. 2).

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, operation within the LCO limits for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 is necessary to limit the potential consequences of a SLB or SGTR to within the SRP acceptance criteria (Ref. 2).

In MODES 5 and 6, the steam generators are not being used for decay heat removal, the RCS and steam generators are depressurized, and primary to secondary leakage is minimal. Therefore, the monitoring of RCS specific activity is not required.

ACTIONS

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate that the specific activity is ≤ ~~[~~60.0~~]~~ μCi/gm. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is continued every 4 hours to provide a trend. 2

The DOSE EQUIVALENT I-131 must be restored to within limit within 48 hours. The Completion Time of 48 hours is acceptable since it is expected that, if there were an iodine spike, the normal coolant iodine concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S), relying on Required Actions A.1 and A.2 while the DOSE EQUIVALENT I-131 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

B.1

With the DOSE EQUIVALENT XE-133 greater than the LCO limit, DOSE EQUIVALENT XE-133 must be restored to within limit within 48 hours. The allowed Completion Time of 48 hours is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

BASES

ACTIONS (continued)

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODES(S), relying on Required Action B.1 while the DOSE EQUIVALENT XE-133 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

C.1 and C.2

If the Required Action and associated Completion Time of Condition A or B is not met, or if the DOSE EQUIVALENT I-131 is > [60.0] μCi/gm, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. 2

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the noble gas specific activity of the reactor coolant ~~at least once every 7 days~~. This measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. The periodic Surveillance Frequency is controlled under the Surveillance Frequency Control. This Surveillance provides an indication of any increase in the noble gas specific activity. 1 1

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. ~~The 7 day Frequency considers the low probability of a gross fuel failure during this time.~~ 1

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes with similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

~~A Note modifies the SR to allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.~~ 3

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.16.2

This Surveillance is performed to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur. The 14 day Frequency periodic Surveillance Frequency is controlled under the Surveillance Frequency Control Program, and is adequate to trend changes in the iodine activity level, considering noble gas activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change ≥ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following iodine spike initiation; samples at other times would provide inaccurate results. 1

The Note modifies this SR to allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.

REFERENCES

---------------------------- Reviewer's Note ----------------------------
The first listed References 1 and 2 are for plants that are licensed to 10 CFR 100.11. The second set of References are for plants that are licensed to 10 CFR 50.67. 4

[1. 10 CFR 100.11. 2

2. Standard Review Plan (SRP) Section 15.1.5 Appendix A (SLB) and Section 15.6.3 (SGTR).

1. 10 CFR 50.67.

2. Standard Review Plan (SRP) Section 15.0.1 "Radiological Consequence Analyses Using Alternative Source Terms."] 2

3. U FSAR, Section [15.1.5] 15.4.6. 1 2

4. U FSAR, Section [15.6.3] 15.4.4.

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.16 RCS Specific Activity

BASES

BACKGROUND

The maximum dose that an individual at the exclusion area boundary can receive for 2 hours following an accident, or at the low population zone outer boundary for the radiological release duration, is specified in [10 CFR 100.11][10 CFR 50.67] (Ref. 1). Doses to control room operators must be limited per GDC 19. The limits on specific activity ensure that the offsite and control room doses are appropriately limited during analyzed transients and accidents. 2

The RCS specific activity LCO limits the allowable concentration level of radionuclides in the reactor coolant. The LCO limits are established to minimize the dose consequences in the event of a steam line break (SLB) or steam generator tube rupture (SGTR) accident.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133. The allowable levels are intended to ensure that offsite and control room doses meet the appropriate acceptance criteria in the Standard Review Plan (SR) (Ref. 2).

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensure that the resulting offsite and control room doses meet the appropriate SRP acceptance criteria following a SLB or SGTR accident. The safety analyses (Refs. 3 and 4) assume the specific activity of the reactor coolant is at the LCO limits, and an existing reactor coolant steam generator (SG) tube leakage rate of [1 gpm] 0.25 gpm per SG; 0.5 gpm total exists. The safety analyses assume the specific activity of the secondary coolant is at its limit of [0.1] μCi/gm DOSE EQUIVALENT I-131 from LCO 3.7.19, "Secondary Specific Activity." 2 2

The analyses for the SLB and SGTR accidents establish the acceptance limits for RCS specific activity. Reference to these analyses is used to assess changes to the unit that could affect RCS specific activity, as they relate to the acceptance limits.

The safety analyses consider two cases of reactor coolant iodine specific activity. One case assumes specific activity at [1.0] μCi/gm DOSE EQUIVALENT I-131 with a concurrent large iodine spike that increases the rate of release of iodine from the fuel rods containing cladding defects to the primary coolant immediately after a SLB (by a factor of 500), or SGTR (by a factor of 335), respectively. The second case assumes the initial reactor coolant iodine activity at [60.0] μCi/gm DOSE EQUIVALENT 2 2

BASES

APPLICABLE SAFETY ANALYSES (continued)

Fuel damage is assumed for the SLB event and the activity released exceeds that released by the two iodine spike cases; therefore, the two iodine spike cases are not analyzed for the SLB event.

I-131 due to an iodine spike caused by a reactor or an RCS transient prior to the accident. In both cases, the noble gas specific activity is assumed to be ~~[280]~~ 518.9 μCi/gm DOSE EQUIVALENT XE-133. 1 2

The SGTR analysis assumes a rise in pressure in the ruptured SG causes radioactively contaminated steam to discharge to the atmosphere through the atmospheric dump valves or the main steam safety valves. The atmospheric discharge stops when the turbine bypass to the condenser removes the excess energy to rapidly reduce the RCS pressure and close the valves. The unaffected SG removes core decay heat by venting steam until the cooldown ends and the Shutdown Cooling (SDC) System is placed in service.

The SLB radiological analysis assumes that offsite power is lost at the same time as the pipe break occurs outside containment. The affected SG blows down completely and steam is vented directly to the atmosphere. The unaffected SG removes core decay heat by venting steam to the atmosphere until the cooldown ends and the SDC System is placed in service.

Operation with iodine specific activity levels greater than the LCO limit is permissible, if the activity levels do not exceed ~~[~~60.0~~]~~ μCi/gm for more than 48 hours. 2

The limits on RCS specific activity are also used for establishing standardization in radiation shielding and plant personnel radiation protection practices.

RCS specific activity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The iodine specific activity in the reactor coolant is limited to ~~[~~1.0~~]~~ μCi/gm DOSE EQUIVALENT I-131, and the noble gas specific activity in the reactor coolant is limited to ~~[280]~~ 518.9 μCi/gm DOSE EQUIVALENT XE-133. The limits on specific activity ensure that offsite and control room doses will meet the appropriate SRP acceptance criteria (Ref. 2). 2 2

The SLB and SGTR accident analyses (Refs. 3 and 4) show that the calculated doses are within acceptable limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of a SLB or SGTR, lead to doses that exceed the SRP acceptance criteria (Ref. 2).

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, operation within the LCO limits for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 is necessary to limit the potential consequences of a SLB or SGTR to within the SRP acceptance criteria (Ref. 2).

In MODES 5 and 6, the steam generators are not being used for decay heat removal, the RCS and steam generators are depressurized, and primary to secondary leakage is minimal. Therefore, the monitoring of RCS specific activity is not required.

ACTIONS

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate that the specific activity is ≤ [60.0] μCi/gm. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is continued every 4 hours to provide a trend. 2

The DOSE EQUIVALENT I-131 must be restored to within limit within 48 hours. The Completion Time of 48 hours is acceptable since it is expected that, if there were an iodine spike, the normal coolant iodine concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S), relying on Required Actions A.1 and A.2 while the DOSE EQUIVALENT I-131 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

B.1

With the DOSE EQUIVALENT XE-133 greater than the LCO limit, DOSE EQUIVALENT XE-133 must be restored to within limit within 48 hours. The allowed Completion Time of 48 hours is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

BASES

ACTIONS (continued)

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODES(S), relying on Required Action B.1 while the DOSE EQUIVALENT XE-133 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

C.1 and C.2

If the Required Action and associated Completion Time of Condition A or B is not met, or if the DOSE EQUIVALENT I-131 is > [60.0] μCi/gm, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. 2

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the noble gas specific activity of the reactor coolant ~~at least once every 7 days~~. This measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. The periodic Surveillance Frequency is controlled under the Surveillance Frequency Control. This Surveillance provides an indication of any increase in the noble gas specific activity. 1 1

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. ~~The 7 day Frequency considers the low probability of a gross fuel failure during this time.~~ 1

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes with similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

~~A Note modifies the SR to allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.~~ 3

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.16.2

This Surveillance is performed to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur. The 14 day Frequency is adequate to trend changes in the iodine activity level, considering noble gas activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change ≥ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following iodine spike initiation; samples at other times would provide inaccurate results. 1

periodic Surveillance Frequency is controlled under the Surveillance Frequency Control Program, and

The Note modifies this SR to allow entry into and operation in MODE 4, MODE 3, and MODE 2 prior to performing the SR. This allows the Surveillance to be performed in those MODES, prior to entering MODE 1.

REFERENCES

------------------------------ Reviewer's Note ------------------------------

The first listed References 1 and 2 are for plants that are licensed to 10 CFR 100.11. The second set of References are for plants that are licensed to 10 CFR 50.67. 4

[1. 10 CFR 100.11. 2

2. Standard Review Plan (SRP) Section 15.1.5 Appendix A (SLB) and Section 15.6.3 (SGTR).

1. 10 CFR 50.67.

2. Standard Review Plan (SRP) Section 15.0.1 "Radiological Consequence Analyses Using Alternative Source Terms."] 2

3. U FSAR, Section [15.1.5]. 15.6.2 1 2

4. U FSAR, Section [15.6.3].

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.16, BASES, RCS SPECIFIC ACTIVITY

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. ISTS SR 3.4.16 Note is deleted. PSL retains the current licensing basis that samples DOSE EQUIVALENT XE-133 in the applicable Modes.

4. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.16, RCS SPECIFIC ACTIVITY

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 17

3.4.17, Steam Generator (SG) Tube Integrity

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM (RCS)

STEAM GENERATOR (SG) TUBE INTEGRITY

LIMITING CONDITION FOR OPERATION

LCO 3.4.17 ~~3.4.5~~ SG tube integrity shall be maintained

AND

All SG tubes satisfying the tube ~~repair~~ plugging criteria shall be plugged in accordance with the SG Program.

Applicability **APPLICABILITY:** MODES 1, 2, 3 and 4.

ACTION: *

ACTION A ~~a.~~ With one or more SG tubes satisfying the tube ~~repair~~ plugging criteria and not plugged in accordance with the Steam Generator Program;

~~1.~~ Within 7 days verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection, and

~~2.~~ Plug the affected tube(s) in accordance with the Steam Generator Program prior to entering ~~HOT SHUTDOWN~~ MODE 4 following the next refueling outage or SG tube inspection.

ACTION B ~~b.~~ With the requirements and associated allowable outage time of Action a above not met or SG tube integrity not maintained, be in ~~HOT STANDBY~~ MODE 3 within 6 hours and in ~~COLD SHUTDOWN~~ MODE 5 within the next 30 hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.17.1 ~~4.4.5.1~~ Verify SG tube integrity in accordance with the Steam Generator Program.

SR 3.4.17.2 ~~4.4.5.2~~ Verify that each inspected SG tube that satisfies the tube ~~repair~~ plugging criteria is plugged in accordance with the Steam Generator Program prior to entering ~~HOT SHUTDOWN~~ MODE 4 following a SG tube inspection.

ACTIONS Note * Separate Action entry is allowed for each SG tube.

~~THIS PAGE DELETED~~

A01

~~THIS PAGE DELETED~~

~~THIS PAGE DELETED~~

A01

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

~~THIS PAGE DELETED~~

~~THIS PAGE DELETED~~

REACTOR COOLANT SYSTEM (RCS)

3/4.4.5 STEAM GENERATOR (SG) TUBE INTEGRITY

LIMITING CONDITION FOR OPERATION

LCO 3.4.17 ~~3.4.5~~ SG tube integrity shall be maintained

AND

All SG tubes satisfying the tube ~~repair~~ plugging criteria shall be plugged ~~or repaired~~ in accordance with the SG Program. ~~Repair applies only to the original SGs.~~ (A02)

Applicability **APPLICABILITY:** MODES 1, 2, 3 and 4.

ACTION:*

ACTION A ~~a.~~ With one or more SG tubes satisfying the tube ~~repair~~ plugging criteria and not plugged ~~(or repaired if original SGs)~~ in accordance with the Steam Generator Program; (A02)

~~1.~~ Within 7 days verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection, and

~~2.~~ Plug ~~or repair~~ the affected tube(s) in accordance with the Steam Generator Program prior to entering ~~HOT SHUTDOWN~~ MODE 4 following the next refueling outage or SG tube inspection. ~~Repair applies only to the original SGs.~~ (A02) (A02)

ACTION B ~~b.~~ With the requirements and associated allowable outage time of Action a above not met or SG tube integrity not maintained, be in ~~HOT STANDBY~~ MODE 3 within 6 hours and in ~~COLD SHUTDOWN~~ MODE 5 within the following 30 hours.

SURVEILLANCE REQUIREMENTS

SR 3.4.17.1 ~~4.4.5.1~~ Verify SG tube integrity in accordance with the Steam Generator Program.

SR 3.4.17.2 ~~4.4.5.2~~ Verify that each inspected SG tube that satisfies the tube ~~repair~~ plugging criteria is plugged ~~or repaired~~ in accordance with the Steam Generator Program prior to entering ~~HOT SHUTDOWN~~ MODE 4 following a SG tube inspection. ~~Repair applies only to the original SGs.~~ (A02)

ACTIONS Note * Separate Action entry is allowed for each SG tube

A01

~~THIS PAGE DELETED~~

~~THIS PAGE DELETED~~

A01

~~THIS PAGE DELETED~~

~~THIS PAGE DELETED~~

A01

~~THIS PAGE DELETED~~

A01

~~THIS PAGE DELETED~~

~~THIS PAGE DELETED~~

A01

~~THIS PAGE DELETED~~

DISCUSSION OF CHANGES
ITS 3.4.17, STEAM GENERATOR (SG) TUBE INTEGRITY

ADMINISTRATIVE CHANGES

A01 In the conversion of the St. Lucie Plant (PSL) Unit 1 and Unit 2, Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG-1432, Rev. 5.0, "Standard Technical Specifications-Combustion Engineering Plants" (ISTS).

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 **Unit 2 only:** CTS 3.4.5 LCO, Action a., and 4.4.5.2 state, in part, that SG repair applies only to the original SGs. Unit 2 contains two AREVA Model 86/19Ti replacement Steam Generators (containing Alloy 690TT Tubing) which were installed at RFO-17 in 2007 (EC 235453, Rev. 0. “PCM-05137 Replacement Steam Generators 2A & 2B). Therefore, the details associated with repairing of SG tubes rather than plugging of SG tubes are deleted from CTS 3.4.5.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.~~18~~ 17 Steam Generator (SG) Tube Integrity 3

LCO 3.4.5 LCO 3.4.~~18~~ 17 SG tube integrity shall be maintained. 3

AND

All SG tubes satisfying the tube plugging ~~[or repair]~~ criteria shall be plugged ~~[or repaired]~~ in accordance with the Steam Generator Program. 2

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

Action Footnote * ---NOTE---
Separate Condition entry is allowed for each SG tube.

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
Action a.1	A. One or more SG tubes satisfying the tube plugging ~~[or repair]~~ criteria and not plugged ~~[or repaired]~~ in accordance with the Steam Generator Program.	A.1 Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection.	7 days	2
		AND		
Action a.2		A.2 Plug ~~[or repair]~~ the affected tube(s) in accordance with the Steam Generator Program.	Prior to entering MODE 4 following the next refueling outage or SG tube inspection	2
Action b.	B. Required Action and associated Completion Time of Condition A not met. OR SG tube integrity not maintained.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours	

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
SR 4.4.5.1	SR 3.4.18.1 17	Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program	3
SR 4.4.5.2	SR 3.4.18.2 17	Verify that each inspected SG tube that satisfies the tube plugging [or repair] criteria is plugged [or repaired] in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection	3 2

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.18 17 Steam Generator (SG) Tube Integrity 3

LCO 3.4.5 LCO 3.4.18 17 SG tube integrity shall be maintained. 3

AND

All SG tubes satisfying the tube plugging [or repair] criteria shall be plugged [or repaired] in accordance with the Steam Generator Program. 2

Applicability APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

Action Footnote *
------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each SG tube.

CONDITION	REQUIRED ACTION	COMPLETION TIME
Action a.1 A. One or more SG tubes satisfying the tube plugging [or repair] criteria and not plugged [or repaired] in accordance with the Steam Generator Program.	A.1 Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection. AND	7 days 2
Action a.2	A.2 Plug [or repair] the affected tube(s) in accordance with the Steam Generator Program.	Prior to entering MODE 4 following the next refueling outage or SG tube inspection 2
Action b. B. Required Action and associated Completion Time of Condition A not met. OR SG tube integrity not maintained.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
SR 4.4.5.1	SR 3.4.~~18~~ 17.1	Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program	3
SR 4.4.5.2	SR 3.4.~~18~~ 17.2	Verify that each inspected SG tube that satisfies the tube plugging ~~[or repair]~~ criteria is plugged ~~[or repaired]~~ in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection	3 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.17, STEAM GENERATOR (SG) TUBE INTEGRITY

1. Changes are made (additions, deletions, and/or changes) to the ISTS that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. ISTS 3.4.17, “Special Test Exception (STE)-RCS Loops,” has not been adopted. Therefore, ISTS 3.4.18, “Steam Generator (SG) Tube Integrity,” is renumbered as ITS 3.4.17, “Steam Generator (SG) Tube Integrity.”

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.~~18~~ 17 Steam Generator (SG) Tube Integrity (3)

BASES

BACKGROUND

Steam generator (SG) tubes are small diameter, thin walled tubes that carry primary coolant through the primary to secondary heat exchangers. The SG tubes have a number of important safety functions. Steam generator tubes are an integral part of the reactor coolant pressure boundary (RCPB) and, as such, are relied on to maintain the primary system's pressure and inventory. The SG tubes isolate the radioactive fission products in the primary coolant from the secondary system. In addition, as part of the RCPB, the SG tubes are unique in that they act as the heat transfer surface between the primary and secondary systems to remove heat from the primary system. This Specification addresses only the RCPB integrity function of the SG. The SG heat removal function is addressed by LCO 3.4.4, "RCS Loops – MODES 1 and 2," LCO 3.4.5, "RCS Loops – MODE 3," LCO 3.4.6, "RCS Loops – MODE 4," and LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled.

SG tube integrity means that the tubes are capable of performing their intended RCPB safety function consistent with the licensing basis, including applicable regulatory requirements.

Steam generator tubing is subject to a variety of degradation mechanisms. Steam generator tubes may experience tube degradation related to corrosion phenomena, such as wastage, pitting, intergranular attack, and stress corrosion cracking, along with other mechanically induced phenomena such as denting and wear. These degradation mechanisms can impair tube integrity if they are not managed effectively. The SG performance criteria are used to manage SG tube degradation.

Specification ~~5.5.8~~ 5.5.6, "Steam Generator (SG) Program," requires that a program be established and implemented to ensure that SG tube integrity is maintained. Pursuant to Specification ~~5.5.8~~ 5.5.6, tube integrity is maintained when the SG performance criteria are met. There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. The SG performance criteria are described in Specification ~~5.5.8~~ 5.5.6. Meeting the SG performance criteria provides reasonable assurance of maintaining tube integrity at normal and accident conditions. (1)

The processes used to meet the SG performance criteria are defined by the Steam Generator Program Guidelines (Ref. 1).

3

BASES

APPLICABLE SAFETY ANALYSES

The steam generator tube rupture (SGTR) accident is the limiting design basis event for SG tubes and avoiding an SGTR is the basis for this Specification. The analysis of a SGTR event assumes a bounding primary to secondary LEAKAGE rate equal to the operational LEAKAGE rate limits in LCO 3.4.13, "RCS Operational LEAKAGE," plus the leakage rate associated with a double-ended rupture of a single tube. The accident analysis for a SGTR assumes the contaminated secondary fluid is only briefly released to the atmosphere via safety valves and the majority is discharged to the main condenser.

The analysis for design basis accidents and transients other than a SGTR assume the SG tubes retain their structural integrity (i.e., they are assumed not to rupture.) In these analyses, the steam discharge to the atmosphere is based on the total primary to secondary LEAKAGE from all SGs of [1 0.5 gallon per minute] or is assumed to increase to [1 gallon per minute] as a result of accident induced conditions. For accidents that do not involve fuel damage, the primary coolant activity level of DOSE EQUIVALENT I-131 is assumed to be equal to the LCO 3.4.16, "RCS Specific Activity," limits. For accidents that assume fuel damage, the primary coolant activity is a function of the amount of activity released from the damaged fuel. The dose consequences of these events are within the limits of GDC 19 (Ref. 2), 10 CFR 50.67 (Ref. 3), 10 CFR 100 (Ref. 3 4) or the NRC approved licensing basis (e.g., a small fraction of these limits). 2 1

Steam generator tube integrity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires that SG tube integrity be maintained. The LCO also requires that all SG tubes that satisfy the plugging [or repair] criteria be plugged [or repaired] in accordance with the Steam Generator Program.

During an SG inspection, any inspected tube that satisfies the Steam Generator Program plugging [or repair] criteria is [repaired or] removed from service by plugging. If a tube was determined to satisfy the plugging [or repair] criteria but was not plugged [or repaired], the tube may still have tube integrity. 2

In the context of this Specification, a SG tube is defined as the entire length of the tube, including the tube wall [and any repairs made to it], between the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet. The tube-to-tubesheet weld is not considered part of the tube. 2

A SG tube has tube integrity when it satisfies the SG performance criteria. The SG performance criteria are defined in Specification 5.5.8 5.5.6, "Steam Generator Program," and describe acceptable SG tube performance. The Steam Generator Program also provides the evaluation process for determining conformance with the SG performance criteria. 1

3

BASES

LCO (continued)

There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. Failure to meet any one of these criteria is considered failure to meet the LCO.

The structural integrity performance criterion provides a margin of safety against tube burst or collapse under normal and accident conditions, and ensures structural integrity of the SG tubes under all anticipated transients included in the design specification. Tube burst is defined as, "The gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation." Tube collapse is defined as, "For the load displacement curve for a given structure, collapse occurs at the top of the load versus displacement curve where the slope of the curve becomes zero." The structural integrity performance criterion provides guidance on assessing loads that have a significant effect on burst or collapse. In that context, the term "significant" is defined as "An accident loading condition other than differential pressure is considered significant when the addition of such loads in the assessment of the structural integrity performance criterion could cause a lower structural limit or limiting burst/collapse condition to be established." For tube integrity evaluations, except for circumferential degradation, axial thermal loads are classified as secondary loads. For circumferential degradation, the classification of axial thermal loads as primary or secondary loads will be evaluated on a case-by-case basis. The division between primary and secondary classifications will be based on detailed analysis and/or testing.

Structural integrity requires that the primary membrane stress intensity in a tube not exceed the yield strength for all ASME Code, Section III, Service Level A (normal operating conditions) and Service Level B (upset or abnormal conditions) transients included in the design specification. This includes safety factors and applicable design basis loads based on ASME Code, Section III, Subsection NB (Ref. ~~4~~ 5) and Draft Regulatory Guide 1.121 (Ref. ~~5~~ 6). 1

The accident induced leakage performance criterion ensures that the primary to secondary LEAKAGE caused by a design basis accident, other than a SGTR, is within the accident analysis assumptions. The accident analysis assumes that accident induced leakage does not exceed ~~[1 gpm per SG, except for specific types of degradation at specific locations where the NRC has approved greater accident induced leakage.]~~ 0.5 gpm total through all SGs and 0.25 gpm through any one SG. The accident induced leakage rate includes any primary to secondary LEAKAGE existing prior to the accident in addition to primary to secondary LEAKAGE induced during the accident. 2

BASES

LCO (continued)

The operational LEAKAGE performance criterion provides an observable indication of SG tube conditions during plant operation. The limit on operational LEAKAGE is contained in LCO 3.4.13, "RCS Operational LEAKAGE," and limits primary to secondary LEAKAGE through any one SG to 150 gallons per day. This limit is based on the assumption that a single crack leaking this amount would not propagate to a SGTR under the stress conditions of a LOCA or a main steam line break. If this amount of LEAKAGE is due to more than one crack, the cracks are very small, and the above assumption is conservative.

APPLICABILITY

Steam generator tube integrity is challenged when the pressure differential across the tubes is large. Large differential pressures across SG tubes can only be experienced in MODE 1, 2, 3, or 4.

RCS conditions are far less challenging in MODES 5 and 6 than during MODES 1, 2, 3, and 4. In MODES 5 and 6, primary to secondary differential pressure is low, resulting in lower stresses and reduced potential for LEAKAGE.

ACTIONS

The ACTIONS are modified by a Note clarifying that the Conditions may be entered independently for each SG tube. This is acceptable because the Required Actions provide appropriate compensatory actions for each affected SG tube. Complying with the Required Actions may allow for continued operation, and subsequent affected SG tubes are governed by subsequent Condition entry and application of associated Required Actions.

A.1 and A.2

Condition A applies if it is discovered that one or more SG tubes examined in an inservice inspection satisfy the tube plugging ~~[or repair]~~ criteria but were not plugged ~~[or repaired]~~ in accordance with the Steam Generator Program as required by SR 3.4.~~18~~ 17.2. An evaluation of SG tube integrity of the affected tube(s) must be made. Steam generator tube integrity is based on meeting the SG performance criteria described in the Steam Generator Program. The SG plugging ~~[or repair]~~ criteria define limits on SG tube degradation that allow for flaw growth between inspections while still providing assurance that the SG performance criteria will continue to be met. In order to determine if a SG tube that should have been plugged ~~[or repaired]~~ has tube integrity, an evaluation must be completed that demonstrates that the SG performance criteria will continue to be met until the next refueling outage or SG tube inspection. The tube integrity determination is based on the estimated condition of the tube at the time the situation is discovered and the

(2) (3) (2) (2)

BASES

ACTIONS (continued)

estimated growth of the degradation prior to the next SG tube inspection. If it is determined that tube integrity is not being maintained, Condition B applies.

A Completion Time of 7 days is sufficient to complete the evaluation while minimizing the risk of plant operation with a SG tube that may not have tube integrity.

If the evaluation determines that the affected tube(s) have tube integrity, Required Action A.2 allows plant operation to continue until the next refueling outage or SG inspection provided the inspection interval continues to be supported by an operational assessment that reflects the affected tubes. However, the affected tube(s) must be plugged ~~[or repaired]~~ prior to entering MODE 4 following the next refueling outage or SG inspection. This Completion Time is acceptable since operation until the next inspection is supported by the operational assessment. (2)

B.1 and B.2

If the Required Actions and associated Completion Times of Condition A are not met or if SG tube integrity is not being maintained, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the desired plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.~~18~~ 17.1 (3)

During shutdown periods the SGs are inspected as required by this SR and the Steam Generator Program. NEI 97-06, Steam Generator Program Guidelines (Ref. 1), and its referenced EPRI Guidelines, establish the content of the Steam Generator Program. Use of the Steam Generator Program ensures that the inspection is appropriate and consistent with accepted industry practices.

During SG inspections a condition monitoring assessment of the SG tubes is performed. The condition monitoring assessment determines the "as found" condition of the SG tubes. The purpose of the condition monitoring assessment is to ensure that the SG performance criteria have been met for the previous operating period.

The Steam Generator Program determines the scope of the inspection and the methods used to determine whether the tubes contain flaws satisfying the tube plugging ~~[or repair]~~ criteria. Inspection scope (i.e., (2)

BASES

SURVEILLANCE REQUIREMENTS (continued)

which tubes or areas of tubing within the SG are to be inspected) is a function of existing and potential degradation locations. The Steam Generator Program also specifies the inspection methods to be used to find potential degradation. Inspection methods are a function of degradation morphology, non-destructive examination (NDE) technique capabilities, and inspection locations.

The Steam Generator Program defines the Frequency of SR 3.4.~~18~~ 17.1. 3
The Frequency is determined by the operational assessment and other limits in the SG examination guidelines (Ref. ~~6~~ 7). The Steam Generator Program uses information on existing degradations and growth rates to determine an inspection Frequency that provides reasonable assurance that the tubing will meet the SG performance criteria at the next scheduled inspection. In addition, Specification ~~5.5.8~~ 5.5.6 contains 1
prescriptive requirements concerning inspection intervals to provide added assurance that the SG performance criteria will be met between scheduled inspections. If crack indications are found in any SG tube, the maximum inspection interval for all affected and potentially affected SGs is restricted by Specification ~~5.5.8~~ 5.5.6 until subsequent inspections support extending the inspection in~~v~~terval. 1

SR 3.4.~~18~~ 17.2 3

During an SG inspection, any inspected tube that satisfies the Steam Generator Program plugging ~~[or repair]~~ criteria is ~~[repaired or]~~ removed from service by plugging. The tube plugging ~~[or repair]~~ criteria delineated 2
in Specification ~~5.5.8~~ 5.5.6 are intended to ensure that tubes accepted for 1
continued service satisfy the SG performance criteria with allowance for error in the flaw size measurement and for future flaw growth. In addition, the tube plugging ~~[or repair]~~ criteria, in conjunction with other elements of 2
the Steam Generator Program, ensure that the SG performance criteria will continue to be met until the next inspection of the subject tube(s). Reference 1 provides guidance for performing operational assessments to verify that the tubes remaining in service will continue to meet the SG performance criteria.

~~[Steam generator tube repairs are only performed using approved repair methods as described in the Steam Generator Program.]~~ 2

The Frequency of prior to entering MODE 4 following a SG inspection ensures that the Surveillance has been completed and all tubes meeting the plugging ~~[or repair]~~ criteria are plugged ~~[or repaired]~~ prior to subjecting 2
the SG tubes to significant primary to secondary pressure differential.

BASES

REFERENCES

1. NEI 97-06, "Steam Generator Program Guidelines."

2. 10 CFR 50 Appendix A, GDC 19.

3. 10 CFR 50.67.

~~3~~ 4. 10 CFR 100.

~~4~~ 5. ASME Boiler and Pressure Vessel Code, Section III, Subsection NB.

~~5~~ 6. Draft Regulatory Guide 1.121, "Basis for Plugging Degraded Steam Generator Tubes," August 1976.

~~6~~ 7. EPRI, "Pressurized Water Reactor Steam Generator Examination Guidelines."

1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.18 17 Steam Generator (SG) Tube Integrity 3

BASES

BACKGROUND

Steam generator (SG) tubes are small diameter, thin walled tubes that carry primary coolant through the primary to secondary heat exchangers. The SG tubes have a number of important safety functions. Steam generator tubes are an integral part of the reactor coolant pressure boundary (RCPB) and, as such, are relied on to maintain the primary system's pressure and inventory. The SG tubes isolate the radioactive fission products in the primary coolant from the secondary system. In addition, as part of the RCPB, the SG tubes are unique in that they act as the heat transfer surface between the primary and secondary systems to remove heat from the primary system. This Specification addresses only the RCPB integrity function of the SG. The SG heat removal function is addressed by LCO 3.4.4, "RCS Loops – MODES 1 and 2," LCO 3.4.5, "RCS Loops – MODE 3," LCO 3.4.6, "RCS Loops – MODE 4," and LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled.

SG tube integrity means that the tubes are capable of performing their intended RCPB safety function consistent with the licensing basis, including applicable regulatory requirements.

Steam generator tubing is subject to a variety of degradation mechanisms. Steam generator tubes may experience tube degradation related to corrosion phenomena, such as wastage, pitting, intergranular attack, and stress corrosion cracking, along with other mechanically induced phenomena such as denting and wear. These degradation mechanisms can impair tube integrity if they are not managed effectively. The SG performance criteria are used to manage SG tube degradation.

Specification 5.5.8 5.5.6, "Steam Generator (SG) Program," requires that a program be established and implemented to ensure that SG tube integrity is maintained. Pursuant to Specification 5.5.8, tube integrity is maintained when the SG performance criteria are met. There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. The SG performance criteria are described in Specification 5.5.8. Meeting the SG performance criteria provides reasonable assurance of maintaining tube integrity at normal and accident conditions. 1

The processes used to meet the SG performance criteria are defined by the Steam Generator Program Guidelines (Ref. 1).

BASES

APPLICABLE SAFETY ANALYSES

The steam generator tube rupture (SGTR) accident is the limiting design basis event for SG tubes and avoiding an SGTR is the basis for this Specification. The analysis of a SGTR event assumes a bounding primary to secondary LEAKAGE rate equal to the operational LEAKAGE rate limits in LCO 3.4.13, "RCS Operational LEAKAGE," plus the leakage rate associated with a double-ended rupture of a single tube. The accident analysis for a SGTR assumes the contaminated secondary fluid is only briefly released to the atmosphere via safety valves and the majority is discharged to the main condenser.

The analysis for design basis accidents and transients other than a SGTR assume the SG tubes retain their structural integrity (i.e., they are assumed not to rupture.) In these analyses, the steam discharge to the atmosphere is based on the total primary to secondary LEAKAGE from all SGs of [1 0.5 gallon per minute] or is assumed to increase to [1 gallon per minute] as a result of accident induced conditions. For accidents that do not involve fuel damage, the primary coolant activity level of DOSE EQUIVALENT I-131 is assumed to be equal to the LCO 3.4. 16, "RCS Specific Activity," limits. For accidents that assume fuel damage, the primary coolant activity is a function of the amount of activity released from the damaged fuel. The dose consequences of these events are within the limits of GDC 19 (Ref. 2), 10 CFR 50.67 (Ref. 3), 10 CFR 100 (Ref. 3 4) or the NRC approved licensing basis (e.g., a small fraction of these limits). 2 1

Steam generator tube integrity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires that SG tube integrity be maintained. The LCO also requires that all SG tubes that satisfy the plugging [or repair] criteria be plugged [or repaired] in accordance with the Steam Generator Program. 2

During an SG inspection, any inspected tube that satisfies the Steam Generator Program plugging [or repair] criteria is [repaired or] removed from service by plugging. If a tube was determined to satisfy the plugging [or repair] criteria but was not plugged [or repaired], the tube may still have tube integrity. 2

In the context of this Specification, a SG tube is defined as the entire length of the tube, including the tube wall [and any repairs made to it], between the tube-to-tubesheet weld at the tube inlet and the tube-to-tubesheet weld at the tube outlet. The tube-to-tubesheet weld is not considered part of the tube. 2

A SG tube has tube integrity when it satisfies the SG performance criteria. The SG performance criteria are defined in Specification 5.5.8 5.5.6, "Steam Generator Program," and describe acceptable SG tube performance. The Steam Generator Program also provides the evaluation process for determining conformance with the SG performance criteria. 1

BASES

LCO (continued)

There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. Failure to meet any one of these criteria is considered failure to meet the LCO.

The structural integrity performance criterion provides a margin of safety against tube burst or collapse under normal and accident conditions, and ensures structural integrity of the SG tubes under all anticipated transients included in the design specification. Tube burst is defined as, "The gross structural failure of the tube wall. The condition typically corresponds to an unstable opening displacement (e.g., opening area increased in response to constant pressure) accompanied by ductile (plastic) tearing of the tube material at the ends of the degradation." Tube collapse is defined as, "For the load displacement curve for a given structure, collapse occurs at the top of the load versus displacement curve where the slope of the curve becomes zero." The structural integrity performance criterion provides guidance on assessing loads that have a significant effect on burst or collapse. In that context, the term "significant" is defined as "An accident loading condition other than differential pressure is considered significant when the addition of such loads in the assessment of the structural integrity performance criterion could cause a lower structural limit or limiting burst/collapse condition to be established." For tube integrity evaluations, except for circumferential degradation, axial thermal loads are classified as secondary loads. For circumferential degradation, the classification of axial thermal loads as primary or secondary loads will be evaluated on a case-by-case basis. The division between primary and secondary classifications will be based on detailed analysis and/or testing.

Structural integrity requires that the primary membrane stress intensity in a tube not exceed the yield strength for all ASME Code, Section III, Service Level A (normal operating conditions) and Service Level B (upset or abnormal conditions) transients included in the design specification. This includes safety factors and applicable design basis loads based on ASME Code, Section III, Subsection NB (Ref. 4 [5]) and Draft Regulatory Guide 1.121 (Ref. ~~5~~ [6]). 1

The accident induced leakage performance criterion ensures that the primary to secondary LEAKAGE caused by a design basis accident, other than a SGTR, is within the accident analysis assumptions. The accident analysis assumes that accident induced leakage does not exceed ~~[1 gpm per SG, except for specific types of degradation at specific locations where the NRC has approved greater accident induced leakage.]~~ [0.5 gpm total through all SGs and 0.25 gpm through any one SG.] The accident induced leakage rate includes any primary to secondary LEAKAGE existing prior to the accident in addition to primary to secondary LEAKAGE induced during the accident. 2

BASES

LCO (continued)

The operational LEAKAGE performance criterion provides an observable indication of SG tube conditions during plant operation. The limit on operational LEAKAGE is contained in LCO 3.4.13, "RCS Operational LEAKAGE," and limits primary to secondary LEAKAGE through any one SG to 150 gallons per day. This limit is based on the assumption that a single crack leaking this amount would not propagate to a SGTR under the stress conditions of a LOCA or a main steam line break. If this amount of LEAKAGE is due to more than one crack, the cracks are very small, and the above assumption is conservative.

APPLICABILITY

Steam generator tube integrity is challenged when the pressure differential across the tubes is large. Large differential pressures across SG tubes can only be experienced in MODE 1, 2, 3, or 4.

RCS conditions are far less challenging in MODES 5 and 6 than during MODES 1, 2, 3, and 4. In MODES 5 and 6, primary to secondary differential pressure is low, resulting in lower stresses and reduced potential for LEAKAGE.

ACTIONS

The ACTIONS are modified by a Note clarifying that the Conditions may be entered independently for each SG tube. This is acceptable because the Required Actions provide appropriate compensatory actions for each affected SG tube. Complying with the Required Actions may allow for continued operation, and subsequent affected SG tubes are governed by subsequent Condition entry and application of associated Required Actions.

A.1 and A.2

Condition A applies if it is discovered that one or more SG tubes examined in an inservice inspection satisfy the tube plugging ~~[or repair]~~ criteria but were not plugged ~~[or repaired]~~ in accordance with the Steam Generator Program as required by SR 3.4.~~18~~17.2. An evaluation of SG tube integrity of the affected tube(s) must be made. Steam generator tube integrity is based on meeting the SG performance criteria described in the Steam Generator Program. The SG plugging ~~[or repair]~~ criteria define limits on SG tube degradation that allow for flaw growth between inspections while still providing assurance that the SG performance criteria will continue to be met. In order to determine if a SG tube that should have been plugged ~~[or repaired]~~ has tube integrity, an evaluation must be completed that demonstrates that the SG performance criteria will continue to be met until the next refueling outage or SG tube inspection. The tube integrity determination is based on the estimated condition of the tube at the time the situation is discovered and the

BASES

ACTIONS (continued)

estimated growth of the degradation prior to the next SG tube inspection. If it is determined that tube integrity is not being maintained, Condition B applies.

A Completion Time of 7 days is sufficient to complete the evaluation while minimizing the risk of plant operation with a SG tube that may not have tube integrity.

If the evaluation determines that the affected tube(s) have tube integrity, Required Action A.2 allows plant operation to continue until the next refueling outage or SG inspection provided the inspection interval continues to be supported by an operational assessment that reflects the affected tubes. However, the affected tube(s) must be plugged [or repaired] prior to entering MODE 4 following the next refueling outage or SG inspection. This Completion Time is acceptable since operation until the next inspection is supported by the operational assessment. 2

B.1 and B.2

If the Required Actions and associated Completion Times of Condition A are not met or if SG tube integrity is not being maintained, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the desired plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.18.1 3
17

During shutdown periods the SGs are inspected as required by this SR and the Steam Generator Program. NEI 97-06, Steam Generator Program Guidelines (Ref. 1), and its referenced EPRI Guidelines, establish the content of the Steam Generator Program. Use of the Steam Generator Program ensures that the inspection is appropriate and consistent with accepted industry practices.

During SG inspections a condition monitoring assessment of the SG tubes is performed. The condition monitoring assessment determines the "as found" condition of the SG tubes. The purpose of the condition monitoring assessment is to ensure that the SG performance criteria have been met for the previous operating period.

The Steam Generator Program determines the scope of the inspection and the methods used to determine whether the tubes contain flaws satisfying the tube plugging [or repair] criteria. Inspection scope (i.e., 2

BASES

SURVEILLANCE REQUIREMENTS (continued)

which tubes or areas of tubing within the SG are to be inspected) is a function of existing and potential degradation locations. The Steam Generator Program also specifies the inspection methods to be used to find potential degradation. Inspection methods are a function of degradation morphology, non-destructive examination (NDE) technique capabilities, and inspection locations.

The Steam Generator Program defines the Frequency of SR 3.4.18.1. The Frequency is determined by the operational assessment and other limits in the SG examination guidelines (Ref. 6). The Steam Generator Program uses information on existing degradations and growth rates to determine an inspection Frequency that provides reasonable assurance that the tubing will meet the SG performance criteria at the next scheduled inspection. In addition, Specification 5.5.8 5.5.6 contains prescriptive requirements concerning inspection intervals to provide added assurance that the SG performance criteria will be met between scheduled inspections. If crack indications are found in any SG tube, the maximum inspection interval for all affected and potentially affected SGs is restricted by Specification 5.5.8 5.5.6 until subsequent inspections support extending the inspection inverval.

SR 3.4.18.2

During an SG inspection, any inspected tube that satisfies the Steam Generator Program plugging [or repair] criteria is [repaired or] removed from service by plugging. The tube plugging [or repair] criteria delineated in Specification 5.5.8 5.5.6 are intended to ensure that tubes accepted for continued service satisfy the SG performance criteria with allowance for error in the flaw size measurement and for future flaw growth. In addition, the tube plugging [or repair] criteria, in conjunction with other elements of the Steam Generator Program, ensure that the SG performance criteria will continue to be met until the next inspection of the subject tube(s). Reference 1 provides guidance for performing operational assessments to verify that the tubes remaining in service will continue to meet the SG performance criteria.

[Steam generator tube repairs are only performed using approved repair methods as described in the Steam Generator Program.]

The Frequency of prior to entering MODE 4 following a SG inspection ensures that the Surveillance has been completed and all tubes meeting the plugging [or repair] criteria are plugged [or repaired] prior to subjecting the SG tubes to significant primary to secondary pressure differential.

BASES

REFERENCES

1. NEI 97-06, "Steam Generator Program Guidelines."

2. 10 CFR 50 Appendix A, GDC 19.

3. 10 CFR 50.67.

4 3. 10 CFR 100.

5 4. ASME Boiler and Pressure Vessel Code, Section III, Subsection NB.

6 5. Draft Regulatory Guide 1.121, "Basis for Plugging Degraded Steam Generator Tubes," August 1976.

7 6. EPRI, "Pressurized Water Reactor Steam Generator Examination Guidelines."

1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.17, BASES, STEAM GENERATOR (SG) TUBE INTEGRITY

1. Changes are made (additions, deletions, and/or changes) to the ISTS Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, licensing basis, or licensing basis description.

2. The ISTS contains bracketed information and/or values that are generic to all Combustion Engineering vintage plants. The brackets are removed, and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

3. ISTS 3.4.17, “Special Test Exception (STE)-RCS Loops,” has not been adopted. Therefore, ISTS 3.4.18, “Steam Generator (SG) Tube Integrity,” is renumbered as ITS 3.4.17, “Steam Generator (SG) Tube Integrity.”

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.4.17, STEAM GENERATOR (SG) TUBE INTEGRITY

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 18

Relocated/Deleted Current Technical Specifications

Unit 1 CTS 3/4.4.9.2, Pressurizer

Unit 2 CTS 3/4.4.9.2, Pressurizer Heatup/Cooldown Limits

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

PRESSURIZER

LIMITING CONDITION FOR OPERATION R01

3.4.9.2 The pressurizer temperature shall be limited to:

a. A maximum heatup of 100°F in any one hour period,

b. A maximum cooldown of 200°F in any one hour period, and

c. A maximum Reactor Coolant System spray water temperature differential of 350°F.

APPLICABILITY: At all times.

ACTION:

With the pressurizer temperature limits in excess of any of the above limits, restore the temperature to within the limits within 30 minutes; perform an analysis to determine the effects of the out-of-limit condition on the fracture toughness properties of the pressurizer; determine that the pressurizer remains acceptable for continued operation or be in at least HOT STANDBY within the next 6 hours and reduce the pressurizer pressure to less than 500 psia within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.9.2 The pressurizer temperatures shall be determined to be within the limits in accordance with the Surveillance Frequency Control Program during system heatup or cooldown. The spray water temperature differential shall be determined to be within the limit in accordance with the Surveillance Frequency Control Program during steady state operation.

REACTOR COOLANT SYSTEM

PRESSURIZER HEATUP/COOLDOWN LIMITS

LIMITING CONDITION FOR OPERATION

R01

3.4.9.2 The pressurizer temperature shall be limited to:

a. A maximum heatup of 100°F in any 1-hour period, and

b. A maximum cooldown of 200°F in any 1-hour period.

APPLICABILITY: At all times.

ACTION:

With the pressurizer temperature limits in excess of any of the above limits, restore the temperature to within the limits within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the structural integrity of the pressurizer; determine that the pressurizer remains acceptable for continued operation or be in at least HOT STANDBY within the next 6 hours and reduce the pressurizer pressure to less than 500 psig within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.9.2 The pressurizer temperatures shall be determined to be within the limits in accordance with the Surveillance Frequency Control Program during system heatup or cooldown.

DISCUSSION OF CHANGES
Unit 1 CTS 3/4.4.9.2, PRESSURIZER
UNIT 2 CTS 3/4.4.9.2, PRESSURIZER HEATUP/COOLDOWN LIMITS

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

R01 The limitation on the pressurizer pressure and temperature (P/T) ensures that the pressurizer is operated within the design criteria assumed for the fatigue analysis performed in accordance with the ASME Code requirements. As such, the Technical Specification places limits on variables consistent with structural analysis results. These limits do not represent an initial condition assumption of a DBA or transient. Although the limits represent operating restrictions, and Criterion 2 includes operating restrictions, the Criterion 2 discussion of the Final Policy Statement specified that only those operating restrictions required to preclude unanalyzed accidents and transients be included in Technical Specifications.

The ITS does not include these Specifications. This changes the CTS by relocating these Specification to the Technical Requirements Manual (TRM). This change is acceptable because the Pressurizer Temperature Specification does not meet the 10 CFR 50.36(c)(2)(ii) criteria for inclusion into the ITS.

10 CFR 50.36(c)(2)(ii) Criteria Evaluation:

1. Pressurizer P/T limits are not used for, nor capable of, detecting a significant abnormal degradation of the reactor coolant pressure boundary.

2. Pressurizer P/T limits do not represent a process variable, design feature, or operating restriction that is an initial condition of a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

3. Pressurizer P/T limits are not part of a primary success path in the mitigation of a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. Pressurizer P/T limits are not addressed in the PSL PSA and do not represent a structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Since 10 CFR 50.36(c)(2)(ii) criteria have not been satisfied, the Unit 1 Pressurizer Specification, which specifies pressurizer heatup and cooldown limits, and Unit 2 Pressurizer Heatup and Cooldown Limits Specification may be relocated to a licensee controlled document outside the Technical Specifications. Pressure and temperature limits associated with the limiting RCS pressure boundary components are retained in separate Technical Specifications. ASME code requirements associated with the limits on pressurizer heatup and cooldown will continue to be controlled pursuant 10 CFR 50.55a. Changes to the TRM will be controlled by the provisions of 10 CFR 50.59. This change is designated as relocation because the Specification does not meet the criteria in 10 CFR 50.36(c)(2)(ii) and has been relocated to the TRM.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
Unit 1 CTS 3/4.4.9.2, PRESSURIZER
UNIT 2 CTS 3/4.4.9.2, PRESSURIZER HEATUP/COOLDOWN LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

Unit 1 CTS 3/4.4.15, Reactor Coolant System Vents

Unit 2 CTS 3/4.4.10, Reactor Coolant System Vents

Current Technical Specifications (CTS) Markup and Discussion of Changes (DOCs)

REACTOR COOLANT SYSTEM

3/4.4.15 REACTOR COOLANT SYSTEM VENTS

LIMITING CONDITION FOR OPERATION

3.4.15 At least one Reactor Coolant System vent path consisting of two vent valves and one block valve powered from emergency buses shall be OPERABLE and closed at each of the following locations:

a. Pressurizer steam space, and

b. Reactor vessel head.

R01

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one of the above Reactor Coolant System vent paths inoperable, STARTUP and/or POWER OPERATION may continue provided the inoperable vent path is maintained closed with power removed from the valve actuator of all the vent valves and block valves in the inoperable vent path; restore the inoperable vent path to OPERABLE status within 30 days, or be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With both Reactor Coolant System vent paths inoperable, maintain the inoperable vent paths closed with power removed from the valve actuators of all the vent valves and block valves in the inoperable vent paths, and restore at least one of the vent paths to OPERABLE status within 72 hours or be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.15 Each Reactor Coolant System vent path shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by:

1. Verifying all manual isolation valves in each vent path are locked in the open position.

2. Cycling each vent valve through at least one complete cycle of full travel from the control room.

3. Verifying flow through the Reactor Coolant System vent paths during venting.

REACTOR COOLANT SYSTEM

3/4.4.10 REACTOR COOLANT SYSTEM VENTS

LIMITING CONDITION FOR OPERATION

3.4.10 At least one Reactor Coolant System vent path consisting of two vent valves and one block valve powered from emergency buses shall be OPERABLE and closed at each of the following locations:

R01

a. Pressurizer steam space, and

b. Reactor vessel head.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

a. With one of the above Reactor Coolant System vent paths inoperable, STARTUP and/or POWER OPERATION may continue provided the inoperable vent path is maintained closed with power removed from the valve actuator of all the vent valves and block valves in the inoperable vent path; restore the inoperable vent path to OPERABLE status within 30 days, or, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With both Reactor Coolant System vent paths inoperable, maintain the inoperable vent paths closed with power removed from the valve actuators of all the vent valves and block valves in the inoperable vent paths, and restore at least one of the vent paths to OPERABLE status within 72 hours or be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.10.1 Each Reactor Coolant System vent path shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by:

1. Verifying all manual isolation valves in each vent path are locked in the open position.

2. Cycling each vent valve through at least one complete cycle of full travel from the control room.

3. Verifying flow through the Reactor Coolant System vent paths during venting.

DISCUSSION OF CHANGES
Unit 1 CTS 3/4.4.15 – Unit 2 CTS 3/4.4.10, REACTOR COOLANT SYSTEM VENTS

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

R01 Reactor Coolant System (RCS) vents are provided to exhaust noncondensible gases and/or steam from the primary system that could inhibit natural circulation core cooling. The function, capabilities, and testing requirements of the RCS vent system are consistent with the requirements of Item II.b.1 of NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980.

The purpose of the pressurizer safety valves is to provide primary relief capability to exhaust noncondensible gases and steam from the RCS during a DBA or transient at power and the pressurizer power operated relief valves (PORVs) provide vent capability during RCS low temperature and pressure conditions.

The ITS does not include these Specifications. This changes the CTS by relocating these Specifications to the Technical Requirements Manual (TRM). This change is acceptable because the Reactor Coolant System Vent Specification does not meet the 10 CFR 50.36(c)(2)(ii) criteria for inclusion into the ITS.

10 CFR 50.36(c)(2)(ii) Criteria Evaluation:

1. The RCS vents do not function as installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

2. The RCS vents are not process variables, design features, or operating restrictions that represents an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

3. The RCS vents are not a structures, systems or components that are part of the primary success path and which function or actuate to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. The RCS vents are not specifically addressed in the PSL PSA and do not represent components which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Since 10 CFR 50.36(c)(2)(ii) criteri have not been satisfied, the Reactor Coolant System Vents Specification may be relocated to a licensee controlled document outside Technical Specifications. Pressure relief requirements are retained in separate Technical Specifications and ensure relief capability is provided to exhaust noncondensible gases and steam from the primary system. In addition, this NUREG-0737 requirement is required pursuant to 10 CFR 50.34(f)(2)(vi). Compliance with applicable portions of 10 CFR 50.34(f)(2) is required by the operating licenses of PSL Units 1 and 2. Changes to the TRM will be controlled by the provisions of 10 CFR 50.59. This change is designated as relocation because the Specification does not meet the criteria in 10 CFR 50.36(c)(2)(ii) and has been relocated to the TRM.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
Unit 1 CTS 3/4.4.15 – Unit 2 CTS 3/4.4.10, REACTOR COOLANT SYSTEM VENTS

There are no specific No Significant Hazards Considerations for this Specification.

Unit 2 CTS 3/4.10.3, Reactor Coolant Loops - Special Test Exceptions

Current Technical Specifications (CTS) Markup
and Discussion of Changes (DOCs)

M01

SPECIAL TEST EXCEPTIONS

3/4.10.3 REACTOR COOLANT LOOPS

LIMITING CONDITION FOR OPERATION

3.10.3 The limitations of Specification 3.4.1 and noted requirements of Tables 2.2-1 and 3.3-1 may be suspended during the performance of startup and PHYSICS TESTS, provided:

a. The THERMAL POWER does not exceed 5% of RATED THERMAL POWER, and

b. The reactor trip setpoints of the OPERABLE power level channels are set at less than or equal to 20% of RATED THERMAL POWER.

APPLICABILITY: During startup and PHYSICS TESTS.

ACTION:

With the THERMAL POWER greater then 5% of RATED THERMAL POWER, immediately trip the reactor.

SURVEILLANCE REQUIREMENTS

4.10.3.1 The THERMAL POWER shall be determined to be less than or equal to 5% of RATED THERMAL POWER in accordance with the Surveillance Frequency Control Program during startup and PHYSICS TESTS.

4.10.3.2 Each wide range logarithmic and power level neutron flux monitoring channel shall be subjected to a CHANNEL FUNCTIONAL TEST within 12 hours prior to initiating startup and PHYSICS TESTS.

DISCUSSION OF CHANGES
CTS 3/4.10.3, REACTOR COOLANT LOOPS – UNIT 2 ONLY

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 Current Technical Specifications (CTS) 3/4.10.3 provides an exception to the limitations of CTS 3.4.1 and the noted requirements of CTS Tables 2.2-1 and 3.3-1. This special test exception permits reactor criticality under reduced flow conditions and is required to perform certain startup and PHYSICS TESTS while at low THERMAL POWER levels. The Improved Technical Specifications (ITS) do not contain this special test exception. This changes the CTS by eliminating a special test exception.

This change is acceptable because this type of PHYSICS TEST is no longer performed. Reactor Coolant System (RCS) flow will be maintained in accordance with the requirements of LCO 3.4.4, “RCS Loops - MODES 1 and 2,” during PHYSICS TESTS in MODES 1 and 2. As a result, this CTS Special test exception is not needed. This change is designated as more restrictive because an exception to the CTS is being deleted.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.10.3, REACTOR COOLANT LOOPS – UNIT 2 ONLY

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 19

ISTS Not Adopted

ISTS 3.4.17, Special Test Exception – RCS Loops

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

1

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Special Test Exception (STE)-RCS Loops

LCO 3.4.17 The requirements of LCO 3.4.4, "RCS Loops - MODES 1 and 2," and the listed requirements of LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating," for the [(Analog) RC flow low, thermal margin or low pressure, and asymmetric steam generator transient protective trip functions] [(Digital) high log power, high local power density, low departure from nucleate boiling ratio protective trip functions] may be suspended provided:

a. THERMAL POWER ≤ 5% RTP and

b. The reactor trip setpoints of the OPERABLE power level channels are set ≤ 20% RTP.

APPLICABILITY: MODE 2, during startup and PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER not within limit.	A.1 Open reactor trip breakers.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.17.1 Verify THERMAL POWER ≤ 5% RTP.	[1 hour <u>OR</u> In accordance with the Surveillance Frequency Control Program]

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.17.2	Perform a CHANNEL FUNCTIONAL TEST on each logarithmic power level and linear power level neutron flux monitoring channel.	12 hours prior to initiating startup or PHYSICS TESTS

1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.17, SPECIAL TEST EXCEPTION (STE) - RCS LOOPS

1. This Reactor Coolant System Loops - Test Exceptions Specification is not included in the PSL Unit 1 and Unit 2 ITS because the exception is not needed to perform any required startup or PHYSICS TESTS.

Improved Standard Technical Specifications (ISTS) Bases Markup and Justification for Deviations (JFDs)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.17 Special Test Exception (STE) RCS Loops

1

BASES

BACKGROUND

This special test exception to LCO 3.4.4, "RCS Loops - MODES 1 and 2," and LCO 3.3.1, "RPS Instrumentation," permits reactor criticality under no flow conditions during PHYSICS TESTS (natural circulation demonstration, station blackout, and loss of offsite power) while at low THERMAL POWER levels. Section XI of 10 CFR Part 50, Appendix B (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. All functions necessary to ensure that the specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. This testing is an integral part of the design, construction, and operation of the power plant as specified in 10 CFR 50, Appendix A, GDC 1 (Ref. 2).

The key objectives of a test program are to provide assurance that the facility has been adequately designed to validate the analytical models used in the design and analysis, to verify the assumptions used to predict plant response, to provide assurance that installation of equipment at the facility has been accomplished in accordance with the design, and to verify that the operating and emergency procedures are adequate. Testing is performed prior to initial criticality, during startup, and following low power operations.

The tests will include verifying the ability to establish and maintain natural circulation following a plant trip between 10% and 20% RTP, performing natural circulation cooldown on emergency power, and during the cooldown, showing that adequate boron mixing occurs and that pressure can be controlled using auxiliary spray and pressurizer heaters powered from the emergency power sources.

APPLICABLE SAFETY ANALYSES

As described in LCO 3.0.7, compliance with Special Test Exception LCOs is optional, and therefore no criteria of 10 CFR 50.36(c)(2)(ii) apply. Special Test Exception LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

BASES

LCO

This LCO is provided to allow for the performance of PHYSICS TESTS in MODE 2 (after a refueling), where the core cooling requirements are significantly different than after the core has been operating. Without this LCO, plant operations would be held bound to the normal operating LCOs for reactor coolant loops and circulation (MODES 1 and 2), and the appropriate tests could not be performed. 1

In MODE 2, where core power level is considerably lower and the associated PHYSICS TESTS must be performed, operation is allowed under no flow conditions provided THERMAL POWER is < 5% RTP and the reactor trip setpoints of the OPERABLE power level channels are set ≤ 20% RTP. These limits ensure no Safety Limits or fuel design limits will be violated.

The exception is allowed even though there are no bounding safety analyses. These tests are allowed since they are performed under close supervision during the test program and provide valuable information on the plant's capability to cool down without offsite power available to the reactor coolant pumps.

APPLICABILITY

This LCO ensures that the plant will not be operated in MODE 1 without forced circulation. It only allows testing under these conditions while in MODE 2. This testing establishes that heat input from nuclear heat does not exceed the natural circulation heat removal capabilities. Therefore, no safety or fuel design limits will be violated as a result of the associated tests.

ACTIONS

A.1

If THERMAL POWER increases to > 5% RTP, the reactor must be tripped immediately. This ensures the plant is not placed in an unanalyzed condition and prevents exceeding the specified acceptable fuel design limits.

SURVEILLANCE REQUIREMENTS

SR 3.4.17.1

THERMAL POWER must be verified to be within limits to ensure that the fuel design criteria are not violated during the performance of the PHYSICS TESTS. [The hourly Frequency has been shown by operating practice to be sufficient to regularly assess conditions for potential degradation and verify operation is within the LCO limits. Plant operations are conducted slowly during the performance of PHYSICS TESTS, and monitoring the power level once per hour is sufficient to ensure that the power level does not exceed the limit.

BASES

SURVEILLANCE REQUIREMENTS (continued)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

SR 3.4.17.2

Within 12 hours of initiating startup or PHYSICS TESTS, a CHANNEL FUNCTIONAL TEST must be performed on each logarithmic power level and linear power level neutron flux monitoring channel to verify OPERABILITY and adjust setpoints to proper values. This will ensure that the Reactor Protection System is properly aligned to provide the required degree of core protection during startup or the performance of the PHYSICS TESTS. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The interval is adequate to ensure that the appropriate equipment is OPERABLE prior to the tests to aid the monitoring and protection of the plant during these tests.

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.

2. 10 CFR 50, Appendix A, GDC 1, 1988.

1

JUSTIFICATION FOR DEVIATIONS
ITS 3.4.17, BASES, SPECIAL TEST EXCEPTION (STE) - RCS LOOPS

1. Changes have been made to be consistent with changes made to the ISTS.